



FUTA Journal of Research in Sciences, 2014 (1): 20-25

## INCIDENCE OF HEPATITIS B INFECTION AMONG THE INHABITANTS OF ESAN-WEST LOCAL GOVERNMENT AREA, EDO STATE, NIGERIA

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### ABSTRACT

In an experiment conducted to determine the incidence of Hepatitis B virus (HBV) infection among the inhabitants of fourteen communities in Esan-West Local Government Area of Edo State Nigeria, blood samples were collected intravenously from a total of three hundred and ninety-eight (398) asymptomatic volunteers aged 0 - 70 years between June, 2012 and May, 2013. The respondents were tested for antibody to HBV (anti-HBV) using HBV test strips (Global product, DRG International Inc., USA). Of the 398 respondents, 151 (37.9 %) were males and 247 (62.1 %) were females. Overall, 29 (7.2 %) tested positive Hepatitis B virus, of whom 9 (5.9 %) were males and 20 (8.1 %) females. Subjects in age groups 21–30 years had the highest infection rate of 62.8% while the females were more infected with the virus than the males giving 37%. Ihunmudumu had the highest number of infected persons (27.6%), while Ujemen, Emuhi, and Ukhun had the least number of persons infected with hepatitis B virus (3.5% respectively). General surveillance, mass immunization and public health education to stop the spread of the infection are hereby advocated.

**Keywords:** Incidence, Hepatitis B Virus, Antibody, Vaccines, Asymptomatic Volunteers.

### INTRODUCTION

Hepatitis is a medical condition characterized by the presence of inflammatory cells in the tissue of the liver. A group of viruses known as the hepatitis viruses such as hepatitis A, B, C, D, E and G cause most cases of hepatitis worldwide (Arauz-Ruiz *et al.*, 2002; Shibayama *et al.*, 2005 and Bruss, 2007), but it can also be due to toxins (notably alcohol, certain medications, some industrial organic solvents and plant's elaborate), other infections and autoimmune diseases (Alter, 2003). Hepatitis A virus (HAV), hepatitis B virus (HBV) and hepatitis C virus (HCV) account for most cases of viral hepatitis (Alberti and Caporaso, 2011; Roche and Samuel, 2011). Hepatitis B is one of the most common infectious diseases in the world and a major public health problem. It has been estimated that about one third of the world population has been infected at one point in their lives, including about 350 million people who are chronic carriers of Hepatitis B virus

(Custer *et al.*, 2004; Mustapha and Jibrin, 2004; Williams, 2006 and Villa *et al.*, 2011).

The virus is transmitted by exposure to infectious blood or body fluids such as semen and vaginal fluids, while the viral DNA has been detected in the saliva, tears, and urine of chronic carriers (Alter, 2003; Martins *et al.*, 2004 and Buddeberg *et al.*, 2008). The predominant routes of transmission vary according to the endemicity of the HBV infection. In areas of high endemicity, perinatal transmission is the main route of transmission, whereas in areas of low endemicity, sexual contact amongst high-risk adults that is predominant signifies route of transmission (Coopstead and Lee-Ellen, 2010). Other risk factors for developing HBV infection include working in a healthcare setting, blood transfusions, dialysis, acupuncture and tattooing (Sirisena *et al.*, 2002 and Kidd-Ljunggren *et al.*, 2006). However, Hepatitis B viruses cannot be spread by holding or shaking hands, sharing eating

utensils or drinking glasses, kissing, hugging, coughing, sneezing, or breastfeeding (Chukwuka *et al.*, 2003). The acute illness causes liver inflammation, vomiting, jaundice, anorexia (poor appetite), malaise and, rarely, death. Chronic hepatitis B may eventually cause liver cirrhosis and liver cancer - a disease with poor response to all but a few current therapies (Chang, 2007 and Coffin *et al.*, 2011). Hepatitis is acute when it lasts less than six months and chronic when it persists longer than 6 months. The infection is preventable by vaccination (Pungpapong *et al.*, 2007).

The majority of the inhabitants of Esan West Local Government Area of Edo State, Nigeria, hitherto, have no basic knowledge of this disease. Therefore, the present study was designed to determine the occurrence of Hepatitis B infection among the inhabitants of Esan West Local Government Area of Edo State, Nigeria and to investigate the factors that predispose individuals to the infection.

## MATERIALS AND METHODS

### Sample collection

A total of three hundred and ninety-eight (398) blood samples were collected from asymptomatic voluntary donors residing in fourteen (14) communities in Esan - West Local Government Area of Edo State, Nigeria between June, 2012 and May, 2013. These communities are Eguare, Ujoelen, Ihunmudumu, Iruokpen, Uhiele, Ukpenu, Uke, Illeh, Emuhi, Idumebo, Ujemen, Emaudo, Ukhun and Urohi. The samples were collected with the help of a Certified Medical Laboratory Scientist from the various hospitals and medical laboratories within the study area. Intravenous blood samples (5mls) were obtained from each of the donors tested for antibody to HBV (anti - HBV) using HBV test strips (Global product, DRG International Inc., USA). Blood sample (5ml) was collected by vein puncture from each respondent and aseptically discharged into EDTA bottles. The samples were mixed thoroughly by upward and downward inversion to prevent coagulation (Zoulim, 2006) and were then analyzed in the laboratory within 1h of collection.

### Sample Preparation

Each sample was spun in a centrifuge (Nickel – Electron variable speed analogue 020GT/1

model, England) for 5 minutes at 4000rpm to separate the serum from the red blood cells. The test strip was removed from the sealed pouch and was used immediately with the arrow head pointing toward the serum. The strip was then inverted vertically into each serum for 10 sec making sure it did not pass maximum line on the test strip when immersing the strip. Thereafter, the strip was placed on a non-absorbent flat surface.

### Determination of HBV in serum

The HBV surface antigen test strip is a rapid chromatographic immunoassay for the qualitative detection of HBV surface antigen in serum (Dienstag, 2008). The test strip contains anti HBsAg particles and HBsAg coated on the membrane. The membrane is pre-coated with anti HBsAg antibodies on the test line region of the strip. During testing, the samples were centrifuged for 5 minutes at 4000rpm. The tip of the test strip was inserted into the serum and allowed to react with the particles coated with anti HBsAg antibodies. The serum moved upward on the membranes chromatographically by capillary action to react with anti HBsAg antibodies on the membrane to generate a colour line. The presence of colour line in the test region indicated positive result, while its absence indicated a negative result.

### Data analysis

The percentage of people infected with Hepatitis B virus was calculated using the expression of Kurbanov *et al.* (2010) as follows: Percentage (%) infected =  $\frac{\text{Number of people infected} \times 100}{\text{Number of people examined}}$

## RESULTS

A total of 398 participants were examined, of which 151 (37.9%) were males and 247 (62.1%) were females. Eguare had the highest overall number of participants of 78 (19.6%), with 24 (30.7%) males and 54 (69.2%) female participants, followed by Ujoelen with 43 (10.8%) persons participated, 22 (51.2%) males and 21 (48.8%) females. Urohi had the lowest number of participants of 7 (1.8%) persons with 6 (85.7%) males and 1 (14.3%) female. In overall, 29 (7.2%) participants tested positive to Hepatitis B virus. Of the 151 males and 247 female participants, 9 (5.9%) and 20 (8.1%) respectively tested positive to

HBV. Ihunmudumu had the highest number of 8 (27.6%) infected persons, with 1 (12.5%) male and 7 (87.5%) female participants been infected with HBV. Ujemen, Emuhi and Ukhun had the least numbers of persons infected with one (3.5%) person each (Table 1).

Ages 0 to 70 years were considered in this study. Table 2 showed the distribution of Hepatitis B infection in Esan-West LGA using age range and sex. Ages 21-30 had the highest number of participants with 156 (39.2%) persons with 58 (37.1%) males and 98 (62.8%) females, followed by ages 31-40 with 121 (30.4%) participants, 46 (38.0%) males and 75 (61.9%) female participants. Age group 61-70 had the lowest number of participants, only 6 (1.5%) persons participated of which 4

(66.6%) are males and 2 (33.3%) are females. In overall, age range 21-30 had the highest number of female participants of 98 (39.6%), followed by age range 31-40 with 75 (30.4%). Age ranges 21-30 and 31-40 had the highest number of male participants of 58 (38.4%) and 46 (30.4%) male, respectively.

The highest number of people infected with HBV was seen in age 21-30 with 14 (48.3%) people infected of which 5 (35.7%) are males and 9 (64.2%) females. 31-40 years group had 10 (34.5%) participants infected with HBV of which 2 (20%) are males and group (80%) are females. Among the 51-60 years group, only 1 (3.5%) person tested positive. Findings from this study also revealed that females were more susceptible to the virus than the males (Tables 1 and 2).

**Table 1: Distribution of Hepatitis B among inhabitants of Esan-West LGA, Edo State.**

Locality	Number of people Examined	Percentage		Sex		Number positive
		Male	Female	Male	female	
Eguare	78	19.6	24	54	2(8.3)	4(7.4)
Ujoelen	43	10.8	22	21	1(4.5)	1(4.7)
Ihunmudumu	38	9.5	13	25	1(7.7)	7(28)
Iruokpen	34	8.5	15	19	2(13.3)	2(10.5)
Uhiele	30	7.5	8	22	(0)	(0)
Ukpenu	29	7.3	10	19	1(10.0)	1(5.3)
Uke	25	6.3	10	15	(0)	(0)
Illeh	23	5.8	11	12	1(9.1)	1(8.3)
Emuhi	22	5.5	11	11	(0)	1(9.0)
Idumebo	21	5.3	6	15	(0)	(0)
Ujemen	20	5.0	7	13	1(14.3)	(0)
Emaudo	16	4.0	6	10	(0)	2(20)
Ukhun	12	3.0	2	10	(0)	1(10)
Urohi	7	1.8	6	1	(0)	(0)
TOTAL	398	100.0	151	247	9	20

\*Values in parentheses represent percentage (positivity) individuals tested positive.

**Table 2: Age range and sex distribution of Hepatitis B among the inhabitants of Esan-West LGA, Edo State.**

Age (yrs)	Numbers Tested	Sex		Numbers positive		Percentage positivity
		Male	Female	Male	Female	
0 – 10	10	6	4	(0)	(0)	0
10 – 20	48	18	30	1(5.6)	1(3.3)	4.1
21 – 30	156	58	98	5(8.5)	9(9.3)	8.9
31 – 40	121	46	75	2(4.3)	8(10.8)	8.2
41 – 50	33	14	19	1(7.1)	1(5.3)	6.1
51 – 60	24	5	19	(0)	1(5.3)	4.2
61 – 70	6	4	2	(0)	(0)	0
Total	398	151	247	9	20	

Values in parentheses represent percentage (positivity) individuals tested positive.

## DISCUSSION

In this study consisting of 151(37.9%) males and 247 (62.1%) females, findings revealed that only 29 (7.2%) people were infected. While Ihunmudumu had the highest number of incidence, with 8 persons infected which represent 21.1% of the population studied. Of the 29 participants that tested positive in this study, 9 (5.9%) were males and 20 (8.1%) females. One of the possible reasons for female's susceptibility is genital mutilation. Ages 0-70 years were considered in this study. It was observed that ages 21-30 (39.2%) and 31-40 (30.4%) had the highest numbers of people examined with 156 and 121 participants respectively. Ages 21 – 30 and 31 - 40 years had the highest number of incidence with 14 and 10 people infected respectively, representing 48.3% and 34.5% respectively of the total population studied. The least is age group 51 – 60 years with 1 person infected, representing 3.5% of the studied population. Certain high risk behaviors and practices which are prevalent in African societies may play some role in the transmission of HBV in the community. These include multiple sex partners, child circumcision, tattoo, sharing of sharp objects like razor, blades, etc. and scarification marks (Libbus and Phillips, 2009) which is usually done most times by local healers in very unhygienic environments

without any consideration for infection control and the instruments used are not usually sterilized (Fairley and Read, 2012). Occupation is also a responsible factor as they are majorly farmers, traders, transporters and civil servants with poor awareness about the disease (virus) and its mode of transmission (Redd *et al.*, 2007; Mastroianni *et al.*, 2011).

HBV infection is an important cause of morbidity and mortality worldwide. There is thus an urgent need of public awareness of this disease (Hepatitis B) which is a silent killer, in order to prevent the spread, treat or totally prevent it. Health workers should be encouraged and empowered to carry out enlightenment campaign on this disease. Most of the persons examined during this study who tested positive did not know they carried the virus. Therefore members of the public should go for regular blood test in the hospital to know their HBV status. Infected individuals should avoid alcohol and imbibe safe sexual practice. Influx of commercial sex workers should be abolished (Bell and Nguyen, 2009).

People who are likely to spread the virus should undergo treatment. To eliminate HBV transmission in Esan-West Local Government Area, not only will the current infant vaccination need to be sustained or even

increased, but should include the adult population and specific effort to vaccinate populations at high-risk of transmission will have to be made. There have been vaccines against HBV infection since 1982, unfortunately, larger percentage of the population is not aware of the availability of this vaccine to prevent the disease. The use of the vaccine was incorporated into the National Immunization Program in Nigeria in 2005 for new babies. The vaccine is only effective in those who have not been infected; therefore, further progress towards the elimination of transmission of Hepatitis B infection in Nigeria will require sustainable vaccination programs (Hollinger and Lau, 2006).

From this study, it was observed that women had the highest population of infection with 8.1%. The risk factors associated with Hepatitis B infection are largely obscure to the people of Esan - West, these calls for more studies into the epidemiology of HBV infection in order to develop effective strategies to curb the spread of the disease. Potential new causes of vaccine failure, such as HBV variants, will need to be assessed and the need for booster doses to preserve vaccine - induced immunity should be evaluated regularly. The introduction of laws requiring immunization against HVB prior to school entry should be considered a viable option for the Esan-West communities to control the spread of the virus.

#### ACKNOWLEDGEMENT

The authors are sincerely grateful to the Primary Health Care Board of Esan-West Local Government Area of Edo State, Nigeria for technical and moral support.

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