

CD4+T- Lymphocytes And Alanine Aminotransferases of HIV Positive Patients Co-Infected With Hepatitis B Virus As Seen At The University Of Abuja Teaching Hospital: A 10 Year Retrospective Study.

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Abstract

Introduction: Hepatitis B virus infection and HIV infection are both endemic in Sub-Saharan Africa and both have similar routes of transmission. Our aim was to determine the prevalence of HIV/HBV co-infection at the University of Abuja Teaching Hospital, Gwagwalada, and also to study the profile of CD4+ lymphocytes and alanine aminotransferase of patients with HIV/HBV co-infection compared to that of patients with HIV infection alone.

Method: The medical records of 1043 HIV patients enrolled into care at the University of Abuja Teaching Hospital from January 2005 to January 2015 were reviewed.

Results: Of the 1043 HIV patients that were studied, 116 had a positive HBsAg test, giving an HIV/HBV co-infection prevalence of 11.1%. The gender-specific prevalence rates of co-infection for males and females were 15% and 9.1% respectively ($p=0.004$). Though the mean serum ALT level among those co-infected was higher (39.0 International Units (IU)/L) compared to those with HIV infection alone (34.5IU/L), this difference was not statistically significant ($p=0.05$). The mean CD4+ cell count was significantly lower among those with HIV/HBV co-infection (341.96cells/ml) compared to those with HIV infection alone (410.68cells/ml) [$p=0.007$].

Conclusion: HIV/HBV co-infection is common in our setting; we found a prevalence rate of co-infection of 11.1%. More men than women were co-infected. CD4+ cell count was lower among those with co-infection compared to those with HIV infection alone.

Key words: HIV, HBV, ALT, CD4+ lymphocytes, prevalence.

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I. Introduction

Hepatitis B virus (HBV) infection and Human Immunodeficiency Virus (HIV) infection are endemic in Sub-Saharan Africa and both have similar routes of transmission. According to the joint UNAIDS and WHO report of 2015, 36.7 million people worldwide are living with HIV; 70% of whom live in Sub Saharan Africa [1]. About a third of the world population has been infected at one point in their lives with HBV, with about 350 million people having chronic infections [2, 3]. Roos E. Barth in a meta-analysis showed that the mean prevalence of HBV in Sub-Saharan Africa is 15% [4].

Significant co-infection rates have been reported in various studies across Sub-Saharan Africa. A study carried out in Ghana showed a co-infection rate of 8.8% [5], while a similar study in Kano, Northern Nigeria, found a co-infection rate of 12.3% [6]. Nguedia Assob et al reporting from Buea, Cameroon found a co-infection rate of 6.4% [7].

Studies of the co-infection between HIV and HBV have shown that HIV infection negatively impacts the natural history of hepatitis B leading to increased rates of persistent infection, loss of protective antibody against HBV, increased risk of liver cancer and liver-related mortality. However, the influence of HBV on HIV progression has been a matter of much debate. As HIV patients are living longer with the use of Highly Active Antiretroviral Therapy (HAART), HBV co-infection has become an issue of concern. Studies in some parts of Africa where HIV patients have survived on HAART for a long time, have shown that liver diseases associated with HBV are the major cause of morbidity and mortality in persons living with HIV and AIDS (PLWHA) [8,9, 10]. It is therefore necessary that physicians managing HIV patients in Sub Saharan Africa understand the challenges of HIV/HBV co-infection.

The aim of this study was to:

- 1) Determine the proportion of HIV patients accessing care at the University of Abuja Teaching Hospital who are co-infected with HBV.
- 2) To compare the profile of CD4+ Lymphocytes and Alanine aminotransferase of HIV patients co-infected with HBV to that of HIV patients not co-infected with HBV.

II. Methodology

This was a retrospective study over a 10-year period carried out among adult HIV patients registered at the University of Abuja Teaching Hospital (UATH), located in the Federal Capital Territory of Nigeria. The HIV clinic at UATH is one of the largest PEPFAR supported sites in the north-central zone.

The records of all the patients enrolled into care from January 2005 to January 2015 were studied. Data of patients who had records of the necessary bio data, serum alanine aminotransferase (ALT), Hepatitis B surface antigen (HBsAg) and CD4+ lymphocyte at enrollment was obtained. A total of 1043 patients were included in the study.

Data was analyzed using the Statistical package for Social Sciences (SPSS) version 16.0. Analyses were carried out using descriptive statistics with mean and standard deviations (SD) or proportions, for continuous or categorical variables, respectively. Differences and relationships were determined using Student's t-test and Chi-square test where applicable and a P value < 0.05 was regarded as significant.

III. Results

A total number of 6535 patients were enrolled into the HIV clinic during the study period. Of this number, 1043 had complete data (HBsAg results, baseline CD4 cell count and serum ALT) and were included in the study. A total number of 690 (66.2%) were females, while 353 (33.8%) were males. The majority of the patients (82%) were in the age range of 18-45 years.

Of the 1043 PLHIV that were studied, 116 had a positive HBsAg while 927 had a negative test. The prevalence of HIV/HBV co-infection in this study was 11.1%. The gender-specific prevalence rates of co-infection were 15% and 9.1% among the males and females respectively (p-value < 0.004).

The mean serum ALT level among those co-infected was 39.0 International Units (IU)/L compared to 34.5 IU/L among those with HIV infection alone (p=0.05).

The mean CD4+ cell count of the study population was 403 cells/ml. The mean CD4+ cell count of those with HIV/HBV co-infection was 341.96 cells/ml, while the mean for those infected with HIV alone was 410.68 cells/ml (p=0.007).

Table 1. Socio-demographic characteristics of the study population.

characteristic	HIV mono infection	HIV/HBV co-infection	total
Sex			
Male	300(85%)	53(15%)	353
female	627(90.9%)	63(9.1%)	690
Age			
<18	24(88.9%)	3(11.1%)	27
18-45	756(88.4%)	99(11.6%)	855
>45	147(91.3%)	14(8.7%)	161
Marital status			
Married	574 (88.7%)	73 (11.3%)	647
Single	144 (87.3%)	21 (12.7%)	165
Widowed	130 (92.2%)	11 (7.8%)	141
Divorced	19 (90.5%)	2 (9.5%)	21
Separated	31 (83.8%)	6 (16.2%)	37
N/A	29 (90.6%)	3 (9.4%)	32
Educational level			
Primary	231 (92%)	20 (8%)	251
Secondary	476 (89.1%)	58 (10.9%)	534
Post-secondary	197 (85.3%)	34 (14.7%)	231
none	23 (85.2%)	4 (14.8%)	27
Employment status			
Employed	740(89.4%)	88 (10.6%)	828
Unemployed	51 (83.6%)	10 (16.4%)	61
Student	27 (81.8%)	6 (18.2%)	33
Retired	6 (100%)	0 (0.00%)	6
Others	56 (86.2%)	9 (13.8%)	65
N/A	47 (94.0%)	3 (6.0%)	50

Table 2: Association between HBV status and demographic variables

variable	HBV positive	HBV negative	P value
Gender			
Male	53	300	0.004
female	63	627	
Age			
<18	3	24	0.566
18-45	99	756	
>45	14	147	
Marital status			
Married			0.678
Single	73	574	
Widowed	21	144	
Divorced	11	130	
Separated	2	19	
N/A	6	31	
Educational level			
Primary			0.870
Secondary	20	231	
Post-secondary	58	476	
none	34	197	
	4	23	
Employment status			
Employed			0.382
Unemployed	88	740	
Student	10	51	
Retired	6	27	
Others	0	6	
N/A	9	56	
	3	47	

Table 3: profile of CD4+ Lymphocytes and ALT of HIV/HBV co-infection compared with HIV mono-infection.

Variable	HIV/HBV co-infection	HIV mono-infection	P-value
Mean CD4+	341.9655	410.6796	0.007
Mean ALT	39 IU	34.5 IU	0.05

IV. Discussion

We analyzed the data obtained from the medical records of 1043 HIV positive patients enrolled into care at the University of Abuja Teaching Hospital Nigeria, over a ten-year period. The majority of the patients (66.2%) were females. This finding is consistent with the HIV epidemic trend in Sub-Saharan Africa where more females than males have been infected with HIV [11, 12]. We observed that out of the 1043 HIV patients recruited in this study, 116 of them were co-infected with HBV, giving a prevalence rate of 11.1 %. This result is similar to the general prevalence of HBV in Nigeria [13, 14, 15], and also similar to findings of co-infection with HIV in other parts of Nigeria. Otegbayo et al in Ibadan reported an HIV/HBV co-infection prevalence of 11.9% [16], while Hamza et al in Kano reported a prevalence of 12.5%. A lower prevalence rate of 8.8% was however reported by Gideon Kye-Duodu et al in Ghana, while Jules Clement Nguedia Assob et al in Cameroon reported a prevalence rate of 6.4%.

The gender-specific HIV/HBV co-infection prevalence rate in this study was statistically higher for males (15%) compared to females (9.4%) [P-value=0.004]. This is also similar to the findings of Hamza et al in Kano who reported gender-specific prevalence rates of 16.9% and 9.2% for males and females respectively. These higher prevalence rates in males may be due to the fact that males are more likely to have multiple sexual partners and are more likely to engage in unprotected sexual activities and other health-related risky behaviors than females.

Most of the study population (82%) fell in the age group of 18-45 years. The same finding is obtainable in other parts of Nigeria as well as other parts of Sub Saharan Africa at large where the young have been mostly hit by the HIV epidemic. Even though most of the co- infection occurred in this age range, there was no statistically significant relationship between age and co-infection rate (p-value=0.566).

We observed that most of the participants who had HIV/HBV co-infection had higher levels of ALT compared to those with mono-infection with HIV only. The mean ALT among those with co-infection was 39 IU compared to 34.5 IU for those with mono-infection. However, this difference was not statistically significant (p-value=0.05). Adewole et al in a similar study in National Hospital Abuja did not find any difference in ALT levels between the co-infected and mono-infected patients [17]. Jules Clement Nguedia Assob et al in Cameroon also did not find any difference in liver enzymes between the two groups.

There was a significant association between CD4+ cell count and HBV co-infection (p-value=0.007). The mean CD4+ cell count of our study population was 403 cells/ml. Those with HIV mono-infection had a higher mean CD4+ cell count (410.68 cells/ml) compared to those with HIV/HBV co-infection (341.96 cells/ml). Although Clement Nguedia Assob et al in Cameroon did not find an association with CD4+ cell count, several other studies carried out in other parts of Nigeria also found a significant association between CD4+ cell count and HBV co-infection, (Lar et al in Jos [18], Adewole et al in Abuja, Amadi et al in Enugu [19], Otegbayo et al in Ibadan). This finding shows that co-infection with HBV may lead to a more rapid decline in CD4+ lymphocytes among HIV infected patients in Nigeria.

V. Conclusion

A significant proportion of HIV infected patients accessing care at the University of Abuja Teaching Hospital are co-infected with HBV, we found a co-infection rate of 11.1%. There is a significant association between male gender and HBV co-infection. Though serum ALT levels were higher among those with HIV/HBV co-infection we could not establish any significant association between ALT levels and HBV co-infection. CD4+ cell counts were lower among those with HBV co-infection.

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