

## ‘Risk of Hepatitis B viral infection and the prevalence of people vaccinated against it among health care workers in LASUTH’.

Abah A.A<sup>1</sup>, Adebisi K E<sup>1</sup>, Obileye M.F<sup>2</sup>, Emmanuel.M.M<sup>2</sup>, Okoturo E<sup>3</sup>

<sup>1</sup>Department of Oral Pathology and Oral Medicine, Lagos State University, College of Medicine

<sup>2</sup>Department of Oral Pathology and Oral Medicine, Lagos State University Teaching Hospital

<sup>3</sup>Department of Oral and Maxillofacial Surgery, Lagos State University, College of Medicine

### Abstract

**Background:** Hepatitis B poses a higher risk to health care workers than the normal population because of their exposure to blood, blood products and body fluids. Universal precaution using barriers (gloves, face masks) can help limit the spread.

**Objectives:** To determine the risk of hepatitis B viral infection amongst Health care workers in LASUTH and the prevalence of people who have been vaccinated.

**Materials and Methods:** Self-administered questionnaires were used as survey instrument. They were distributed amongst the cadres of health care workers at Lagos State University, Teaching Hospital, (LASUTH), Ikeja. Data generated from the questionnaires were analyzed using Epi-Info version 3.5.1.

**Results:** One-hundred and thirty-three health care workers at LASUTH filled the questionnaires. One hundred and three were females and thirty were males, with female to male ratio of 3.4:1. The respondents were mostly in the age group 25-34years. Majority of the participants were nurses 65(48.9%). Seventy (52.6%) of the workers have had inoculation injury while 63(47.4%) had not. Though most of them do not recap their needles 68(51.1%), but a great percentage still does, 65 (48.9%). Quite a number 117(88.0%) dispose their sharps in punctured resistant sharp-bins. Most of the participants have been vaccinated 82(61.6%). Amongst them, 18 (13.5%) had received a single dose of the hepatitis-B vaccine; 14 (10.5%) two doses; 50(37.6%) received the 3doses while 11(8.3%) didn't remember how many doses they have received.

**Conclusion:** The risk of contracting hepatitis B virus is obviously present and a great percentage has shown ignorance about the vaccine.

**Keywords:** Health care-workers, Hepatitis B virus, Hepatitis B vaccine.

### I. Introduction

Hepatitis B is a small envelope DNA virus. It was originally known as ‘serum hepatitis’<sup>1</sup>. It is transmitted through contact with the blood or body fluids (saliva, sweat, semen and vaginal fluid) of an infected person<sup>2,3</sup>. Other risk factors for HBV infection include working in a healthcare setting due to the risk of needle pricks, contact with infected blood; blood transfusions, dialysis, sexually transmitted, acupuncture, use of contaminated needles among injecting drug users, sharing of razor blades, tattoo, flared toothbrushes which can breach the oral mucosa and travel in countries where it is endemic<sup>3</sup>.

Viral hepatitis due to hepatitis B virus (HBV) is a major public health treat worldwide<sup>4</sup>. It attacks the liver and can cause both acute and chronic diseases<sup>5</sup>. It reduces the liver's ability to perform its roles. It can cause an acute illness such as yellowing of the skin and sclera (jaundice), nausea, vomiting, extreme fatigue, abdominal pain and dark urine. Specifically, Hepatitis B virus may cause an asymptomatic condition, with or without progression of the disease; acute hepatitis, fulminant hepatitis, massive hepatic necrosis, liver cirrhosis and cancer<sup>6</sup>. More than 780,000 people die every year due to complications of hepatitis B, including cirrhosis and liver cancer<sup>7</sup>. Hepatitis B can serve as a gateway to infection by the Hepatitis Delta virus.

Hepatitis B is preventable with the currently available safe and effective vaccine, usually a recombinant type (example Engerix B). The vaccine has been available since 1982<sup>4</sup> and it's effective in preventing infection and its chronic denouement. It was the first vaccine against a major human cancer. World Health Organization recommends that all infants receive the hepatitis B vaccine as soon as possible after birth, preferably within 24hours. If missed, the child can take it 6weeks after, as part of pentavalent regime. For adults, the recommended outright vaccination still remains a three-dose regimen, with the second and third doses at 1and 6 months after the first dose<sup>8,9</sup>. A post vaccination test is required to verify the effectiveness and a booster dose is needed after 5years.

Those to be vaccinated include: Everyone but especially health-care workers, people who frequently require blood or blood products, dialysis patients, recipients of solid organ transplantations, people interned in prisons and internally displaced persons in camps, injecting drug users; people with multiple sexual partners and

travellers. Travellers who have not completed their hepatitis B vaccination series should be offered the vaccine before leaving for endemic areas.

Study on Hepatitis B vaccine has been done at Lagos State University Teaching Hospital (LASUTH) amongst dentists, but this is not representative of the different cadres of the health workers for proper planning; hence, the justification for the study are: unavailable data on Hepatitis B risk and the prevalence amongst healthcare workers at Lagos State University Teaching Hospital (LASUTH). To encourage the governing body of LASUTH to solve any factor hindering the workers from completing their vaccination and to make the vaccine readily available to the staff at no cost.

Therefore the objectives of the study are: To determine the risk of hepatitis B viral infection amongst Health Care Workers at LASUTH and to evaluate the prevalence of people who have been vaccinated.

## II. Materials And Methods

This was a cross-sectional study of health care workers at LASUTH, Lagos State, Nigeria. Well-structured questionnaires were distributed to the Health Care Workers in the hospital. The questionnaires captured biographic data, occupation, infection control, vaccination status, reasons for not been vaccinated and suggestions on how to improve vaccination. Participation was voluntary. Data generated from the questionnaires were analyzed using Epi-Info version 3.5.1.

## III. Result

One hundred and thirty three health care workers participated in the study. There were 103 females (77.4%) and 30 males (22.6%) (Table 1). Participants were mostly within the age range of 25-34years (53, 39.8%) while the least were in the range of 55-64years (3, 2.3%) (Table 2). Majority of the participants were nurses 65 (48.9%) (Table 3). One hundred and sixteen (93.5%) claimed they can easily be infected (Table 4). Seventy (52.6%) of the participants have had needle prick injury while 63(47.4%) have not. Table 5. Majority of the participants wear gloves 116 (87.2%) (Table 6). Sharps were disposed majorly in sharp bins 117(88%) (Table 7). Only fifty (37.6%) had received three doses of the hepatitis-B vaccine. (Table 8).

Lack of opportunity to be vaccinated was the major reason most were not vaccinated 30(22.6%) while the least was fear of the side effects 1 (0.8%) (Table 9).

**Table 1:**

| <i>SEX</i>   | <i>Frequency</i> | <i>Percentage</i> |
|--------------|------------------|-------------------|
| FEMALE       | 103              | 77.4%             |
| MALE         | 30               | 22.6%             |
| <b>Total</b> | 133              | 100%              |

**Table 2:**

| <i>AGE GROUP</i> | <i>Frequency</i> | <i>Percentage</i> |
|------------------|------------------|-------------------|
| 15-24            | 12               | 9.0%              |
| 25-34            | 53               | 39.8%             |
| 35-44            | 32               | 24.1%             |
| 45-54            | 18               | 13.5%             |
| 55-64            | 3                | 2.3%              |
| NOT GIVEN        | 15               | 11.3%             |
| <b>Total</b>     | 133              | 100%              |

**Table 3:**

| <i>PARTICIPANTS</i>          | <i>Frequency</i> | <i>Percentage</i> |
|------------------------------|------------------|-------------------|
| Dentist                      | 17               | 12.8%             |
| Physician                    | 6                | 4.5%              |
| Surgeon                      | 6                | 4.5%              |
| Obstetrics and gynecologists | 2                | 1.5%              |
| Dental nurse                 | 6                | 4.5%              |
| Dental therapist             | 9                | 6.8%              |
| Nurse                        | 65               | 48.9%             |
| Medical laboratory scientist | 3                | 2.3%              |
| Physiotherapist              | 1                | 0.8%              |
| <b>Total</b>                 | 133              | 100%              |

**Table 4:**  
**EASILY INFECTED**

|              | <i>Frequency</i> | <i>Percentage</i> |
|--------------|------------------|-------------------|
| Yes          | 116              | 93.5%             |
| No           | 8                | 6.5%              |
| <b>Total</b> | 124              | 100%              |

**Table 5:**  
**NEEDLE PRICK INJURY**

|              | <i>Frequency</i> | <i>Percentage</i> |
|--------------|------------------|-------------------|
| Yes          | 70               | 52.6%             |
| No           | 60               | 47.4%             |
| <b>Total</b> | 130              | 100%              |

**Table 6:**  
**UNIVERSAL PRECAUTION  
USE OF GLOVES**

|              | <i>Frequency</i> | <i>Percentage</i> |
|--------------|------------------|-------------------|
| Yes          | 116              | 87.2%             |
| No           | 17               | 12.8%             |
| <b>Total</b> | 133              | 100%              |

**Table 7:**  
**SHARP DISPOSALS**

|              | <i>Frequency</i> | <i>Percentage</i> |
|--------------|------------------|-------------------|
| Sharp bins   | 117              | 88.0%             |
| Plastic bins | 9                | 6.8%              |
| Others       | 7                | 5.3%              |
| <b>Total</b> | 133              | 100%              |

**Table 8:**  
**VACCINATION STATUS**

|                | <i>Frequency</i> | <i>Percentage</i> |
|----------------|------------------|-------------------|
| Doses          |                  |                   |
| 1Dose          | 18               | 13.5%             |
| 2 Doses        | 14               | 10.5%             |
| 3 Doses        | 50               | 37.6%             |
| Can't remember | 11               | 8.3%              |
| None           | 40               | 30.1%             |
| <b>Total</b>   | 133              | 100%              |

**Table 9:**  
**REASONS WHY WORKERS  
ARE NOT VACCINATED**

|   | <i>Frequency</i> | <i>Percentage</i> |
|---|------------------|-------------------|
| No opportunity to be vaccinated         | 30               | 22.6%             |
| Lack of need to be vaccinated           | 4                | 3.0%              |
| Fear of the side effects of the vaccine | 1                | 0.8%              |
| Have been vaccinated                    | 92               | 69.2%             |
| Others                                  | 6                | 4.5%              |
| <b>Total</b>                            | 133              | 100%              |

### III. Discussion

According to World Health Organization, there were more than 400 million carriers of hepatitis B virus (HBV) in the world by the year 2000 and approximately 80-90% of children carriers and 5-10% of adult became chronic carriers of the virus<sup>10</sup>. Also reported that 1.2 million people die from HBV-related diseases every year<sup>11</sup>. The best approach to reduce the burden of hepatitis B is to nip it in the bud through infection and vaccination control measures<sup>12</sup>.

The prevalence of Hepatitis B is highest in sub-Saharan Africa and East Asia<sup>13</sup>. Most people in these regions become infected with the hepatitis B virus during childhood and between 5–10% of the adult population are chronically infected. According to Iranian studies, about 2-3% of Iranian population is HBcAb positive and about 1.3 to 8.69% of the population is chronic HBV carriers<sup>14</sup>.

It is also endemic in China and Gambia; affecting over 90% of Gambians<sup>15</sup>. To show the importance of hepatitis B vaccine, Gambian Hepatitis Intervention Study (GHIS) has provided a detailed and valuable assessment of the long term efficacy of HBV vaccination on Hepatocellular cancer<sup>15</sup>. Their infants were not routinely vaccinated until July 1986 when national Hepatitis vaccination was introduced, now it is a different ball game entirely after the vaccination. It has been established that most infections in endemic regions were acquired in childhood.

High rates of chronic infections are also found in the Amazon and the Southern parts of the Eastern and Central Europe. Less than 1% of the population in Western Europe and North America are chronically infected. In the Middle East and the Indian subcontinent, an estimated 2–5% of the general population is chronically infected.

In Lagos, Nigeria, a study by Belo in 2000 found the prevalence of active infection by HBV to be 25.7% amongst surgeons<sup>16</sup>. The importance in health care sector cannot be over-emphasized. These surgeons can easily transfer the infection to patients.

Despite the existence of a safe and effective vaccine, Nigeria has remained a hyper-endemic area for hepatitis B virus infection with an estimated 12% of the total population being chronic carriers<sup>17</sup>.

Health care workers come in contact with blood and body fluids regularly. They are at a great occupational risk and the demands on health care resources are also enormous.

From our study, the perceived occupational risk of contracting hepatitis-B infection amongst the health care workers was high, 116(93.5%) (Table 4). This was also noticed in a study by Okeke et al amongst medical students in a Nigerian institution, where they had high perceived risk 88.7%.<sup>18</sup> but slightly lower (50.4%)<sup>19</sup> in a study by Ibekwe RC et al amongst health care workers in Enugu, Nigeria.

Most of the participants in our study observe universal precaution by using gloves [116(87.2%)] to prevent contaminations. However, more than half of the participants [70(52.6%)] have had needle prick injury which predisposes them to the risk of the HBV infection. When compared to the number that completed the 3doses of the vaccine 50(37.6%), the risk is obvious. The 3doses confers about 98% immunity. If the 40 (30.1%) people that have not been vaccinated are amongst those that have sustained needle prick from infected patients, this is a great risk, a concern! A study by Odusanya et al. has shown risk amongst medical students in their preclinical and clinical year at LASUTH who were exposed to blood and body fluids. In the study, only 8students have received the 3doses of the vaccine and 10 already positive for the HBsAg and recommended vaccination for the students<sup>20</sup>.

Also a study on hepatitis vaccination amongst healthcare workers in a tertiary hospital in South-West Nigeria reported 53.8% that completed the vaccine<sup>21</sup>. This is higher than the findings in our study where a total of 50 (37.6%) out of 133 had completed the 3doses. Azodo et al also demonstrated low complete hepatitis B vaccination amongst dentists in Benin; only 20.0% completed the 3doses<sup>22</sup>. Comparing the dentists with the health-care workers at LASUTH, the trend is also low. This is a clarion call, a call for action by the health institution and the Government.

Infection control practice is encouraging but by standard in a hospital setting, it should be absolute. It is not all the participants in our study that dispose sharps in sharp bins but 88% do. This is almost similar with the findings of Rampal et al. where 92.7% dispose in sharp bins<sup>23</sup>.

Most of the participants in our study [30(22.6%)] claimed they were not vaccinated due to lack of opportunity. To what extent this claim is true leaves much to be desired, but we believe that adequate education on the need to be vaccinated against HBV will motivate health workers to seek to be vaccinated.

#### **IV. Conclusion**

The study revealed that a great percentage of the workers have not completed the three doses and a great percentage has been pricked with needles. These show the workers are at a great risk of the infection; however guideline principles should be laid to minimize needle prick injury (examples do not ensheath or recap needles after use; do not separate needles from disposable syringes prior to disposal etc.).

A policy should be put in place for all workers to be vaccinated during their pre-employment documentation process whether they have perceived need or not. For the old staff, the vaccine should be made readily available at no cost, in order to encourage them. Thorough counseling of the staff should also be done with emphasis on benefits of the vaccination. A monitoring team should also be set up to ensure the vaccines are taken as at when due.

The hospital should also promote partnership with pharmaceutical companies in providing the vaccines.

#### **Conflict of Interests**

The authors do not have any conflict of interests.

#### **Acknowledgement**

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### References

- [1]. Fawad Khan, Sulaiman Shams, Ihteshamud Din Qureshi, MuhmmadIsrar, Hayat Khan, Muhammad TahirSarwar, and Muhammad IlyasHepatitis B virus infection among different sex and age groups in Pakistani Punjab. *Virol J.* 2011; 8: 225.
- [2]. Kidd-Ljunggren K<sup>1</sup>, Holmberg A, Bläckberg J, Lindqvist B. High levels of hepatitis B virus DNA in body fluids from chronic carriers. *J Hosp Infect.* 2006; 64(4): 352-357.
- [3]. Kew MC. Possible transmission of Serum hepatitis via the conjunctiva *Infect Immuno.* 1973; 7(5): 823-824.
- [4]. Ghorbani GA, Alavian SE and Ghadimi HR. Long Term Effects of One or Two Doses of Hepatitis B Vaccine in Adults after Five Years. *Pakistan J Bio Sci.*, 2008; 11: 660-663.
- [5]. Mayer TK et al. Hepatitis B assays in serum, plasma and whole blood on filter paper *BMC Clin. Pathol.* 2012; 12: 8.
- [6]. LiangTJ. Hepatitis B: The Virus and Disease. *Hep.* 2009; 49(5):13-21.
- [7]. Lozano R, et al. Global and regional mortality from 235 causes of death for 20 age groups in 1990 and 2010: a systematic analysis for the Global Burden of Disease Study 2010. *Lancet* 2012; 380: 2095- 2128.
- [8]. Poland GA. Determination of deltoid fat pad thickness. Implications for needle length in adult immunization. *JAMA.*1997; 277: 1709–11.
- [9]. Poland GA, Jacobson RM. Clinical practice: Prevention of hepatitis B with the hepatitis B vaccine. *N Engl J Med.* 2004; 351: 2832–8.
- [10]. Betancourt, AA, Delgado CA and Estévez ZC, 2007. Phase I clinical trial in healthy adults of a nasal vaccine candidate containing recombinant hepatitis B surface and core antigens. *Int. J. Infect. Dis.*2007; 11: 394-401.
- [11]. Saravanamuttu, G., I. Samreen, M. Joanne, M. Ramsay and G. Jonathan, 2007. International public health repository for hepatitis B. *Nucleic Acid Res.*, 35: D367-D370
- [12]. Pungapore S, Kim W, Poterucha J. Natural history of Hepatitis B virus infection: an update for clinicians. *Mayo ClinProc*; 2007; 82(8) 967 (right)
- [13]. Kiire CF. The epidemiology and prophylaxis of hepatitis B in sub-Saharan Africa: a view from tropical and subtropical Africa. *GUT* 1996; 38(2): 5-12. (RIGHT)
- [14]. Adibi P, et al. An economic analysis of premarriage prevention of hepatitis B transmission in Iran. *BMC Infect. Dis.* 2004; 4: 31-35
- [15]. Whittle HC et al. The pattern of childhood hepatitis B infection in two Gambian villages. *J Infect Dis* 1990; 161(6): 1112-1115.
- [16]. Belo AC. Prevalence of Hepatitis B virus markers in Surgeons in Lagos, Nigeria. *E. Afri Med J.* 2000; 77(5): 283-285.
- [17]. Ugwuja EI. Seroprevalence of Hepatitis B surface Antigen and liver function tests among adolescents in Abakaliki, South Eastern. *Internet Journal of Tropical Medicine.* 2010;6(2):1–6.
- [18]. Okeke EN, Ladep NG, Agaba EI, Malu AO. Hepatitis B vaccination status and needle stick injuries among medical students in a Nigerian University. *Nig. J Med* 2008; 17(3): 330-332.
- [19]. Ibekwe RC, Ibeziako N. Hepatitis B vaccination statusamongt Health workers in Enugu, Nigeria. *Niger J Clin.Prac.* 2006; 9(1): 7-10.
- [20]. Odusanya OO, Meurice FP, Hoet B. Nigerian Medical students are at risk of hepatitis B infection. *Trans R.Soc Trop Med Hyg* 2007; 101(5):465-468.
- [21]. Adekanle O, Ndububa DA, Olowookere SA, Ijarotimi O, andIjadunola KT. Knowledge of Hepatitis B Virus Infection, Immunization with Hepatitis B Vaccine, Risk Perception, and Challenges to Control Hepatitis among Hospital Workers in a Nigerian Tertiary Hospital. *Hep Res Treat.*2015; 2015:1-6.
- [22]. Azodo CC, EhizeleAO,Uche I, Erhabor P. Hepatitis B Vaccination Status Among Dental Surgeons in Benin City, Nigeria. *Ann Med Health Sci. Res.* 2012; 2(1): 24-28.
- [23]. Kampal L, Zakaria R, Sook LW, MdZain. Needle Stick and Sharps Injuries and Factors zoAssociated Among Health Care Workers in a Malaysian Hosp *Eur J Soc Sci* 2010; 13: 3.