

Original Paper

Seroprevalence of Human Immunodeficiency and Hepatitis B Viruses among Patients at a Health Facility in Freetown, Sierra Leone

Solayide A Adesida^{1,3}, Gevao F Tamba¹, Foday Sahr^{1,4*} and Gevao M Sahr²

¹Department of Microbiology, ²Department of Haematology, College of Medicine and Allied Health Sciences, University of Sierra Leone, Freetown, Sierra Leone, ³Nigerian Institute of Medical Research, Division of Molecular Biology and Biotechnology, Lagos, Nigeria, ⁴34 Military Hospital, Wilberforce, Freetown, Sierra Leone

ABSTRACT

Human Immunodeficiency Virus (HIV) and Hepatitis B Virus (HBV) constitute serious public health problems worldwide. In Sierra Leone, information on both viral infections remains scanty. This study estimated the seroprevalence of HIV and HBV infections and a possible co-infection in one hundred and ninety-eight (198) patients seeking diagnosis at a private laboratory in Freetown, Sierra Leone. Blood plasma was collected from each patient after informed consent was obtained. The samples were assayed for antibodies to HIV virus and HBV antigen using appropriate assays. Male patient accounts for 52% of the population examined. Thirty-one (31) of the 198 patients examined (15.7%) were positive for HIV. Hepatitis B surface antigen (HbsAg) was present in 17 (39.5%) females and 26 (60.5%) males. Thirteen (13) (6.6%) patients were co-infected with HIV and HBsAg. This is the first documented evidence of HBsAg and HIV co-infection in Sierra Leoneans. Larger population based studies are however needed to confirm the findings.

Key words: Co-infection, Hepatitis B surface antigen, HIV, Seroprevalence

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INTRODUCTION

Human immunodeficiency virus and hepatitis B virus are among the leading causes of morbidity and mortality. Human Immunodeficiency Virus (HIV) is a retrovirus having two strains: HIV 1 and 2. The virus belongs to a group of cytopathic lentiviruses. On the other hand, Hepatitis B virus (HBV) is a double-stranded, enveloped DNA virus belonging to the Hepadnaviridae family. The core antigen (HBcAg), envelope antigen (HBeAg) and surface antigen (HBsAg) are most important HBV antigens and markers (Eugene *et al.*, 2004). However, HBsAg remains the main marker of HBV disease and appears shortly after acute infection (Brito and Alhyraba, 2008). Both HIV and HBV are known to be transmitted through sexual intercourse, blood and blood products, shared needle, other body fluids such as vaginal fluid, semen and breast milk (Koziel and Peters,

2007). Because of the overlap in risk factors, it is therefore common for some patients to be infected with both viruses. HIV/HBV co-infection is associated with increased risks of liver-related diseases including hepatocellular carcinoma (Benhamou, 2004).

The estimated prevalence of chronic hepatitis B virus (HBV) infection in patients with HIV infection is between 7.6% and 11% in the United States (Brito and Alhyraba, 2008). In sub-Saharan Africa, for instance, Ghana, HIV seroprevalence of HIV is between 3.8-19.2% (Ampofo *et al.*, 2002; Adjei *et al.*, 2006) and HBsAg was detected among 30 of 70 cases of liver cirrhosis, giving a prevalence rate of 42.9% compared to 7.5% (21 out of 280) among the negative population (Blankson *et al.*, 2005).

*Corresponding author: Tel: +232 33-8050-221; E-mail: fsahr@yahoo.com

Studies on the prevalence of HIV and HBV co-infection among Sierra Leoneans have not been done but, there are speculations that the prevalent rate of both infections in Sierra Leone might be among the lowest in sub-Saharan Africa. The Sierra Leone NAS and some workers estimate HIV prevalence at 0.9 - 3.29% (Sierra Leone NAS, 2006; Sahr *et al.*, 2008). Other independent studies estimate HBV prevalent at 2.6%- 5.1% (Wurie *et al.*, 1995; Garcí'a-Calleja *et al.*, 2006).

We studied the prevalence of HIV and HBV using the surface antigen marker in patients seeking diagnosis services at a private health facility in Freetown Sierra Leone. All the patients were unhospitalised, had no prior knowledge of their HIV or HBV status and chosen not only because previous studies have targeted selected groups to determine the national prevalence of either of the infection but to reflect possible mis-diagnosis of either of the viral infection. The prevalence of co-infection with the two viruses among the patients was also examined.

MATERIALS AND METHODS

Setting/Study Population

This study is a cross-sectional study conducted over a two months period at a private diagnostic centre in downtown Freetown, Sierra Leone. The diagnostic centre is a well equipped, reputable clinical laboratory, with its clientele from all over the country. As a result, the centre presents an integral part of health services for survey of diseases in Sierra Leone. All persons referred to the laboratory from different hospitals for either Hepatitis B or HIV testing based on suspicion on clinical ground were investigated during the study period. Those requesting for HIV testing were tested for HBV alongside the required test and those requesting for HBsAg were tested for HIV. Some of the patients chose not to disclose their age but all, confirmed they were above eighteen years of age. The patients were counseled and informed consent was obtained after the study was fully explained to them. They were assured the confidentiality of the results of the study.

Sample Collection and Analysis

10mls of venous blood was aseptically collected from each of the participants using plasma specimen EDTA collection tubes. The Plasma were kept up to three days at 2-8°C. Strategy III recommendation of the Joint United Nations Program on HIV/AIDS and WHO which involves three rapid assays for diagnosis and surveillance in low prevalent countries (UNAIDS, 1997) was

employed for HIV testing. As instructed by each kit manufacturer, all the plasma samples were tested for the presence of HIV antibodies with the Abbot determine HIV 1 & II, trinity Biotech's Capillus HIV 1/HIV 2, and Uni-Gold (Trinity Biotech, Ireland). Only samples with positive reactions with the three kits were considered positive. Hepatitis B infection status was tested with HBsAg latex (Abbott, USA), a slide agglutination test, and the manufacturer's procedures and recommendations were followed. Latex particles coated with monoclonal antibodies anti-HBsAg are agglutinated when mixed with samples containing HBsAg. A homogenous suspension of the latex particles and the sample indicates negative result.

Data Analysis

Data were recorded on a structured compilation sheet using SPSS version 12.0.

RESULTS AND DISCUSSION

In this study, 198 patients were examined for HIV and HBV infections. Seroprevalence assessment of HIV provides essential information for instituting and implementation of AIDS control programs and for monitoring HIV transmission within a country. 15.7% (31 of 198) were infected with HIV (Table 1). This is significantly higher than that of the national HIV/AIDS estimate of 2.1% in urban setting in Sierra Leone (Garcí'a-Calleja *et al.*, 2006). Nonetheless the prevalence is consistent with the reported prevalent rate in a hospital based study carried out in Tansen Palpa, Nepal among clinically suspected cases (Napit, 2001).

The HBsAg seroprevalence among the cohort studies was found to be 21.7% (43 out of 198) (Table 1). Of these hepatitis B virus mono-infected patients, seroprevalence of hepatitis B among males and females was 25.5% and 17.7% respectively. This high percentage of HBsAg in males correlates with the number of subjects screened and the results corroborate that of Muktar and co-workers which shows that none of the six females examined in their study tested positive for Hepatitis B surface antigen (Muktar *et al.*, 2005). The prevalence of hepatitis B infection varies from country to country and depends upon a complex mix of host, behavioural and environmental factors. It has been documented to be highest in regions with low socioeconomic levels.

In Sierra Leone, previous studies have reported 5.1% among middle to high socio-economic antenatal population (Wurie *et al.*, 1995) and 2.6% in a population of primary school children in Freetown, Sierra Leone (Hodges *et al.*, 1998). One possible explanation for these discrepancies could be the differences in the sensitivity and specificity of the latex agglutination technique employed for HbsAg screening. Additionally, the high percentage could be attributed to differences in socio-demographic background our study cohort and those of other studies. Thus, we

probably overestimate the true prevalence among the cohort examined. Figure 1 summaries the disease burden of the infections among the cohort. It would therefore be interesting to investigate the impact of selected socio-demographic variables in the transmission of this infection in subsequent studies. Nevertheless, based on the latex agglutination method, the over 20% HBsAg seroprevalence reported in this study is similar to reports from other developing countries (Alao *et al.*, 2009).

Table I: Seroprevalence of the Infections in Relation to Sex

Sex	No Screened	No (%) with HIV-1/2	No (%) with HBsAg	No (%) Co-infected with HIV1/2 + HBsAg
Male	102	17(54.8)	26 (60.5)	6(46.2)
Female	96	14(45.2)	17 (39.5)	7(53.8)
Total	198	31	43	13

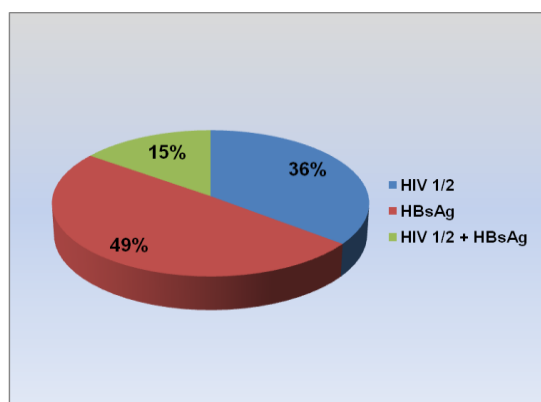


Figure 1: Summary of the Disease Burden among the 198 Patients

Results of this current study also revealed that 6.6% (13 out of 198) of the patients were co-infected with HIV and HBsAg. Co-infection with human immunodeficiency virus (HIV) and hepatitis B virus (HBV) has become a major global problem, leading to increased morbidity and mortality in developing countries. This however is the first report on the co-infection of HIV and HBV in Sierra Leone and it is particularly worrisome since it may pose a significant burden to health care services. Patients co-infected with HIV and HBV are known to have high progression to hepatitis fibrosis and other complications than those with HIV or HBV mono-infection (Brito and Alhyraba, 2008).

Considering the overall prevalence, it is intricate to compare our findings with other studies that are population based. However, this observed prevalence for the two viral infections may not be unanticipated since the subjects were already clinically suspected of having either HIV or HBV infections at a single health facility. This clearly increases case detection and may unlikely be representative of the general Sierra Leonean populace. The absence of data regarding risk factors and the ages of the patients also present a drawback. Regardless of these limitations, we consider that this study contains valuable information on the emerging trend of these viral infections in Sierra Leone. Also, we are of the opinion that either or both infections may be on the increase.

In conclusion, findings from this study have raised pertinent issues of public health importance particularly the co-infection of both viruses among patients in Freetown, Sierra Leone. In order to clearly define the disease burden, assess the transmission routes and other risk factors, there is a need to undertake a properly designed population study involving various populations so that proper public health measures could be instituted. Health education services and support programs for HIV/AIDS and HBV such as immunization should also be made accessible.

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