

Co-infection of HIV and HBV among Nigerian Patients and Blood Donors at Sagamu.

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SUMMARY

Background: Viral infections are common globally especially among Africans. Hepatitis B virus infection (HBV) is hyper-endemic while Human Immunodeficiency virus (HIV) infection has become endemic in Nigeria. However, there is a dearth of information on the co-infection of both viruses among Nigerians.

Objective: To determine the prevalence of HIV, HBV and co-infection of the two viruses in Nigerian patients and blood donors at Olabisi Onabanjo University Teaching Hospital, Sagamu.

Subjects, Materials and Methods: Seventy-eight consecutive adult Nigerians on medical ward admission as well as 350 Nigerian blood donors who consented to participate in the study were recruited. Their sera were analysed for both HBV and HIV infections using Enzyme linked Immunosorbent Assay (second generation ELISA). Infection with HIV was confirmed by Western Blot.

Result: The sero-prevalence rate of HIV type I infection was greater among the patients (14.1%) than among the blood donors (4.8%) ($P < 0.001$) with no statistically significant gender difference in both groups. The HIV-type II infection (1.3%) was found in only one patient with lymphoma who also had HIV-type I infection. Similarly, the sero-prevalence of HBV was greater among the patients (16.7%) than the blood donors (6.8%), $p < 0.001$ but no gender difference was demonstrated in either the patients or the blood donors ($p > 0.05$). Combined HIV and HBV infections occurred in 2.6% and 1.1% of the patients and blood donors respectively. Single infection with either HBV or HIV is commoner than co-infection of both viruses among the patients and the blood donors ($p < 0.05$). Patients with enterocolitis, lobar pneumonia and lymphoma were infected with only HIV while those with liver cirrhosis and hepatocellular carcinoma had only HBV infection.

Conclusion: Both HIV and HBV infections are common among Nigerian patients and blood donors, however co-infection with the two viruses are uncommon. Similarly,

HIV-type II infection is rare among Nigerians patients and may co exist with HIV-type I infection. Enterocolitis, lobar pneumonia and lymphoma may be indicator diseases of HIV infection. Co-infections of HIV and HBV should be suspected among Nigerian patients with pulmonary tuberculosis, chronic hepatitis and sickle cell anaemia infection with either HIV or HBV seems to be common in the health care settings in Nigeria. *Niger Med. J, Vol 46, No.3, July -Sept., 2005: 64 – 67.*

KEY WORDS: HIV/HBV infections, Nigerians, hospital patients, blood donors.

INTRODUCTION

Viral infections have assumed a major public health problem especially those resulting from Hepatitis B virus (HBV) and Human Immunodeficiency virus (HIV) causing significant morbidity and mortality. These viral infections are endemic in the tropics particularly in Africa especially Nigeria (1–3). The routes of transmission of the two viruses are similar and are predominantly by sexual intercourse and parenteral including blood transfusion (6–8) with HBV being more readily transmitted than HIV due to greater numbers of the former in most body fluids (5). These routes are routine procedures in the hospital setting, making the hospital workers and patients to be particularly vulnerable to the acquisition of the viral infections. Both infections may manifest acutely with progression in some cases to chronic sequelae (1,4).

Since the reduction of new infections is a very effective measure to curtail infections, determination of the prevalence of HIV and HBV infections in at risk population is useful. Hence we present the results of our study on the prevalence of HBV and HIV infections among Nigerian patients and blood donors.

MATERIALS AND METHODS

Seventy-eight consecutive adult Nigerians who consented to participate in the study were recruited from the Medical ward of Olabisi Onabanjo University Teaching Hospital (OOUTH), Sagamu, Nigeria. The diagnosis of the different diseases in the patients were made from relevant clinical features and appropriate investigations including histology reports of tissues biopsies. Similarly, 350 consecutive Nigerian blood donors were recruited as control subjects at the blood bank of OOUTH, Sagamu. The study was carried out after obtaining approval from the Ethical committee on medical research of the hospital.

Ten Millilitre of blood was obtained from each subject and centrifuged, with separated serum stored at -20°C until analysis.

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The thawed sera were screened for both HBV and HIV infections. Detection of the infections were done by assaying Hepatitis B surface antigen (HBsAg) for HBV infection and antibodies to HIV types I and II by enzyme linked immunosorbent assay (ELISA) at the Department of Medical Microbiology, OOUTH, Sagamu. The confirmation of HIV infections was done by Western Blot at HIV laboratory of the Haematology Department of the University College Hospital, Ibadan.

The data obtained were analysed using SPSS statistical package with Student's t-test and Fisher's Z-test for significant differences in proportions at $P < 0.05$.

RESULTS

The study involved 78 patients. Those with infective diseases (63, Group I) and non-infective diseases (15, Group II), and 350 healthy adult Nigerian blood donors (Group III) as controls. The male to female distribution was 46: 17 in group I, 12: 3 and 350:19 in groups I and II respectively. The respective mean (standard error) ages of groups I to III were 36 (1.7), 46 (4.5) and 33 (1.6) years respectively with the patients being generally older than the blood donors ($p < 0.001$).

patients and was found in only one patient with non-infective disease (lymphoma) who also had HIV-type I infection, Table 1.

The mean age of the patients with HIV and HBV infection were 40(12) and 39(6) years respectively while those with co-infection of HIV and HBV were 35(10) years. However the blood donors with HIV, HBV and co-infection of both viruses were 32(9), 35(10) and 29(7) years of age respectively. There was no difference in ages of subjects with single infection of either HBV or HIV and combined infections among either the patients or the blood donors.

The sero-prevalence of HBV was greater among the patients (16.7%) than the blood donors (6.8%), $p < 0.001$, but similar among the two groups of patients studied.

The sero-prevalence rate of HBV infection appeared higher only among the male (19%) patients compared to their female (10%) counterparts ($p > 0.05$) but was without sex difference among the controls. In addition, there was no gender difference in the sero-prevalence rates of HIV infection among the patients and the control, Table 2).

There was no difference between the sero-prevalence rates of either HBV or HIV infection among the patients with

Table 1: Prevalence of HBV and HIV infections among Nigerian patients and blood donors.

Group	Number Male/Female	Age (years) Mean + S.E.	Prevalence %		
			HIV	HBV	HIV + HBV
Infective Disease – I	46/17	36 + 1.7	15.8	14.1	3.2
Non infective Disease – II	12/3	46 + 4.5	13.3	26.7	–
Blood donors – III	331/19	33 + 1.6	4.8	6.8	1.1

S.E. – Standard Error HIV – Human Immunodeficiency Virus HBV – Hepatitis B Virus

Table 2: Sex distribution of sero-prevalence of HBV and HIV infections among Nigerian patients and blood donors.

Group	Number	Prevalence %	
		HIV	HBV
Patients			
Males	58	17.2	19
Females	20	10	10
Blood donors			
Males	331	4.8	6.9
Females	19	5.2	5.2

HIV – Human Immunodeficiency Virus HBV-Hepatitis B Virus

The sero-prevalence rates of HIV type I infection were similar among those with infective diseases (15.8%) and non-infective diseases (13.3%), $p > 0.05$ but the rate in either group was greater than the value of 4.8% among the blood donors ($p < 0.001$). Infection with HIV-type I occurred also more frequently among the patients in group I than the subjects in group III ($p < 0.05$) HIV-type II accounted for 1.3% of all the

Table 3: Diseases associated with HIV and HBV infections among the patients.

Disease	Number	Infections		
		HIV	HBV	HIV+HBV
Tuberculosis				
Pulmonary	21	3	5	1
Disseminated	22	1	1	–
Enterocolitis	13	2	–	–
Septicemia	5	1	1	–
*Chronic hepatitis	2	1	2	1
Lobar pneumonia	2	1	–	–
Sickle cell anaemia	4	1	2	1
Liver cirrhosis	3	–	2	–
Lymphoma	4	2	–	–
Hepatocellular carcinoma	3	–	1	–
Total	78	11(14.1)	13(16.7)	2(2.6)

*One patient sero-positive for HIV + HBV also had sickle anaemia HIV – Human Immunodeficiency Virus HBV – Hepatitis B Virus Parentheses – percentage.

CO-INFECTION OF HIV AND HBV

infective diseases and the controls but the sero-prevalence rate of HBV (26.7%) was greater than that of HIV (13.3%) infection among the patients with non-infective diseases ($p < 0.05$).

Lone infection of either HBV or HIV is commoner than co-infection of both viruses among the patients and the blood donors ($p < 0.05$, table 1). Combined infections of both HIV and HBV occurred only among the patients with infective diseases (3.2%) and blood donors (1.1%), Tables 1 and 3.

Patients with enterocolitis, lobar pneumonia and lymphoma were infected with only HIV while those with liver cirrhosis and hepatocellular carcinoma had only HBV infection. However, patients with pulmonary tuberculosis, chronic hepatitis and sickle cell anaemia had combined infections of HIV and HBV. Furthermore, lone HIV or HBV infection was found in patients with sickle cell anaemia, chronic hepatitis, septicaemia, pulmonary and disseminated tuberculosis, Table 3.

DISCUSSION

Communicable diseases are common ailments of patients on hospital admission in the tropics (9) and this is corroborated by our study where 81% of the patients presented with easily identifiable infectious diseases. However, the other occult infections such as those caused by HIV and HBV become obvious and confirmed upon serological assay of the markers of the infections.

Human immunodeficiency virus is assuming increasing trends and continues to be a burden especially among Africans¹⁰. The infection is still in endemic proportions among Nigerians with prevalence rates ranging from 1.2 – 12% and a national median prevalence of 5% in 2003 among the pregnant women attending ante-natal clinics (2). The seroprevalence of 4.8% in our blood donors is similar to previous reports by Shokunbi *et al.* (11) in Nigerian blood donors. However, it is not unexpected that the prevalence of HIV is higher in our patients than blood donors since the former may be presenting with the outcome of the infection. This is corroborated by the presence of the infection among patients with pulmonary tuberculosis, enterocolitis, lobar pneumonia, septicaemia and lymphoma which are indicator diseases for acquired immunodeficiency syndrome (12–14). The rare occurrence of HIV type II compared to type I infection in our subjects is not unusual (11,12,15). The presence of dual HIV types I and II in one of our patient with lymphoma is significant and may suggest that this malignancy is indicative of both HIV sub types I and II among Nigerians.

Hepatitis B virus although hepato-tropic, is ubiquitous because it could also affect any organ in the body culminating in different diseases (1), hence its occurrence in equal proportions of our patients with infective and non-infective diseases. With regards to specific diseases, the presence of the virus in patients with chronic hepatitis, cirrhosis and hepatocellular carcinoma could be of aetiological consideration (16). However, patients with pulmonary tuberculosis, septicaemia and sickle cell anaemia who also had the infection could have acquired it through parenteral injections, invasive procedures and blood transfusion that they received while being treated (7,13,17). These modes of transmitting HBV infection

among the patients could be responsible for its higher prevalence among the patients than the blood donors. In addition heterosexual transmission of the virus could not be eliminated among all the subjects because of the high prevalence of the infection among healthy Nigerians (3). This is corroborated by the prevalence rate of the infection among the blood donors.

The insignificantly higher occurrence of HBV infection among our male patients might be resulting from the small size of our studied female population. This is important because the males have poorer handling of the infection than the females because of the presence of immunoregulatory gene on X chromosome that determines susceptibility (18), a fact also previously reported (19). However, this study has also shown that both male and female subjects have equal sero-prevalence rate of HIV infection and it could be consequent to its heterosexual transmission (8,20). However, the higher prevalence rate of HBV infection compared to HIV infection among our patients with non-infective disease is a reflection of higher efficiency of transmission of the former than the latter (5) as well as the higher occurrence of HBV infection among Nigerians (2,3). The presence of co-infection of HIV and HBV among our patients with infective diseases especially pulmonary tuberculosis and chronic active hepatitis is not surprising since it could be due to the therapeutic procedures of the diseases favouring the acquisition of the viral infections (7,17). Similarly, the detection of combined HBV and HIV infections in equal proportions of our patients and blood donor is not unexpected as both groups are exposed to injections and they are all involved in heterosexual activity. However, it is significant because the co-infection will influence treatment of the subjects and the outcome of individual infection (21–23). The latter may arise because HIV tends to increase HBV replication, cause increase in HBV DNA, increase the risk of chronic HBV infection after exposure by reduced immunological response to the infection, increase risk of HBV reactivation, reduce the response to interferon therapy of HBV infection and vaccination against HBV (24,25). It is pertinent to note that the higher occurrence of single infection by either HIV or HBV than co-infection of the two viruses in our subjects follows previous report (25).

In conclusion, this study shows that infections by HIV and HBV are commoner among adult Nigerian patients on admission than the blood donors at Olabisi Onabanjo University Teaching Hospital, Sagamu, Nigeria. In addition, co-occurrence of these viral infections exists but are uncommon compared to single infections. Similarly, HIV-type II infection is rare among Nigerians and may co-exist with HIV-type I infection. Enterocolitis, lobar pneumonia and lymphoma may be indicator diseases of HIV infection. Co-infections of HIV and HBV should be suspected among Nigerian patients with pulmonary tuberculosis, chronic hepatitis and sickle cell anaemia infection of either HIV or HBV is commoner in the health care settings than in the community in Nigeria.

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