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## Prevalence of Hepatitis B Virus Surface Antigen (Hbsag) in patients undergoing extraction at the University College Hospital, Ibadan.

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### Summary

Hepatitis B Virus (HBV) infection and its sequelae (liver cirrhosis and hepatic carcinoma) are endemic in Africa. The risk of transmission of the infection during dental treatment is real. This study was carried out to determine the rate of Hepatitis B Surface Antigen (HBsAg) as a marker of hepatitis B virus infection in patients undergoing dental extraction in order to highlight the potential risk of nosocomial transmission among the Dental Health Workers (DHW) and their patients. Three hundred (143 males and 157 females) consecutive patients requiring dental extraction who volunteered were enrolled into this study. Their ages ranged from 11 years to 95 years with a mean of 37.2 years (SD= 16.725) and a median of 36 years. The overall HBsAg infection rate was 18.3% (55/300). A higher infection rate (23.1%) occurred among the male patients compared with 14% in females ( $p = 0.0086$ ). The high rate of HBV infection found among this study population suggests that Dental Surgeons in this environment have a high risk of exposure to hepatitis B virus and should be immunized at the beginning of their professional life. Universal biosafety measures should be observed strictly in all invasive procedures.

**Keywords :** *Hepatitis B, dental surgeons, dental patients*

### Résumé

Le virus de l'infection de l'hépatite (HBV) et ses séqueles (cirrhose du foie et carcinome hépatique) sont endémiques en Afrique. Ce risque de transmission de l'infection durant le traitement dentaire est réel. Cette étude était faite pour déterminer le taux d'hépatite surface antigène comme un marqueur de l'infection du virus de l'hépatite B chez les patients suivant une extraction dentaire dans l'ordre d'illuminer le potentiel risque de transmission nosocomiale parmi les employés et ses patients du service dentaire et trois cent (143 mâles et 157 femelles) patients consécutifs ayant besoin d'une extraction dentaire acceptaient de participer à cette étude. Leur âge variait entre 11 à 95 ans avec une moyenne d'âge de 37.2 ans (SD : 16.715) et une médiane de 36 ans. Le taux total de HbS Ag infection était de 18.3 % (55/300). Un plus grand taux d'infection (23.1%) apparaît parmi les patients mâles comparé à 14% chez les femelles ( $P < 0.0086$ ). Le taux élevé de Hb V trouvé parmi cette population étudiée suggère les chirurgiens dentaires dans cette environnement ont un risque élevé d'exposition au virus de l'hépatite B et doivent être immunisés au début de leur carrière professionnelle. Les mesures universelles biologiques doivent être observées strictement dans tous les procédures invasives.

### Introduction

Hepatitis B Virus (HBV) infection, although worldwide is known to be endemic in the developing world. In Sub-Saharan Africa, between 8% and 40% of the population are carriers [1].

It has been implicated in the aetiology of serum hepatitis and the long-term sequelae of the infection include liver cirrhosis and primary liver cell carcinoma. [2] About 80% of primary liver cancer are attributable to hepatitis B virus infection [1,2].

The risk of exposure to blood-borne viruses in dental practice is a potential hazard to both the health care giver as well as the patient. The risk of transmission of HBV has been shown to be higher than those of Hepatitis C Virus (HCV) or Human Immunodeficiency Virus (HIV) [3]. Outbreaks of HBV infection have been documented to occur in dental practice [4,5,6,7]. Studies in several countries especially in the developing world have shown that considerable risk of HBV infection in general dental practitioners exists and is highest in dentists who carry out surgical procedures like oral surgeons and periodontologists [8]. It has also been documented that the risk of becoming a chronic HBV carrier is ten times higher in dental health care workers (DHCW) than the general population [9].

Findings in a seroprevalence survey of doctors and dentists working at the University College Hospital (UCH) Ibadan [10] showed that the latter group has a higher rate (45%) of HBV infection than the former (35%). This is not surprising since dental surgeons by the nature of their work are more exposed to blood and blood products than general doctors. Infection in the dental operatory could be transmitted through direct contact with blood and blood contaminated oral fluids or secretions. Indirect transmission through contact with contaminated instruments, equipment or surfaces, air-borne contaminants such as droplets, splashes, spatter or aerosols of oral fluids could also occur especially when universal precautions are poorly observed.

This study was therefore undertaken as a follow-up study [10] to determine the rate of HBV infection using (HBsAg) as a marker in a group of patients undergoing dental extractions at the oral surgery clinic of the University College Hospital, Ibadan in order to highlight the potential risk to the dental surgeons.

### Materials and methods

#### (a) Study Population

All the patients reporting for dental extraction at the oral surgery clinic of the University College Hospital (UCH) Ibadan from January to and July, 2001 were eligible for the study. A total of 300 consecutive individuals who gave consent voluntarily, after a detailed explanation of the purpose of the study constituted our study population. Each participant completed a screening questionnaire designed to assess risk factors to acquiring HBV infection. Approval was obtained from the Hospital Ethical Committee for the study.

#### (b) Sample Collection

About 10 mls of venous blood was collected under aseptic condition by venopuncture into an

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EDTA tube from each patient. Plasma was separated from each blood sample and stored at  $-20^{\circ}\text{C}$  until tested.

#### (c) Laboratory Methods

Each of the stored sera sample was tested for HBsAg, using commercially available ELISA Kits (Monolisa, Sanofi, Pasteur, France). All initially positive specimens were retested using the same kit. Processing of analysis of the samples were carried out according to the test kit's manufacturer's instructions in the Department of Virology, University College Hospital, Ibadan.

#### Data Analysis

Patients data were classified by age and sex using the Microsoft Excel worksheet on Windows 98 platform and analysed accordingly. Student test was used to compare proportions of positive in the various categories at 95% level of significance ( $P=0.05$ ).

#### Results

Patients enrolled into this study included 143 males and 157 females. Age range was 11 to 95 years with a mean of 37.2 years ( $SD=16.725$ ) and a median of 32 years. HBV infection rate of 18.3% (55/300) was found among the patients (Table 1).

For males, age range was from 11 to 95 years with a mean of 36.8 ( $SD=17.40$ ) years. The HBV infection rate was 23.1%. Analysis of the results showed a statistically significant difference in the infection rate in the younger age group, i.e.  $<30$  yrs, compared with the older ( $>30$  years) male patients tested:  $P=0.0095$  (Table 1).

**Table 1:** Demographic data of the 300 dental patient tested for HbsAg in Ibadan, Nigeria.

Age (yrs)	Males		Females		Total	
	No Tested	No(%) Positive	No Tested	No(%) Positive	No Tested	No(%) Positive
10-19	13	8(61.5)	11	2(18.0)	24	10(41.7)
20-29	51	13(24.5)	57	8(14.0)	108	21(19.4)
30-39	25	2 (8.0)	29	3(10.3)	54	5 (5.3)
40-49	16	4(25.0)	19	4(21.1)	35	8(22.9)
50-59	19	5(26.3)	17	2(11.8)	36	7(19.4)
60-69	10	1(10.0)	17	1 (5.9)	27	2 (7.4)
$>70$	9	0 (0.0)	7	2(31.4)	16	2(12.5)
Total	143	33(23.1)	157	22(14.0)	300	55(18.3)

Age range for the females was 15 to 75 years with a mean of 37.56 ( $SD=16.36$ ) years and HBV infection rate was 14%. There was no statistically significant difference between the younger ( $<30$  yrs) and the older ( $>30$  yrs) female patients tested: ( $P=0.325$ ).

A statistically significant ( $P=0.0086$ ) higher HBsAg infection rate was observed among males (23.1%) than females (14%), (Table 1).

#### Discussion

Hepatitis B virus infection and its sequelae (hepatocellular cancer, viral hepatitis and hepatic cirrhosis) are said to account for about 2 million deaths annually in the developing world [11]. Several studies from various centres in Nigeria have shown

that the sero-prevalence of HBsAg in various regions ranges from 6% to 45% [10, 12, 13, 14, 15, 16, 17]. The overall sero-prevalence rate of 18.3% of HBV infection in the present study falls within the range found in these previous studies. This level of infection is very high when compared with 1% to 5% observed in the developed countries like North America and Western Europe [1]. Various routes of transmission of HBV have been suggested in the developing countries. These include factors such as cultural practices like tattooing, ear-piercing, circumcision and face marking (tribal marks) which are common in Nigeria. It is known that these practices are carried out by illiterates using sharp metals like knife or blade, which are not sterilised and are usually repeatedly used on several clients.

However the higher HBV infection rate in males (23.1%) than females (14%) recorded in this study compares with the findings of Baba et al 1998 [17] in a set of non-AIDS patients in Maiduguri where the rate was 43% and 36% respectively. Gregorio et al 1994 [18] suggested that what could be responsible for this is a shorter carrier state of HBsAg among females compared with males.

A significant finding is the high prevalence of HBsAg in children (41.7% in 10-19 years age group). A previous study [14] similarly found high prevalence rate (71%) in children less than 10 years in Maiduguri. Porter et al 1994 [1] had earlier indicated that perinatal transmission which is a more important contributory factor in developing world may be responsible for this very high infection rate among children. However, cultural practices like tattooing, circumcision, facial marks with non-sterile instruments might also play a significant role.

Hepatitis B virus has been one of the most important occupational hazards for healthcare Workers (HCW) especially dentists. The risk of Dental Surgeons acquiring the infection during practice is higher in our environment due to a high carrier rate. For example in a previous study [10], a high seropositivity (45%) for HBsAg was observed in blood samples collected from doctors and dentists with 80% of them not having been previously vaccinated against HBV. The risk of acquiring Hepatitis B infection is being progressively reduced or minimised through increasing awareness, strict implementation of universal safety precautions and vaccination of groups at risks like HCWs, in the developed world [1].

On the other hand, HBV infection is still considerably high in the third world [19] as a result of lack of infrastructure, equipment and materials. Due to economic reasons, most hospitals cannot always provide materials needed for strict adherence to universal precautions when carrying out procedures on patients. For instance, a previous study showed that dentist and doctors were able to adhere to universal precautions in less than 50% of the occasions whenever procedures were carried out on patients [10].

Odemuyiwa et al [12] in a recent study found that medical and nursing students did not have a higher prevalence of HBsAg when compared with microbiology (non-clinical) students. It is therefore reasonable to deduce safely that the high sero-prevalence found in dentists and doctors in the same institution may be due to their acquiring the infection during practice which the groups of students do not undertake. This study further showed that dentists in our environment have high risk of exposure to viral hepatitis B infection due to high carrier rate in their patients. In view of the fact that most carriers are either free of symptoms or are yet to be diagnosed it is therefore recommended that universal precautions should be strictly observed in all invasive procedures. In addition, health care institutions in governmental and non-governmental organizations



should ensure the availability of consumables necessary for biosafety methods so as to encourage compliance with universal precaution guidelines. All dentists and dental care-givers should be vaccinated preferably at the beginning of their training period.

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