AFRICAN JOURNAL OF MEDICINE and medical sciences

VOLUME 30, NUMBER 4, DECEMBER 2001

EDITOR:
B. O. OSOTIMEHIN

ASSISTANT EDITOR:
A. O. UWAIFO

ISSN 1116 — 4077

Afr J. Med. med. Sci. (2001) 30, 333-335

Hepatitis B Surface Antigen (HbsAg) in the sera of medical, nursing and microbiology students in Ibadan, Nigeria

SO Odemuyiwa, OI Oyedele, JC Forbi, CO Elemuwa, MA Ibeh, AKW Kfutwah, LN Uche and AA Anibaba
Department of Virology, College of Medicine, University College Hospital, Ibadan, Nigeria.

Summary
A total of 331 serum samples collected from medical students, student nurses, microbiology students, and patients presenting with Pyrexia of Unknown Origin (PUO) were tested for the presence of Hepatitis B surface Antigen (HbsAg). While only seven (14.0%) of 50 microbiology students (mean age 24.0 years) tested positive for HbsAg, six (6.7%) of 89 student nurses (mean age 21.6 years) and 13 (13.5%) of 95 medical students (mean age 24.3 years) in the clinical phase of their study were found to have HbsAg in their sera. Also, 10 (10.3%) of 97 patients with PUO (mean age 25.4 years), a group of patients from whom medical personnel are most likely to often collect blood for laboratory studies, were found to have HbsAg in their sera. No significant difference was found in the prevalence of HbsAg among the different groups examined in this study (P>0.05). The result of the study thus shows that medical and nursing students, unlike what is known for practising nurses, physicians and surgeons are not at a higher risk of HBV transmission than students of botany and microbiology. Likewise, patients with PUO do not constitute a group that is more likely to transmit HBV to medical personnel than other groups of patients. Vaccination against hepatitis B virus during the early period of medical and nursing training may therefore go a long way to reduce the high prevalence of hepatitis B virus infection previously reported among practising health personnel in Nigeria.

Keywords: *HBsAg, students, PUO*

Résumé
Un total de 331 sérum prélévés des étudiants médicaux, les infermiers, les étudiants de microbiologie et les malades de pyrexie d'origine inconnue (POI) ont été examinés pour la pésence de l'hépatite B surface Antigene (HbsAg). Tandis que sept seulement (14.0%) de 50 étudiants de microbiologie (24,0 ans age moyenne) et 13 (13,5%) de 95 étudiants médicaux (24,3 ans age moyenne ont montré la presence de HbsAg dans leur séra au cours de la phase clinique d'étude. En plus, 10(10,3%) de 97 malades avec le POI (25,4 ans age moyenne), un groupe des malades don't le personnel médical prélève certainement et souvent de sang pour des études laboratoires, ont presenté une présence de HbsAg dans leur séra. Aucune différence considérable n'a été trouvée dans la fréquence de HbsAg parmi les différents groupes examinés dans cette étude (P> 0,05). Le résultat d'étude montre ainsi, que les étudiants médicaux et les étudiants infirmiers par contre aux infirmières, aux médicins et aux chirurgiens ne courrent pas le risque élévé d'une transmission VHB que les étudiants de botanique et de microbiologie. Aussi bien que les malades de POI qui ne constituent pas un groupe avec une haute possibilité de transmettre aux personnels médicaux plus qu'autres malades. La vaccination contre le virus hépatite B lors du début de la formation médicale et infirmière réduira la haute fréquence d'infection de virus hépatite B précédemment signalé parmi les personnels de la santé exercant du Nigéria.

Correspondence: Dr S.O. Odemuyiwa, Department of Virology, College of Medicine, University College Hospital, Ibadan, Nigeria.
e-mail: ibadan-lab@who-nigeria,org.ng.

Introduction

Hepatitis B virus (HBV) has been shown to be the major actiological agent of chronic liver disease in Nigeria [1]. In Nigeria, just like in many other countries of sub-Saharan Africa, prevalence rates ranging from 40% in children to 10 % in adults have been reported for Hepatitis B surface antigen (HbsAg), an important marker of hepatitis B carrier state [2]. Thus, in comparison to health personnel from developed countries where the prevalence of Hepatitis B carrier state is much lower, health personnel in the developing countries of Africa are exposed to a greater risk of acquiring hepatitis B infection from hospital environment.

Among health personnel, the risk of transmission of the virus is known to be highest among individuals routinely involved in invasive procedures, like surgeons and operating room personnel [3]. A previous study in Nigeria showed that doctors and dentists are at a higher risk of acquiring hepatitis B infection than other members of the population [4]. The present study was carried out to assess the prevalence of hepatitis B infection among medical students and student nurses, whose students also exposed to the risk of hospital-acquired HBV infection during the course of their training in comparison to students of botany and microbiology who are not exposed to such risks.

Materials and methods

Serum samples

Blood samples were collected from randomly selected, healthy medical students and student nurses in their first, second and third years of studies (clinical years of study in the case of medical students) at the University College Hospital, Ibadan, Nigeria. The purpose of the study was first explained to the students before blood samples were collected from selected individuals who agreed to be bled. Blood samples were also collected from a control group consisting of all final-year (fourth year) students of Microbiology in the department of Botany and microbiology of the University of Ibadan, Nigeria. Students of botany and microbiology were chosen as a control group since their training does not involve routine contacts with patients, hypothetically conferring on them a lower risk of hospital-acquired hepatitis B infection in comparison to medical students and student nurses. In addition, blood samples were collected from patients with Pyrexia of Unknown Origin (PUO). PUO patients were selected on the basis of negative test for the presence of malaria parasite (MP) and recent infection by *Salmonella typhi*. This group of patients was included because of the possible role of intercurrent Hepatitis B virus infection in PUO, information about in literature which is rare and because of the risk they may pose to medical students and student nurses if a high incidence of HbsAg positivity is seen in such

patients. It was assumed that students are more likely to have more contacts with this group of patients than with other patients. *ELISA for HbsAg Detection*: For the detection of HbsAg in the sera, an antigen Capture Enzyme Immunoassay (EIA) using a commercial HbsAg detection kit was carried out according to manufacturer's instructions (Murex Diagnostics, UK).

Statistical analysis

To compare the proportions of students positive in the different groups the chi-square test was used at 95% confidence level. The analysis was done after recording the data in a Microsoft Excel worksheet on a Windows '95 platform.

Results

Samples were collected from 89 nursing students, 95 medical students and 50 students from the department of botany and microbiology. The ages of the medical students ranged from 20 to 28 years (mean: 24.3 years) while those of student nurses ranged from 18 to 24 years (mean: 21.6 years). Students of microbiology were aged 20 to 32 years (mean: 24.0 years). While all (100.0%) the student nurses were female, 15 (15.8%) and 80 (84.2%) of the 95 medical students were female and male respectively. Also, while 22 (44.0%) of the 50 microbiology students were female, 28 (56.0%) were male. The 97 patients with pyrexia of unknown origin were aged 17 to 35 years (mean: 25.4 years)

Of the 234 students tested, 26 (11.1%) were found to have HbsAg in their sera while only 10 of 97 (10.3%) patients with PUO were found to have HbsAg in their sera. The difference in the prevalence of HbsAg among students and patients with PUO was not significant ($P = 0.31 > 0.05$). When the students were stratified according to sex, 11 (10.1%) of the male and 15 (11.9%) of the female students examined were positive for HbsAg. Although a higher proportion of medical students (13/95) than nursing students (6/89) had HbsAg in their sera, the difference was not statistically significant ($P = 0.06 > 0.05$). Of the 50 students of botany and microbiology examined, 7 (14.0%) were found to be positive for HbsAg. There was no significant difference ($P = 0.10 > 0.05$) between the proportion of medical and nursing students having HbsAg in their sera (19/184) and the control population consisting of final year students of Microbiology (7/50). A comparison of the prevalence of HbsAg in the sera of nursing students (6/89) with female medical students (1/15) and female students of Botany and Microbiology (2/22) showed no statistically significant difference ($P = 0.27 > 0.05$). Similarly, the prevalence of HbsAg was not significantly higher ($P = 0.34 > 0.05$) among male medical students (12/80) than male students of botany and microbiology (5/28). The results of the study are summarised in Table 1.

Table 1: Prevalence of Hbs Ag among students and patients in Ibadan, Nigeria

Goups Tested	No. Tested	Mean Age (in years)	Total No. Positive %
Medical students	95	24.3	13 (13.7)
Nursing students	89	21.6	6 (6.7)
Microbiology students	50	24.0	7 (14.0)
Patients with PUO	97	25.4	10 (10.3)
Total	331	23.8	36 (10.9)

Discussion

Hepatitis B virus infection continues to be very important worldwide but constitutes a major public health problem in the less developed countries of Africa, Asia and South America [5] A prevalence of 10 to 40 % has been reported for HbsAg in some parts of Africa [6]. Previous workers have reported a prevalence of HbsAg ranging from 6 to11% among healthy blood donors in Nigeria [7,8] A prevalence of 42.2% was found among patients visiting sexually transmitted diseases (STD) clinics in the country [9]. A prevalence of 10.9% was reported among the population examined in the present study. This rate is within the range previously reported for the general population in Nigeria.

However, a higher prevalence of hepatitis B carrier state has previously been reported among health personnel in Nigeria when compared with the general population [4]. The report did not indicate if health personnel acquired the hepatitis B infection during their training period or after they entered into medical practice. It has however been shown that unvaccinated young medical practitioners are more likely to be positive for HbsAg than their often-adequately vaccinated older colleagues [4]. In the present study, the prevalence of HbsAg was not found to be significantly higher among medical students and student nurses than a control population of students from the department of botany and microbiology of approximately the same age. This may be an indication that the risk of infection with hepatitis B virus during the period of medical or nursing training is not as high as during the period of medical and nursing practice. This is probably a result of closer and more frequent contacts with patients after graduation and thus a higher chance of contracting hospital-acquired hepatitis B infection. This therefore suggests that the risk of infection of practising medical and nursing personnel with hepatitis B virus could be considerably reduced by vaccination during the period of training, a very important policy in many medical schools worldwide [9].

Also probably closely related to the risk of hospital acquired hepatitis B infection are contacts with patients with (PUO) a common condition in tropical countries including Nigeria. The importance of inapparent hepatitis B infection in patients with PUO, after the elimination of malaria and endemic bacterial infections in developing countries, has recently been reviewed [10],. Medical personnel often need to collect samples from such patients for further laboratory studies. PUO patients testing negative for the presence of malaria parasites (MP) in their blood and negative for evidence of recent infection with *Salmonella typhi* were tested in the present study. Although fever is often among the earliest symptoms of acute hepatitis B virus infection with demonstrable levels of HbsAg in the blood [11], there was no significant difference between the prevalence of HbsAg in the sera of patients with PUO and the other groups studied. Thus contact with patients with PUO does not increase the risk of hospital-acquired hepatitis B infection among medical and nursing personnel.

In conclusion, we have demonstrated that medical students and student nurses do not have a higher prevalence of hepatitis B surface antigen when compared to students of Microbiology. Thus, vaccinating medical students and student nurses before they graduate to practise their professions can prevent the previously reported high prevalence of hepatitis B surface antigen in the sera of practising medical personnel in Nigeria.

eferences:

Ojo OS, Thursz M, Thomas HC, Ndububa DA, Adeodu OO, Rotimi O, Lawal AA, Durosinmi MA, Akonai AK and Fatusi AO. Hepatitis B virus mark ers hepatitis D virus antigen and the Hepatitis C virus antibodies in Nigeria patients with chronic liver dis ease. East Afr Med J 1995; 72: 719-721.

Fakunle YM, Abdurrahman MB and Whittle HC: Hepatitis B virus infection in children and adults in Northern Nigeria: a preliminary survey. Trans R Soc Trop Med Hyg 1981; 75:626-629.

Popejoy SL and Fry DE. Blood contacts and expo sure in the operating room. Surg Gynecol Obstet 1991; 172: 480-483.

Olubuyide IO, Ola SO, Aliyu B, Dosunmu OO, Arotiba JT, Olaleye OA, Odaibo GN, Odemuyiwa SO and Olawuyi F: Hepatitis B and C in doctors and dentists in Nigeria. QJM 1997; 90: 417-422.

Ayoola EA and Olubuyide I; Hepatitis B surface an tigen and immunoglobulin M complexes in chronic carriers and patients with acute and chronic liver dis eases. Afr J Med Med Sci 1989; 18: 21-24.

6. Szmunes W, Prince AM, Diebolt G, Leblanc R, Masseyeff R and Linhard J: The epidemiology of hepatitis B infections in Africa: results of a pilot sur vey in the Republic of Senegal. Am J Epidemiol 1973; 98: 104-110.
7. Abiodun PO, Ihonghe JC, Ubaru R and Krauledat P: HbsAg carrier rate among the adult population in Benin city, Nigeria (ELISA-method). Public Health 1986; 100: 362-367.
8. Nasidi A, Harry TO, Vyazov SO, Munube GM, Azzan BB and Ananiev VA: Prevalence of hepatitis B infection markers in representative areas of Nigeria. Int J Epidemiol 1986; 15: 274-276.
9. Diekema DJ, Albanese MA, Densen P and Doebbeling BN: Student health policies of US medical schools. Acad Med 1996; 71: 1090-1092.
10. Gill G: Infection/PUO on return to the UK, Practitio ner 1989 22: 233: 945-947.
11. Fields BN, Knipe DM, Howley PM, Chanock RM, Melnick JL, Monath TP, Roizman B, and Straus SE, Eds: Fields Virology. Philadelphia: Lippincott Raven Publishers 1996; 2748-2750.