

Coinfection of Hepatitis B and C virus among HIV Patients Visiting Specialist Hospital in Ikole Ekiti, Nigeria

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Abstract

Infections from HIV, Hepatitis B and Hepatitis C viruses constitute a major public health challenge in sub-Saharan Africa, and concurrent morbidities from liver diseases among HIV patients have also been observed due to co-infection with hepatitis B (HBV) and C (HCV) viruses. Free testing of HBV and HCV are not provided alongside free HIV treatment in Nigeria. The aim of this study was to determine the prevalence of HBV and HCV infections among HIV-infected individuals, and describe the socio-demographic features and correlates of HIV and HBV/HCV co-infected patients at Ikole Ekiti, Nigeria. This was a cross-sectional study among HIV individuals attending Specialist Hospital, Ikole Ekiti, Nigeria. One hundred and fifty eight (158) HIV infected individuals were first screened and later tested for marker of HBV and HCV using Enzyme-linked Immunosorbent Assay (ELISA) and their demography information were collected. Data were analysed using packages within SPSS software and a $p < 0.05$ was regarded as significant. Prevalence rates of Hepatitis B and C virus infections obtained were 5.7% and 1.9%, respectively. Two (1.3%) had triple infection of HIV/HBV/HCV. The CD4 count of the sample tested ranged from 2 to 2140 cell/mm³ with a mean value of 210 cell/mm³. About 62.5% of them had CD4 T cell count less than 200 cells/mm³. The mean ALT and AST are 23.8 IU/L and 25.9 IU/L respectively. In conclusion, Co-infection with hepatitis B and C virus is common among HIV-infected individuals and this confirm the necessity for routine screening for this markers before initiation of highly active antiretroviral therapy. Also, HBV negative individuals should be immunized with HBV vaccine to improve the prognosis of their HIV status.

Keywords: Coinfection, Hepatitis B, Hepatitis C, HIV, ELISA

INTRODUCTION

About 34.2 million people are living with HIV/AIDS worldwide, and sub-Saharan Africa remains the most affected region [1]. Also, About 700 million and 23 million people are chronically infected with the Hepatitis B Virus (HBV) worldwide and Nigeria respectively and its complication resulted into mortality of about 600,000 every year in Nigeria. [2] Epidemiologically HIV, HBV and Hepatitis C virus (HCV) share common routes of transmission, hence the frequent occurrence of their co-infections [3]. Whether HBV or HVC affects HIV progression has been a matter of much debate. However, there are evidences to suggest that there is faster progression of HIV, even to AIDS-defining illness, in those co-infected with either HBV or HCV [4].

With the advent of highly active antiretroviral therapy (HAART) and the possibility for HIV patients living longer, clinicians are more likely to be confronted with issues relating to co-infection with these viruses and the management challenges they present, especially in resource-limited settings like ours. Several antiretroviral drugs (ARVs) have dual activity against HIV and HBV as such reliable epidemiological data are needed in order to make estimations on the logistical and economic impact of HIV/HBV co-infection. The aims of this study were to determine the prevalence of HBV and HCV infection among HIV-infected individuals, compare and correlates the socio-demographic features of HIV and HVB/HCV co-infected patients at Specialist Hospital, Ikole Ekiti, Nigeria

METHODS

This was a cross sectional study from November 2012 to April 2013 among HIV infected individuals attending the Institute of Human Virology in Nigeria (IHVN) of Specialist Hospital, Ikole Ekiti, Nigeria. Ethical approval was sought for from Permanent secretary, Ministry of Health, Ekiti. State, Nigeria. Informed consent was obtained from each study subject before administration of questionnaire. One hundred and fifty eight (158) HIV patients were randomly selected for the project. Four milliliter (4ml) of venous blood was collected from each patient into sterile plain bottles containers using standard procedures. The blood was allowed to clot and centrifuged at three thousand (3000) revolutions per minute (rpm) for five (5) minutes to separate the serum.

The sera extracted were stored in plain bottle at – 20 °C until tested. The sera were first screened and later tested using Enzyme Link Immunosorbent Assay (ELISA). HIV screening was done using the national algorithm; HBsAg test was done using First Response HBsAg Card Test, manufactured by PMC Medical (India) Pvt. Ltd. Kachigam Daman (UT) 396215, India. Anti-HCV test was done using Clinotech Diagnostic Kit manufactured by Clinotech Diagnostics Inc. Canada. CD₄ cell count were done using Cyflow SL-Green, manufactured by Patex, Germany. Liver enzymes were also estimated using ALT and AST kit Sigma Aldrich kit. Data were analyzed using packages within SPSS software.

RESULTS

Among 158 HIV individuals, there were 40/158 (25.3%) males and 118/158 (74.7%) females. These patients aged between 3-82 years, mean age was 35.5 years and median age was 35 years. One hundred and twenty four (83.2%) patients fell within the age 30-49yrs. Mean CD4 T lymphocyte count of the study participants was $210/\text{mm}^3$, while the median value was $142/\text{mm}^3$ (Table 1). Table 1 also showed the distribution of the human immunodeficiency virus (HIV) infected in study participant as per Centers for Diseases Control classification for HIV infected adults and adolescents with the mean CD4 lymphocyte count in each category (2).

Fifty four (34.2%) of patients had CD4 count of more than $500 \text{ cell}/\text{mm}^3$, 68/158 (43.3%) of patients had CD4 count ranging from 200-499 cells/mm^3 and 27/158 patients (17.09%) had CD4 count of less than $200 \text{ cells}/\text{mm}^3$. Table 2 classified alaline transaminase (ALT) and aspartate transaminase (AST) of the patients into

three (3) groups. 143/158 (90.50%) had normal ALT and 6 /158(3.80%) had raised ALT while 130/158 (82.3%) showed normal AST and 19 (12.0%) showed higher AST. 16/158 (10.1%) of patients were of age greater than 50 years, 8/158 (5.1%) of teenager and no children was affected.

This study detected nine patients that were positive for HBV and therefore the prevalence of HBV was 9/158 (5.7%). Among the HBV positive patients, there were 3/9(33.3%) males and 6/9 (66.7%) females. These patients aged between 28-54 years, mean age was 35.5 years. Eight (88.9%) of patients fell within the age range 30-49 years which implies the high prevalence of HIV among adult while 1/9 (11.1%) of patient fell within the range of 50-60 years. Five (55.6%), 3/9 (33.3%) and 1/9 (11.1%) of patients fell within the CD4 of greater than 500, 200-499 and less than 200 cells/mm^3 respectively as shown in table 1. HCV coinfection was found among studied population and 3/158 of patients were anti HCV positive, while 2/158 (1.3%) of patients had triple infection of HIV/HBV/HCV.

Table1: The baseline characteristics of HBV negative patients, HBV positive patients and overall study patients

Parameters	HBV -Ve(149)	HBV +ve (9)	All patient(158)
Sex			
Male	37(24.8%)	3(33.3%)	40
Female	112(75.2%)	6(66.7%)	118
Age			
<20	8(5.4%)	0	8
20-29	1(0.67 %)	0	1

30-49	124(83.3 %)	8(88.9%)	132
>50	16(10.7 %)	1(11.1 %)	0
Mean	35yrs	36yrs	35.5yrs
Range	3-82yrs	28-54yrs	3-82yrs
CD4			
>500	54((36.2 %)	5(55.6 %)	59
200-499	68(45.6%)	3(33.3%)	71
<200	27(18.2 %)	1(11.1 %)	28

Table 2: The Liver Enzymes Parameters of HBV negative patients, HBV positive patients and overall study patients

Parameters	HBV-Ve(149)	HBV +Ve(9)	All Patients
ALT			
<7	3(2.2%)	1(11.1%)	4
7-56	140(93.4%)	8(88.9%)	148
>56	6(4.3%)	0	6
AST			
1-4	0	0	0
5-40	130(87.25%)	9(100%)	148
>40	19	0	19

Table 3: The distribution of the human immunodeficiency virus (HIV) infected in study participant as per centers for diseases control classification for HIV infected adults and adolescents with the mean CD4 lymphocyte count in each category

Category	CD ₄	No of Patients	Mean CD4 count
1	T cells >500cells/mm ³	59	118.36
2	T cell 200-499cells/mm ³	71	32.24
3	T cells <200 cells/mm ³	28	32.11

DISCUSSION

From this study, the prevalence of HBV co-infections among HIV positive patients in Ikole Ekiti, Southwestern Nigeria is 5.7%. Individuals aged below 49 years are most affected and these are the workforce of the society which can have adverse effect on productivity. The prevalence is similar to the finding of 6.6% in Nigeria [4]. However, the prevalence of HIV/HBV co-infection in this study is lower to the findings of 11.9% in Ibadan [6] and 11.5% in Abuja [7], both in Nigeria. The differences in prevalence in these studies could be attributed to differences in patient selection.

Gender-specific prevalence showed that females had higher seropositivity for HIV- HBV co-infections (3.8%) than their male counterparts with 1.9% prevalence which may be due to polygamous relationship. This observation however, disagrees with the report by in which males had higher prevalence rate than females in both rural and urban areas with observation that male sex was an important risk factor for HBsAg positivity [8]. Co-infection of HCV among HIV individuals was detected in 3 (1.9%) of participants in our study, this is lower than the prevalence of 4.8% and 3% reported from Ibadan [6] and Abuja [6] both in Nigeria, respectively.

Reason for this regional disparity is not very clear. A study from Lagos which compares prevalence of Anti-HCV between HIV/AIDS patients and HIV-negative controls found prevalence of HIV/HCV co-infection to be 5.8%, and the HIV-positive participants were 7 times more likely to

have HCV infection than the HIV-negative controls [9]. In HIV infected patients, coinfection with HCV has been associated with a reduced survival rate [10]. The increase risk of HCV relates advanced liver diseases in people with HIV infection makes early HCV diagnosis a priority [11].

Unfortunately, this has not been given desire attention in Nigeria health care delivery system, largely due to dearth of information on HIV – HCV coinfection. Two (1.3%) had triple infection of HIV, HBV and HCV. The reason for this outcome is not far-fetched. It has been established that the overwhelming risk factor for HCV infection in almost all studies is a history of illicit injection drug use [11]. This habit, though very efficient in HCV transmission is a rare occurrence amongst the Nigerian HCV infected patients studied.

However the prevalence of viral hepatitis is reported to be higher in male Nigerians than the females [12], probably due to the higher frequency of exposures to infected blood and blood products by the male folks as a result of occupation and social behavior [13]. A number of studies in different transmission groups have confirmed that age is a co-factor for disease susceptibility and progression. (14) The mean CD4 count (237/mm³) for HIV-HBV coinfecting patients was significantly higher than that for with HIV alone (211/mm³). However, those with HIV/HCV co-infection had a mean CD4 count of (213.4/mm³) which was not different when

compared with the corresponding value for patients with HIV alone.

CONCLUSION AND RECOMMENDATIONS

This study showed that co-infection with hepatitis B and C virus is common among HIV-infected patients and this further reaffirms the need for routine baseline screening for this marker, as it is a major consideration in the initiation and choice of highly active antiretroviral therapy. Furthermore, those found to be negative should be immunized with HBV vaccine to improve the prognosis of their HIV status. Our findings confirm that HBV is a major co-morbid infection and a threat to HIV/AIDS patients in Nigeria. The high prevalence of HBV and HCV in HIV patients confirms the need for routine baseline screening for these markers in HIV- infected patients, as this could affect the choice of HAART regimen for the patients.

Alanine transaminase, AST and CD4 count were significantly higher among participants with HIV/HBV co-infection. Therefore, liver enzymes should be monitored more closely in HBV and/or HCV co-infected HIV patients. Co-infection of hepatitis B virus is common among HIV-infected persons and should be a major consideration in the initiation and choice of therapy. Studies on the impact of HIV infection in the natural history of chronic HBV and the effect of chronic hepatitis B on immune recovery are necessary.

However, the low prevalence of HIV/HCV co-infection reported in this study is probably due to the uncommon intravenous drug use in this

population. Infant vaccination against HBV is also recommended as this will likely reduce the HBV/HIV co-infection rate in the future. Furthermore, creation of awareness campaign to better inform the general public of these viruses, especially the rural areas where most people are not aware of the implications of Hepatitis infections, would ensure early reporting of cases and hence prompt treatment.

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Authors Contributions

OOO contributed and advised ASO on the concept and design of the experiment. ASO, OOO,OA and BAB did preliminary work while the rest of the experiment was done by ASO and BAB under the supervision of OOO who also did the statistical analysis. The write up was executed by ASO with contributions and proof – reading by other authors.

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