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SCREENING FOR HEPATITIS B SURFACE ANTIGEN (HBsAg) AMONG HEALTH CARE WORKERS (HCW) IN AN URBAN COMMUNITY SOUTH –SOUTH NIGERIA

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ABSTRACT

Hepatitis B virus (HBV) infection is a major public health problem worldwide, while infection is highest in the developing world particularly Asia and sub-Saharan Africa. Healthcare workers (HCW) are at extra risk of acquiring blood-borne viral infections, particularly hepatitis B (HBV), this study is therefore aimed at estimating prevalence of Hepatitis B virus infection and its associated risk factors among health care workers in Uyo Metropolis. A total of 188 Health personnel, which constitutes Nurses, Doctors, Medical Laboratory Scientists, Technicians/Assistants, Pharmacists And Ward Assistance, were screened for HBV surface antigen (HBsAg) using ELISA HBsAg kits (Clinotech diagnostic 3rd generation). A well-structured questionnaire was used to determine demographic and other relevant data. Out of the one hundred and Eighty-eight (188) respondents screened. Thirty two (32) representing 17.0% were found to be seropositive, Distribution of Hepatitis B Infection based on age showed a higher prevalence of (4.8%) among subjects aged 46-50years; X^2Values = 0.708; P>0.05. Considering gender, female subjects recorded (17.3%**)** prevalence compared to (16.7%) recorded by the Male subjects;X^2 Values= 0.538, df = 1, p>0.05.Considering the profession of the subjects screened, the highest prevalence of 6.9% was found among nurses while the least

prevalence of 0.53% was recorded among pharmacists. From the result obtained, it is obvious that the prevalence of HBV tends to be high among personnel with high proximity to blood and body fluids, it is therefore important that health personnel be properly informed about their risk to HBV infection, so as to adopt measures to avoid infection, while routine vaccination of health workers against HBV is highly recommended.

Keywords: Health Care Workers (HCW), (HBsAg), Screening

INTRODUCTION

Globally, more than two billion people alive today have been infected with HBV at some time in their lives. Of these, about 350 million have chronic (lifelong) infections and become carriers of the virus **[1, 3]**. These chronically infected persons are at high risk of death from liver cirrhosis and hepato cellular carcinoma. In endemic regions, HBV related diseases exert a heavy toll socio-economically by affecting mainly the young and economically active age group **[4]**. The demands on health care resources are also enormous. It has been established that most infections in endemic regions were acquired in childhood **[5]**. It is also known that prevalence increases with age and transmission occurs mostly through parenteral and sexual exposure and in special risk groups such as health care workers [HCWs]and the sexually active **[4]**. The risk of HBV infection in HCWs depends on the prevalence of HBV infected patients that the HCWs are exposed to, and the frequency of exposure to infected blood and body fluids **[6]**. Among HCWs, surgeons have the highest risk of HBV infection from their patients **[7]**.The major characteristic that underpins the epidemic propensities of HBV is its ability to cause chronic and persistent infection in apparently healthy individuals. Healthy carriers provide the continuous flow of infection to uninfected persons thereby maintaining a steady and increasing infection in the population.

Hepatitis B virus infection is a recognized occupational hazard as non-immune health care workers (HCW) stand a risk of getting infected from their work place **[8, 9]**. Generally HCW who perform invasive procedures for example surgeons, dentists, emergency workers and those who handle human specimens like the Laboratory Scientists and technicians have been consistently shown to have higher prevalence of hepatitis B virus infection than their counterparts **[10, 11]**. The differences in HBV infection rates may reflect disparities in the risk of exposure to infection **[12, 13]**. Immunization against HBV are now

recognized as a high priority in preventive medicine in all countries. Immunization against hepatitis B is at present recommended in a number of countries with low prevalence of HBV only for groups that are at an increased risk of acquiring this infection. These groups include health workers, people who require blood transfusion or blood products, organ transplant, patients with natural or acquired immunodeficiency. This approach is important in reducing the potential as well as occupational risk of infection with HBV among certain groups of people as mentioned above, **[14, 15]**.

MATERIALS AND METHODS

Study Area

The study was carried out within Uyo metropolis, which constitutes the following locations: St. Luke's Hospital, Anua, the Public Health Laboratory/Staff Clinic, Uyo, and the University of Uyo Medical Center, all in Uyo Metropolis, AkwaIbom State where most of the State secondary health care facilities are located.

Study Population

A total of 188 health personnel were carefully selected for the study, volunteers included Doctors, Nurses and Ward Orderlies, Laboratory Scientists, Medical Laboratory Technicians / Assistants, and Pharmacists. Non-medical personnel whose duties do not include direct dealing with patients or handling of samples from patients were excluded from the study. Consideration was also given to the duration of employment of staff in the institutions. Health personnel who have been employed for six months and above were enrolled for the study.

Questionnaires

A well-structured questionnaire was designed and administered to all volunteered health personnel at the three sites of the study, to obtain demographic and other relevant data.

Ethical Clearance /Consent

Ethical clearance was sought and granted after fulfilling all the ethical requirements for using humans as study subjects while Informed consent was obtained as a response to the consent form issued to each subject recruited for the study.

Sample Collection and Processing

3ml of venous blood was collected, duly labeled and allowed to clot and sera carefully separated into cryovials and stored at -20oC prior use. Sample assay/Analytical process was carried out using the HBsAg EIA, which is a solid–phase simultaneous sandwich immune assaying method.

Data Analysis: Filled questionnaires were crosschecked manually for correct data entry. The data was analyzed using the SPSS software package, while the critical level for

statistical significance was set at p=5% (0.05) using the chi-square analysis.

RESULT

Table 1 showed the distribution of Hepatitis B Virus infection according to age of subjects' screened. The highest numbers of positive cases were found among those aged 46-50 years with 9(4.8%) positivity, while the least was found among those aged 19-25 years. The distribution of HBV based on gender is as shown on **Table 2**. A total of 78 males representing 41.5% participated in the study with 13 positive representing 6.9%. In contrast, female Subjects screened recorded 19 (10.1%) prevalence.

The distribution of infection based on years of service by the personnelis as shown on **Table 3**, the highest number of positivity was found among those who have worked for 26-30 years, with 9 (4.8%) positivity, while those who are likely to retire in the next 1-5 years had 2 (1.1%) prevalence. The distribution of HBV based on profession is as shown on **Table 4**, the highest numbers of positive cases were recorded among Nurses with 13 (6.9%). followed by Ward Assistance with 6 (3.2%). Laboratory Scientists recorded 5 (2.7%) seropositivity, while the Laboratory Technicians/Assistants on the other hand recorded 4 (2.1%) positivity.

The prevalence of HBV distribution based on clinical history and social life styles are shown in **Table 5**. Of the 11 volunteers who received blood transfusion 5 (2.7%) tested positive. While those who had no history of transfusion recorded 24 (12.8%) positivity. Those who could not ascertain their transfusion status recorded 8 (1.6%) prevalence. The prevalence of HBV based on social lifestyle of subjects screened showed that 16 (8.5%) prevalence was recorded. Based on the number of sexual partners, subjects with single partner recorded 14 (7.4%) positivity, while multiple sexual partners had 12 (6.4%). Those without any sexual partner recorded 6 (3.2%) positivity.

Table 1: Distribution of Hepatitis B Infection According to Age Range

Age Range	Total No. of Subjects Screened	No. Positive Cases (%)		No. Negative Cases (%)	
19-25years	6	0	0	6	3.2
26-30years	24	3	1.6	21	11.2
31-35years	28	4	2.1	24	12.8
36-40years	43	8	4.3	35	18.6
41-45years	36	5	2.7	31	16.5
46-50years	36	9	4.8	27	14.4
51-55years	15	3	1.6	12	6.4
Total	188	32	17.0	156	83.0

Note: Chi-Square Values = 0.708, df = 6, p=0.05

Table 2: Distribution of Hepatitis B Infection Based on Sex

Sex	Total No. of Subjects Screened (%)		No. Positive Cases (%)		No. Negative Cases (%)	
Male	78	41.5	13	16.7	65	83.3
Female	110	58.5	19	17.3	91	82.7
Total	188		32	34.0	156	166.0

Note: Chi-Square Values= 0.538, df= 1, p>0.05

Table 3: Distribution of Hepatitis B Virus According to Duration of Employment

Years of Service	Total No. of Subjects Screened (%)		No. Positive Cases (%)		No. Negative Cases (%)	
1-5years	6	3.2	0	0	6	3.2
6-10years	26	13.8	3	1.5	23	12.2
11-15years	33	17.5	4	2.1	29	15.4
16-20years	39	20.5	8	4.3	31	16.5
21-25years	35	18.6	6	3.2	29	15.4
26-30years	34	8.1	9	4.8	25	13.3
31-35years	15	7.8	2	1.1	13	6.9
Total	188		32	17.0	156	83.0

Note: Chi-Square Values = 0.0547, df = 6, p=0.05

Table 4: Distribution of Hepatitis B Infection Based on Study Site and Profession of Subjects Screened

Professions	Total No. of Subjects Screened (%)		No. Positive Cases (%)		No. Negative Cases (%)	
Clinicians	14	7.4	3	1.6	11	5.9
Nurses	93	49.7	13	6.9	80	6.9
Scientists	18	9.6	5	2.7	13	6.9
Pharmacists	9	4.8	1	0.54	8	4.3
Technicians/ Assistants	31	16.5	4	2.1	27	14.4
Ward Orderlies/ Attendance	23	12.2	6	3.2	17	9.0
Total	188		32	17.0	156	83.0

Note: Chi-Square Values = 0.668, df = 2, p<0.05; Chi-Square Values= 0.520, df = 5, p<0.05

Table 5: Prevalence of HBV Based on Clinical History and Social Life Styles

Transfusion	Total No. of Subjects Screened (%)		No. Positive Cases (%)		No. Negative Cases (%)	
Yes	11	5.6	5	2.7	6	3.2
No	169	89.9	24	12.8	145	77.1
Don't Know	8	4.3	3	1.6	5	2.7
ALCOHOLISM						
Yes	69	36.7	16	8.5	53	28.2
No	110	58.5	13	6.9	97	51.6
No Answer	9	4.8	3	1.6	6	3.2
SEXUAL PARTNERS						
Single	119	63.3	14	11.8	105	55.9
Multiple	47	25.0	12	6.4	35	18.6
None	22	11.7	6	3.2	16	8.5
Total	188		32.0	17.0	156	83.0

NOTE: Chi-Square Values = 0.001, df =2, P<0.05; Chi-Square Values = 0.059, df = 2, P>0.05; Chi-Square Values = 0.041, df = 2, P<0.05

DISCUSSION

Occupational exposure of HBV is a well-recognized risk for health care workers (HCWs) **[16]**. In developing regions, 40%-65% of HBV infections in health-care workers occurred due to per-cutaneous occupational exposure **[4]**. Risk of HBV infection is primarily related to the degree of contact with blood in the workplace and also to the hepatitis B-e antigen (HBeAg) status of the source person. From the result obtained, this study showed a record of 17.0% prevalence which indicates a high prevalence of Hepatitis B virus among health care workers at our locations of study. According to the findings of **[6]**, the common factor for those at high risk has been high frequency of contact with patients'blood **[6]**. In a study conducted among surgeons in Lagos Nigeria by Bello, 2000 **[17]** the prevalence of HBsAg among this category of Health workers was 25.7%. However in contrast, HBsAg seropositivity of 17.8% and antiHBs positivity of79.2% were recorded among hospital workers in Senegal which agrees with the result obtained in this study. From a similar study conducted among health care workers in Uganda, a prevalence of 9.0% was recorded for current infection **[18]**. Prevalence of HBsAg recorded at our location of study could also be that the prevalence of HBV infection is increasing, this is particularly so in view of the inadequate enlightenment on the infectious nature of the virus.

Considering various categories of the HCW, the nurses screened had a prevalence of 6.9% which was the highest prevalence among the health workers screened, compared to the Medical Laboratory Scientists with a record of 2.7%. Ward attendance, recorded a prevalence of 3.2% positivity, these category of health care workers by nature of their exposure always had close contact with patients and body fluids. This probably accounted for the high positive rates among these subjects. Similar observations have been reported in other studies with laboratory technicians, dentists and nurses being disproportionately affected **[12, 19]**. The variations among the different cadres of HCW might be a reflection of the different levels of risk of exposure to a hazardous work environment the different categories of health care workers operate in.

Based on gender, male subjects recorded6.9% positivity, compared to females with 10.1%. The statistical difference among the sexes was found to be significant among both sexes ($p<0.05$).Other studies however, showed the same results while others found that males are more infected than females **[2]**, although there

is no clear explanation of such variation among these studies, the nature of the society being modest may make gender of little or no influence on the spread of HBV infection. However gender is seem not to be a relevant factor in this work.

With regards to the age of subjects screened, different studies concerning the prevalence of HBV infection among health care workers including this studies, reflects a trend of age-related seropositivity, it was found that subjects aged 46-50 years recorded a higher prevalence, this is in agreement with the findings of Daw *et al.,* 2000 **[20]** who observed that those who are aged over 40 were significantly higher than those who aged less than 40 years. This is in an agreement with other studies carried out by other investigators, **[21]** who showed that the incidence of HBV markers increased with age and duration of employment. This however, may reflect the higher risk of exposure in the corresponding age in the general population.

The prevalence among other health personnel showed that those with high proximity to blood and body fluids may be at greater risk, this is evident in the low percentage recorded among pharmacists who by nature of their work do not handle blood and body fluids as much as do scientists, doctors and nurses. Odemuyiwa, 2001, **[22]** made similar findings when HBV prevalence among Nurses, Medical Laboratory Scientists, Doctors, Dentists and Ward Orderlies were compared with other category of health workers. Differentials in knowledge about the dangers of hepatitis B virus infection and the available prevention strategies might also partly explain the observed differences in prevalence. It is worthy of note that individuals without any knowledge on the infectious nature of neither the virus nor its prevention had a higher risk of life time exposure to hepatitis B virus infection.

The high prevalence of HBV among the health personnel probably reflects acquiring HBV infection during the performance of their duty schedules. Hadler, *et al*., **[23]** noted that since HBV can survive in dried blood specimen for a long time, the possibility that health workers can be infected even in situation less likely could not be ruled out. This view is supported by the report of SHEA, 1991, **[24]**, which indicated that the prevalence of HBV, HCV and HIV among health care workers is related to their work. The finding of a high prevalence of HBV infection among health care personnel is a major concern not only regarding the continuous spread of the infection, but the fact that health workers are daily exposed to

the risk of infectious diseases in the course of their work.

Considering other possible risk factors, it was observed that those who had blood transfusion recorded a higher prevalence compared to those who had none. This highlighted the risk involved in the transfusion of unscreened blood. The practice of giving unscreened blood to patients should therefore be avoided in view of the possibility of HBV infection. The World Health Organization (WHO, 2005) **[25]** and the Center for Disease Control (CDC, 2004) **[26]** strongly recommend screening of blood meant for transfusion for infectious agents such as HBV and HIV.

Health Care personnel who incidentally had a longer duration of service recorded a higher prevalence of 4.8% This implies that individuals who had interacted with patients for a long period of years are more prone to hospital-based HBV infection than those who had worked for a shorter period, However, Abdhalah *et al*., **[27]** commented that after controlling other variables, longer duration in service remained significantly associated with a lower risk of current infection. This finding is at variance with what has been reported in other studies, Braka, *et al*., **[28]** and Pavli, *et al*., **[29]**, where prevalence of HBsAg was highest amongst the longest serving participant, which is in agreement with findings from our studies.

CONCLUSION

The prevalence of current hepatitis B virus infection and life time exposure to hepatitis B virus infection among health care workers was high. Exposure to potentially infectious body fluids was also high and yet only a small percentage of HCW are vaccinated against hepatitis B virus infection. Considering the risk of transmitting HBV to patients, there is an urgent need to focus efforts on reducing transmission through improving the work place environment and ensuring prompt vaccination of all health care workers who are highly susceptible to the infectious virus. It is also important that health personnel be properly informed about their risk of HBV infection, so as to adopt measures to avoid been infected. This will help to maintain the integrity of the health system by protecting its workforce and ensuring that health workers are not linked in any way with the transmission of the HBV in the general population.

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