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Full Length Research Paper

Prevalence of hepatitis B virus surface antigen (HBsAg) in patients attending dental centre of a tertiary hospital (a pilot study)

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Abstract

There is a dearth of consensus national prevalence data on Hepatitis B surface antigen (HBsAg) infection in Nigeria and in our institution, a tertiary hospital in southwest Nigeria, and no prevalence study is available. This study was carried out to determine the sero-prevalence of HBsAg in patients attending our Dental centre for dental extraction and other oral and maxillofacial surgery procedures. HBsAg was tested in 53 apparently healthy individual who attended Dental centre for extraction and other surgical procedures by using clinitech (USA) diagnostic HBsAg. About 5mls of venous blood for each subject was obtained into EDTA bottle, Plasma was separated, samples were tested by Clinitech lateral flow immunochromatographic method (LFT). The overall sero-positivity to HBsAg in our subjects was 9.4%. The seropositivity was more in males (14.8%) than in females (3.8%) and was in the 3rd and 4th decades of life. Test for statistical significance were not applied due to our limited sample size. The study demonstrated that surgical procedures irrespective of type carry a risk of HBsAg infection. Observance of universal precautions should be strictly adhered to by dentists, oral and maxillofacial surgeons. A pre-operative screening of subjects being prepared for surgery (including dental extraction) for HBsAg is recommended to enable appropriate preventive measures to be made.

Keywords: Prevalence, hepatitis B surface antigen, dental centre, tertiary hospital

INTRODUCTION

Hepatitis B virus infection is a major health problem with more than 350million individuals affected worldwide (Misra et al., 2009). It has been stated that during the course of chronic hepatitis B virus (HBV) infection, an estimated 15-40% would develop complications such as acute exacerbation, liver cirrhosis and hepatocellular carcinoma (Misra et al., 2009, Liaw et al., 2005, de Franchis et al., 2003). In these patients, the HBV is present in high concentrations in blood, serum, serous exudates, semen, vagina fluid and most body fluids (Ray, 2003). It is endemic in the developing world and in the Sub-Saharan Africa, between 8% and 40% of the population are carriers (Porter et al., 1994; Odaibo et al., 2003).

There is a risk of transmission of HBV in dental practice to both the health care givers and the patients. Outbreaks

of HBV infection in dental practice have been documented by others. (Bell et al., 1993; Shaw et al., 1986; Centre for Disease Control 1987) Infections in dental practice have been shown to be highest in dental surgeons who carry out surgical procedures such as oral and maxillofacial surgeons, periodontologists (Scully and Samaranayake, 1992). It has also been stated that the risk of becoming a chronic HBV carrier is ten times higher in dental care health workers (DCHW) than in the general population (Wisnom and Lee, 1993). In a similar study was conducted by Odaibo et al. (in 2003) in the same south-west geopolitical zone of Nigeria) on the prevalence of HBV in patients undergoing dental extraction at University College Hospital Ibadan, a prevalence rate of 18.3% was documented in 300 patients (Odaibo et al., 2003). In addition, a sero-prevalence survey of doctors and dentists at the same hospital, showed that the dentists had a higher rate (45.0%) of HBV infection than the doctors (35.0%) (Olubuyide et al., 1997).

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Our study is therefore an attempt at finding out the prevalence of HBV infection (using HBsAg) in asymptomatic adult patients as a marker of infection in those attending the Dental Centre of Lagos university Teaching Hospital (LUTH) for dental extraction ,and other surgical procedures carried out in oral and maxillofacial surgery department. This is to highlight the potential hazards of HBV to the oral and maxillofacial surgeons and other associated healthcare workers.

MATERIALS AND METHODS

Patients who reported at the dental centre (LUTH) requiring extraction of teeth and other surgical procedures such as diagnostic biopsy prior to oral and maxillofacial surgical procedures from July to December 2012 were eligible for the study. Patients consent was sought after a detailed explanation of the study was given to them. Ethical Committee approval of the Hospital was sought and obtained prior to the commencement of the study.

Sample Collection: A 5mls venous blood was collected under aseptic technique by venepuncture into an EDTA bottle from each patient who consented. Plasma was separated from each blood sample and stored at -20°C until tested.

Laboratory methods: Clinitech ® (USA) diagnostic HBsAg Lateral Flow Immunochromatographic (LFI) method was employed for rapid direct binding of hepatitis B surface antigen (HBsAg) by monoclonal/polyclonal antibody against HBsAg. (Kim and Tolles 1973; Magnus et al., 1975) 200 µl of each sample was pipetted and dispensed into the sample well on each LFI cassette. Capillary action of the loaded sera was observed and visual interpretation of the result was done. Interpretation of results were done as follows: Negative- only one colour band appeared in the control region (C) indicating no hepatitis infection; Positive- colour bands appeared on both control (C) and test band (T) indicating presence of hepatitis infection and; Invalid- No band was visible.

RESULTS

A total of 53 patients who consented to the study were included, this consisted of 27males and 26 females with M: F ratio of 1:1 approximately (Table 1). The age range was 18 to76 years with a mean of 33years (S.D.-+12.2).

The overall sero-positivity to Hepatitis B virus infection in our study was 9.4% (Table 1), however, in the males, the sero-positivity was 14.8% , while the sero-positivity in female was 3.8%. A further breakdown of the results showed that in the males, sero-positivity was more prevalent in the age groups between 20-29 and 30-39years (Table 1) however; no statistical significance was proved due to our limited sample size

of 53 patients.

Age range of infection in the males, was more prominent than in females. The surgical procedures undertaken for patients included dental extraction 48(90.6%), other surgical procedures 4(7.6%), cyst enucleation 1(1.9%) (Table2).

DISCUSSION

An estimated 350million individual is affected worldwide by hepatitis B virus infection, (Misra et al., 2009) and around 1 million die due to the consequences of this infection (Mamun-Al-Mahtab, 2009). The seropositivity of hepatitis B virus in the sub-saharan Africa has been said to be between 8% and 40%. (Porter et al., 1994; Odaibo et al., 2003; Scully and Samaranayake, 1992; Olubuyide et al., 1997; Mamun-Al-Mahtab 2009; Nasidi et al., 1986; Baba et al., 1988). These findings are contrary to Western Europeans and American studies where prevalence of between 1 and 5% are reported. (Porter et al., 1994; Odaibo et al., 2003) An Italian study claimed 11.7% infection rate of hepatitis B virus in immigrants visiting Italy from the less developed countries in Africa, Asia and China (Scotto et al., 2010). The high infection rates in Afro-Asians were attributed to lack of or incomplete prophylactic vaccination in their countries of origin and risky sexual behavior. Other workers have adduced lack of education, awareness campaign by government and mass media of less developed countries as contributory factors (Porter et al., 1994; Odaibo et al., 2003). Some workers have shown a higher HBsAg positivity among HIV positive individuals and attributed this to shared transmission route of HBV and HIV infection.(Burnett et al., 2005; Negero et al., 2011) Similar assertions were made by workers in Nnewi, Nigeria who found a co-infection of HIV/HBV rate of 4.2% (Eke et al., 2011).

In our study, a sero-prevalence of 9.4% was observed, when compared with other studies in Nigeria, this value falls within the range of 8% to 40% (Porter et al., 1994; Odaibo et al., 2003; Scully and Samaranayake. 1992) among others though our study had a limited sample size of 53, nevertheless, the value is fairly representative. Eke et al found a vertical transmission rate of 51.6% of HBsAg in their study at Nnewi, thus making mother to child transmission a major route of infection in Nigeria. They therefore advocated routine screening for HBsAg in pregnant women and subsequent immunization as practiced in the developed countries of the world (Eke et al., 2011).

Our patient's sero-positivity was more prevalent in the age groups between 20-29 and 30-39years (table 1).

Also males had more seropositivity than females, similar observation was reported from a study in Alexandria in which prevalence of HB virus was found to be more in the males (Wasfi and Sadek, 2011). The

Table 1. Showing age range, and sex distribution of subjects tested for HBsAg

Age in yrs	Male Tested Positive		Female Tested Positive		Total Tested Positive	
	N%	N%	N%	N%	N%	N%
10-19	0(0.0)	0(0.0)	2(3.8)	0(0.0)	2(3.8)	0(0.0)
20-29	12(22.6)	2(50.0)	11(20.8)	1(100.0)	23(43.4)	3(60)
30-39	10(18.9)	2(50.0)	6(11.3)	0(0.0)	16(30.2)	2(40)
40-49	2(3.8)	0(0.0)	4(7.5)	0(0.0)	6(11.3)	0(0.0)
50-59	1(1.9)	0(0.0)	3(5.7)	0(0.0)	4(7.5)	0(0.0)
60-69	1(1.9)	0(0.0)	0(0.0)	0(0.0)	1(1.9)	0(0.0)
≥70	1(1.9)	0(0.0)	0(0.0)	0(0.0)	1(1.9)	0(0.0)
Total	27(50.9)	4(100.0)	26(49.1)	1(100.0)	53(100.0)	5(100.0)

Table 2. Showing age range and reasons for dental attendance of subjects tested for HBsAg

Age in yrs	Reason for Dental attendance			
	Dental Extraction N%	Incisional Biopsy N%	Cyst Enucleation N%	Total N%
10-19	1(1.9)	1(1.9)	0(0.0)	2(3.8)
20-29	21(39.6)	1(1.9)	0(1.9)	23(43.4)
30-39	14(26.4)	2(3.8)	0(0.0)	16(30.2)
40-49	6(11.3)	0(0.0)	0(0.0)	6(11.3)
50-59	4(7.5)	0(0.0)	0(0.0)	4(7.5)
60-69	1(1.9)	0(0.0)	0(0.0)	1(1.9)
≥70	1(1.9)	0(0.0)	0(0.0)	1(1.9)
Total	48(90.6)	4(7.5)	1(1.9)	53(100.0)

most likely explanation for higher prevalence in males than females in our study may be adduced to males having more risk factors than females such as visiting barber shops, sharing of shaving equipments, more likely to get wounded than females. Similar observations for age-groups most affected by hepatitis B and C were observed in Alexandria, Egypt and the United States (Wasfi and Sadek, 2011; Armstrong et al., 2006).

The risk of transmission of hepatitis B virus to health care workers, nurses, operative theatre staff, surgeons have been stressed (Kesiene et al., 2011). Outbreaks of hepatitis B virus infection in dental practice have been shown to be highest in dental surgeons who carry out surgical procedures such as oral and maxillofacial surgeons and periodontologists (Odaibo et al., 2003; Scully and Samaranayake, 1992). A first case of patient-to-patient transmission of hepatitis B virus in oral surgery was reported in the United States in 2007, attributed to blood with high viral load inadvertently on a surface/clothing, missed during clean-up/disinfection of operatory, suspected as source of infection from the source patient to the succeeding patient treated 161 minutes later (DePaola LG newsletter @biotrol.com; Redd et al., 2007). The infection occurred despite adherence to standard precautions and all recommended infection control practices. The explanation was that most oral surgery procedures result in bleeding hence HBV

present a risk of transmission for both dental staff and patients. It was therefore stressed that appropriate infection control measures must be followed on routine basis (CDC 2003; CDC 1990; Allos and Schaffner, 2007). Also all dental practices should adhere to the guidelines for infection control in Dental Healthcare Settings published in 2003 by CDC. These guidelines are advocated to be followed for each and every patient in addition to standard precaution such as Hand hygiene, surface disinfectant and sterilization (CDC 2003).

Our seropositivity of 9.4% to Hepatitis B virus is important and there are chances of transmission of infection to our oral and maxillofacial surgeons and other health care workers. Dental healthcare workers have been claimed to be ten times more at risk of being a chronic carrier of hepatitis B virus than in the general population (Wisnom and Lee, 1993).

The majority of our patients attended for dental extraction (90.6%), however, others had biopsy prior to other surgical procedures (7.6%), cyst enucleation (1.9%). An infection rate of 9.4% in 53 patients shows the risk to which our dental surgeons and other dental health care workers (DHCW) are exposed. In a similar study conducted at University college Hospital, Ibadan on patients requiring dental extraction (Odaibo et al., 2003) a prevalence rate of 18.3% was documented in 300 patients. The implication is that all surgical procedures

irrespective of type carry the risk of infection of hepatitis B.

Dentists and doctors have been shown to have higher sero-positivity up to 45% of HB virus infection as evidenced by blood samples taken from them in a study (Olubuyide et al., 1997) and up to 80% of them were not vaccinated against Hepatitis B virus. We did not carry out sero-positivity tests in our dental health care workers for comparison. Further studies may be needed to address this area.

However, infection have been claimed to be higher in the developing countries, due to lack of infrastructure, equipments and materials as most hospitals cannot provide materials needed for strict adherence to universal precautions when carrying out procedures (Odaibo et al., 2003).

To reduce the chances of infection of healthcare givers therefore, all of doctors, dentists, surgeons should be vaccinated against HB virus preferably at the start of their careers. A similar recommendation has been given by others (Odaibo et al., 2003). In addition, observance of universal precautions should be strictly adhered to in all invasive procedures. Health institutions should also provide basic consumables –surgical gloves, face masks, theatre dressings, and medicaments necessary for safety procedures.

Finally a pre-operative screening (of all patients being prepared for surgery) for HB virus, HIV is recommended as a routine, this is not for stigmatization, but to enable the healthcare givers make adequate preparations and take appropriate preventive measures when managing such patients.

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