Sero-prevalence of Hepatitis B Virus among Ambulance Drivers and Mortuary workers in Plateau State, Nigeria.

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ABSTRACT

Aims:: To determine the prevalence of Hepatitis B Virus among Ambulance Drivers and Mortuary workers in Plateau State with possible associated risk factors for the infection

Study design: A cross section, descriptive study.

Place and Duration of Study: Various hospitals in plateau state(Jos University Teaching Hospital (JUTH) in Jos, Plateau State Hospital in Jos, Air-Force base Hospital in Jos, Our Lady of Angels Hospital in Jos, MRS Hospital in Bassa Local government and Pankshin General Hospital in Pankshin Local Government in Plateau State) between December 2015 and February 2016.

Methodology: Eighty (80) blood samples were collected from Ambulance Drivers and Mortuary workers from various hospital for the determination of Hepatitis B surface Antigen and Hepatitis B core Immunoglobulin-M Antibody. Rapid Immunochromatographic Assay (Strip test) and Indirect Enzyme Linked Immunosorbent Assay (ELISA) were used in the analyses of the samples.

Results: Out of 80 samples screened, 6 (7.5%) were positive for Hepatitis B surface Antigen and 7(8.8%) were positive for the Hepatitis B core Immunoglobulin-M antibody. Of the 80 samples analyzed, 56 were males of which 2 (3.6%) were positive for Hepatitis B surface antigen and 3(5.4%) were positive for Hepatitis B core Immunoglobulin-M Antibody respectively. In Females, 4 (16.7%) were positive for Hepatitis B surface antigen and 4 (16.7%) tested positive for Hepatitis B surface antigen. The presence of anti-Hepatitis B core Antibody (HBcAb) indicates previous or ongoing infection with Hepatitis B Virus. The 7 positive samples for Hepatitis B Immunoglobulin-M Antibody in this study indicate recent or acute infection with Hepatitis B Virus.

Conclusion: The use of Personal Protective Equipment (PPE), well screened blood, vaccination and having one sexual partner needs to be advocated through public enlightment campaigns or education for proper prevention of Hepatitis B Virus infection among Health care workers.

Keywords: [Hepatitis B, Immunoglobin, antigen, Mortuary, Ambulance}

1. INTRODUCTION

Hepatitis B is an infectious inflammatory disease of the liver which can potentially result in permanent damage of the liver. It is caused by a viral Hepatitis B which has caused epidemic in part of Asia and Africa and it is endemic in China. In the world population, about a third of it has been infected at one point of their lives with Hepatitis B Virus including 350 million that are said to be chronic carrier [1]. HBV is a double-stranded DNA virus of 3,200 nucleotides belonging to the family Hepadnaviridae (from heap, liver and DNA for the type of genome). The DNA strand of negative polarity is transcribed inside the core particles from an encapsulated RNA template [2].

About 75% of the Nigeria population must have been exposed to the virus at one time or the other in their life time. Mozambique is said to be highest ranking in terms of infection in Sub – Saharan African, followed by Nigeria [3]. The increase in demand for health services and blood transfusion increases the possibility of the transmission of HBV (and other blood borne pathogens) through contaminated blood as reported by [4].

The diagnosis of HBV infection is generally made on the basis of serology. Virtually all the individual infected with HBV, either acutely or chronically will have detectable serum HBV. The clinical spectrum of HBV infection ranges from sub-clinical to acute symptomatic Hepatitis or rarely fulminant Hepatitis during the acute phase and from inactive HBsAg carrier state, chronic Hepatitis of various degree of histologic severity to cirrhosis [5]. Approximately 15-40% of people who develop chronic Hepatitis B are expected to progress to cirrhosis, an end stage liver disease [6]. In acute infection, HBV is detected several weeks after infection and its appearance coincidence with onset of clinical symptoms [7]. Acute Hepatitis B infection does not usually require treatment because most adults have the infection spontaneously. Early antiviral treatment may only be required in less than one percent of patient, whose infection takes a very aggressive course. On the other hand, treatment of chronic infection may be necessary to reduce the risk of cirrhosis and liver cancer. Currently, there are medications licensed for treatment of HBV in the United States. These include, Lamividine, adefovir, tenofovir, telbivudine and entecavir. The treatment lasts from 6 months to a year on medication in and genotypes [8].

The virus gains entry into the host through a variety of possible portals of entry. Hepatitis B virus primarily interferes with the functions of the liver by replicating in liver cells, known as hepatocytes [9]. Hepatitis B virus itself does not cause cell death. Hepatocytes killing is mediated by cytotoxic T lymphocytes directed against virus infected cells [10]. When the virus attaches itself to a liver cell, the core particle releases its content of DNA and polymerase into the liver cell nucleus. During HBV infection, the host immune response causes both heptocellular damage and viral clearance. Although the innate immune response does not play a significant role in these processes, the adaptive immune response,

particularly virus specific cytotoxic T lymphocytes (CTLS), contribute to most of the liver injury associated with HBV infection [9].

Hepatitis B Virus can be spread among health workers. Transmission usually occurs from unsafe practices which often could have been avoided with standard precautions and appropriate aseptic techniques. Transmission is typically associated with unsafe injection practices, as exemplified by several occurrences that occur in ambulatory health care settings [1].This viral DNA has been detected in the tears, saliva and urine of chronic carriers, blood transfusion, dialysis, acupuncture and tattooing [11].

Prevalence of Hepatitis B Virus has considerable economic implication because some of its implication such as cirrhosis and cancer place a great demand on health care system. Chronic Hepatitis B Virus infection and cirrhosis of the liver are well recognized factors for hepatocellular carcinoma (HCC) and liver failure is the main causes of death, currently more than one million people die each year from the consequence of Hepatitis B Virus infection [7].

To prevent transmission of Hepatitis B virus among ambulance drivers, mortuary workers and also other health workers, they must adhere to standard precautions and follow fundamental infection control principles, including safe injection practices, safe wound cleansing and appropriate aseptic techniques [12]. These principles and practices need to be made explicit in institutional policies and reinforced through in-serviced education to all personnel involved in direct patient care including those in ambulatory care settings and post mortem services. The effectiveness of these measures should be monitored as part of the oversight process. In addition, prompt reporting of suspected health care related cases coupled with appropriate investigation and improved monitoring of surveillance data are needed to accurately characterize and prevent healthcare related transmission of viral Hepatitis [12].

Hepatitis B Virus prevalence has been carried out mostly among different population. Based on the level of studies and virulence of Hepatitis B Virus, not much awareness and research has been done on its prevalence among health workers, ambulance drivers and mortuary workers in Plateau State. This study therefore is geared towards determining the prevalence of HBV among Health care such as the Ambulance Drivers and Mortuary workers in Plateau State in relation with their age and sex.

2. METHODOLOGY

2.1 Sample Population

A total number of 80 blood samples were collected from ambulance drivers and mortuary workers between the age of 21 and 80 at various Hospitals in Plateau State for the detection of Hepatitis B Virus. The study included only voluntary mortuary workers and ambulance drivers in Plateau State.

2.2 Sample Collection

Three ml of blood was collected from each of the Ambulance Drivers and Mortuary workers from the anterior cubital vein of the fore arm using a sterile disposable needles and syringes.

The blood sample was dispensed into a plain plastic container and was centrifuged at 3000rpm for 5minutes and the serum was carefully harvested into a dry, clean and well labeled cryovial tubes. Meanwhile, consent of each of the Ambulance drivers and Mortuary workers was duly obtained and questionnaire (about their number of sex partner, use of protective protective equipment and exposure to blood) was given to them all in which was filled before the collection of their blood sample.

2. 3 Sample Analysis

Hepatitis B surface antigen was tested in the serum sample collected using Hepatitis B virus rapid strip (Rapid Immunochromatographic Assay) and Hepatitis B core Antibody (HBcAb) IgM was tested for using Enzyme Linked Immunosurbent Assay method (ELISA).

2.4 Test procedure and principle: Test was carried out using Global® rapid test strip kit for HBsAg [13] and AccuDiag™ ELISA kit for HBcAb [14]

2.5 Data Analysis

Data was collected and analyzed using Statistical Package for Social Science (SPSS) version 21.0. All data obtained were subjected to descriptive statistics, analysis of variance (ANOVA) and Duncan Multiple Range Test and the level of significance was set at $p \leq 0.05$.

3. RESULTS AND DISCUSSION

3.1 Prevalence of Hepatitis B Virus Antigen among Ambulance Drivers and Mortuary Workers in Relation to Sex and numbers of sex partner.

A total number of 7 patients (8.8%) tested positive for Hepatitis B Virus using HBcAb IgM ELISA out of which 6 (7.5%) patients were positive for the HBsAg .Table 1 shows the prevalence of Hepatitis B Virus surface antigen and its core IgM antibody among Ambulance Drivers and Mortuary workers in relation to sex. A total number of 56 male samples were tested with 3 (5.4%) tested positive for Hepatitis B virus using HBcAb ELISA kit and HBsAg Global® rapid test strip. Among females, a total number of 24 female samples were collected with 4 (16.7%) positive to Hepatitis B Virus using HBcAb IgM ELISA kit and HBsAg Global® rapid test strip. (P>0.05), which shows the relationship is not statistically significant.

The prevalence of Hepatitis B Virus surface antigen and its core IgM antibody among Ambulance Drivers and Mortuary workers in Plateau state in relation to the numbers of sex partners. A total number of 80 respondents were grouped into one and more than one based on their numbers of sex partners. Respondents with one sex partners were 60 in which 2 (3.3%) were positive. Respondents with more than one sex partners were 20 with only 5 (25.0%) testing positive. The relationship is statistically significant as (P<0.05).

Table 1: Prevalence of Hepatitis B Virus surface antigen and its core IgM antibody among Ambulance Drivers and Mortuary workers in Plateau State In relation to Sex and number of sex partner

In relation to Sex				**In relation to number of sex partner**			
Sex	Number Tested	Number positive	Percentage positive	**Number of Sex Partners**	Number Tested	Number Positive	Percentage Positive
Male	56	3	5.4	**1**	60	2	3.3
Female	24	4	16.7	**2 or more**	20	5	25
Total	**80**	**7**	**8.8**	**Total**	**80**	**7**	**8.8**

P VALUE = 0.101, X^2 = 2.69 P VALUE = 0.003, X^2 = 8.819

3.2 Prevalence of Hepatitis B Virus Antigen among Ambulance Drivers and Mortuary Workers in Relation to Age

Table 2 shows the prevalence of Hepatitis B Virus surface antigen and its core IgM antibody among Ambulance Drivers and Mortuary workers in relation to Age. A total of 80 respondents were grouped into age group of 21-30, 31-40, 41-50, 51-60, 61-70 and 71-80 years. Nine (9) respondent fell into age range 21-30 in which 1 (11.1%) was positive. In age the range of 31-43, 1(6.3%) was positive out of the total of 16. In the age range of 41-50, 3 (7.3%) were positive out of the total of 40. A total number of 13 respondents fall in the age range of 51-60 with only 1(7.7%) positive sample detected. The age the range of 61-70years includes only 1 respondent which was not positive to Hepatitis B Virus. One respondents fall in the age range of 51-60 which was positive to Hepatitis B Virus. (P>0.05) which shows relationship is statistically insignificant.

Table 2: Prevalence of Hepatitis B Virus surface antigen and its core IgM antibody among Ambulance drivers and Mortuary workers in Plateau State in relation to Age.

Age group	Number Tested	Number Positive	Percentage Positive
21-30	9	1	11.1
31-40	16	1	6.3
41-50	40	3	7.3
51-60	13	1	7.7
61-70	1	0	0
71-80	1	1	100
Total	**80**	**7**	**8.8**

P- VALUE = 0.880 $X^2 = 0.255$

3.3 Prevalence of Hepatitis B Virus Antigen among Ambulance Drivers and Mortuary Workers in Plateau State in Relation to the State of Origin

Table 3 shows the prevalence of Hepatitis B Virus surface antigen and its core IgM antibody among Ambulance Drivers and Mortuary workers in Plateau State to State of origin. A total number of the 80 respondent fell into Plateau State, Nassarawa State, Bauchi State and Port Harcourt State. A total number of 72 respondents are from Plateau state by birth in which 7 (9.7%) were positive, 3 respondents are from Nassarawa, 4 respondents from Bauchi and 1 respondent from Port Harcourt by birth in which one of them tested positive for both HBsAg and HBcAb IgM. ($P>0.05$), which shows relationship is not statistically significant.

Table 3: Prevalence of Hepatitis B Virus surface antigen and its core IgM antibody among Ambulance Drivers and Mortuary workers in Plateau State in relation to State of Origin.

State of Origin	Number Tested	Number Positive	Percentage Positive
Plateau	72	7	9.7
Bauchi	4	0	0

Nasarawa	3	0	0
Port Harcourt	1	0	0
Total	80	7	8.8

P-VALUE = 0.837 $X^2 = 0.852$

3.4 PREVALENCE OF HEPATITIS B VIRUS ANTIGEN AMONG ABULANCE DRIVERS AND MORTUARY WORKERS IN RELATION TO THE USE OF PERSONAL PROTECTIVE EQUIPMENT , HISTORY OF BLOOD TRANSFUSION AND SPECIALIZED AREA OF WORK

Table 4 shows the Prevalence of Hepatitis B Virus surface antigen and its core IgM antibody among Ambulance Drivers and Mortuary workers in Plateau State in relation to the use of Personal Protective Equipment, history of blood transfusion and specialized area of work.

The Prevalence of Hepatitis B Virus surface antigen and its core IgM antibody among Ambulance Drivers and Mortuary workers in Plateau State in relation to the use of Personal Protective Equipment. Among the total of 80, 75 do not adhere to use of personal protective in which 7 (9.3%) among them were positive, the remaining five (5) of the respondents for the study adhere to the use of personal protective equipment in which none was positive. ($P<0.05$) which shows statistically significant relationship.

The prevalence of Hepatitis B Virus surface antigen and its core IgM antibody among Ambulance Drivers and Mortuary workers in Plateau State in relation to History of Blood transfusion. Among the total of 80 respondents, a total of 6 respondents for the study had transfusion prior to the study in which 3(50%) were positive. A total number of 74 never had any form of blood transfusion before the study among which 4 (5.4%) were positive. ($P<0.5$) which shows relationship is statistically significant.

The prevalence of Hepatitis B Virus surface antigen and its core IgM antibody among ambulance drivers and mortuary workers in relation to specialized area of work is shown. Among the total number of 80 respondents, 17 were ambulance drivers in which 2 (11.8%) were positive, 63 were mortuary workers in which 5 (7.9%) were positive. ($P>0.05$) which shows relationship is statistically insignificant.

Table 4: Prevalence of Hepatitis B Virus surface antigen and its core IgM antibody among Ambulance Drivers and Mortuary workers in Plateau State in relation to the use of Personal Protective Equipment, history of blood transfusion and specialized area of work

	Use of PPE			**History of Blood transfusion**			**Specific area of Assignment**			
	Number tested	Number Positive	Percentage positive	Number tested	Number Positive	Percentage positive		Number tested	Number Positive	Percentage positive
Yes	5	0	0	6	3	50	**Ambulance Drivers**	17	2	11.8
No	75	7	9.3	74	4	5.4	**Mortuary workers**	63	5	7.9
Total	**80**	**7**	**8.8**	**80**	**7**	**8.8**	**Total**	**80**	**7**	**8.8**

P VALUE= 0.405, $X^2 = 0.511$ P VALUE= 0.010, $X^2 = 13.823$ P VALUE = 0.62, $X^2 = 0.246$

4. DISCUSSION

In 2010, the World Health Assembly adopted resolution to recognize viral Hepatitis as a global health problem [19]. Ever since, various measures have been taken to reduce the level of Hepatitis B virus in Nigeria [20]. Although there is no documentation on the prevalence of Hepatitis B Virus antibody on Ambulance Drivers and Mortuary workers in Plateau State, nonetheless, Hepatitis B virus has been circulating in Nigeria and so therefore Ambulance drivers and mortuary workers face a great risk of exposure.

Samples positive to HBsAg and HBcAb IgM indicate previous and ongoing infection with Hepatitis B Virus in an undefined time frame. This may be likely because the respondent has a resolved Hepatitis B Virus infection or low level chronic infection or false positive anti-HBc and it's susceptible to the infection.

From previous research on Hepatitis B in Nigeria, statistic shows that about 14% of Nigerians are affected and this places Nigeria as one of the most affected country in Africa [19]. As a result of various risk factors attached to their job, there is more tendency of acquiring this Hepatitis B Virus. Although they are health workers have little or no knowledge about how Hepatitis B Virus may be acquired and so may careless in taking adequate measures in adhering to the ethical code of the Ambulance Drivers and the Mortuary workers. Several measures have been taken and has been included in the ethical code of the mortuary workers and ambulance drivers which if adhered to can reduced the prevalence of viral infections including Hepatitis B Viral infection thereby reducing the spread of the disease to the patients and other people around [21].

Based on this research among ambulance drivers and mortuary workers, 5.4% are positive in male while 83.3% are positive in female which shows a higher positivity in female. But there are more of males in this job than female which suggest that some of the female might have got the infection not as a result of the risk factor attached to the job. Based on previous research on sexual activities among ladies in Plateau State, and the level of sexually transmitted disease in plateau state, high prevalence among the female may be as a result of this [22]. Those who got infected as a result of risk factor associated to their job may get infected as a result of poor handling of infected patient or poor disinfection of working bench. The inconsistency in research among sex as regards to Hepatitis B Virus also shows that the infection affects both the male and females in same way.

Youths between age group 21 and 30 are more involved in several risk factors of Hepatitis B Virus Infection like having casual sex, having more than one sexual partner and are more involved in more involved in Social Vices [19]. Statistic on prevalence of Hepatitis B Virus in Nigeria shows a higher prevalence in the young youths between the ages of 21-30 which is related to this research on Hepatitis B virus among Ambulance Drivers and Mortuary workers.

In this study, it's been shown that among the state of origin represented by the respondents, Plateau has the highest prevalence of Hepatitis B Virus Infection. Plateau represents the highest prevalence of 9.7% and is been supported in the previous research which shows Plateau is one of the states with high prevalence of Hepatitis B among the middle-belt states in Nigeria [21]. Hepatitis B virus is sexually transmitted disease [23]. This risk factor is increased with having more sex partners [24]. This is shown in this study conducted Ambulance Drivers and Mortuary workers in Plateau State with respondents with more than one partner has higher percentage of 15%.

Part of the ethical code guiding mortuary workers and ambulance drivers is the use of personal protective equipment. [25]. It's amazing that some of the workers in the mortuary and the ambulance drivers fail to adhere to their work ethic code. These include the use of gloves, lab coats e.t.c [26]. In this study, workers who make use of personal protective equipment were negative. The use of these Protective reduces the chances of contacting infections by serving as the first barrier against them but still for its effectiveness, it has to be used properly. [25]. Disposable gloves should be disposed after use and not kept to be used later again or next day. So also, lab coats should be kept clean. Enough of this Personal Protective Equipment should be supplied well enough on regular basis.

One of the common ways of acquiring Hepatitis B virus in Nigeria is through blood contact [27]. 50% of blood transfused workers were positive. It shows possibility of acquiring the infection through blood transfusion. This may be from the equipment used or improperly screened blood [28].

The study also shows a higher prevalence of Hepatitis B virus of 11.8% among ambulance drivers and 7.9% among mortuary workers. Ambulance drivers are more easily exposed as they are the one that come first in attending to patients and the mortuary workers comes last [26]. Some patients' primary cause of being admitted is not because they are HBV positive. It may be because they are involved in accidents. Most ambulance drivers in Nigeria helps in getting the injured patients and even corpses into the car in which some of them may be positive to Hepatitis B Virus. In this way, they are predisposed to this virus.

5. CONCLUSION

At the end of the study, it was shown that Hepatitis B virus is common among Ambulance Drivers and Mortuary workers and they are carriers of this virus in the health sector. The Ambulance Drivers and Mortuary workers not only contact Hepatitis B Virus through the exposure to their work by contact with infected body fluid but also through other risk factors outside their work.

The best protection against HBV infection however, is the Hepatitis B vaccine. The vaccine offers the protection for about 10 years or more, however, it's of no use in those already infected with HBV [11]. Vaccination of all workers should be encouraged and ensured in all hospitals.

Use of Personal Protective Equipment (PPE), well screened blood and having one sexual partner needs to be advocated through public enlightment campaigns for proper prevention of Hepatitis B Virus infection among Health care workers in Plateau State.. There should be Hepatitis B Virus awareness programme to help educate the Ambulance Driver and Mortuary workers about the risk of the infection if not treated.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

AUTHORS' CONTRIBUTIONS

This work was carried out in collaboration between both authors. Author OEF designed the study, performed the statistical analysis, wrote the protocol, and wrote the first draft of the manuscript and managed the analyses of the study. Author EOF managed the literature searches. Both authors read and approved the final manuscript.

ETHICAL APPROVAL

All authors hereby declare that all experiments have been examined and approved by the University Ethics committee (Ref JUTHDCSIADM/127DXX/6353) and have therefore been performed in accordance with the ethical standards laid down in the 1964 declaration of helsinki."

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