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Public Health Correlates of Co-Infections of Syphilis and Hepatitis B Among People Living with HIV at the General Hospital, Calabar

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Abstract

Introduction: *HBV and Syphilis share certain epidemiological characteristics and route of transmission with HIV, and co-infections are not uncommon. Against the backdrop of the need for understanding of the risk factors as a cornerstone for designing effective prevention and control interventions, this research determined the prevalence and some determinants of co-infection of hepatitis and syphilis among PLHIVs.*

Methods*: Descriptive cross sectional study among 350 PLHIVs seen at the General Hospital Calabar selected using multistage sampling method. Disease screenings were done using standard techniques. Data was analyzed using the SPSS software version 17.0.*

Results: *Prevalence of HBV and Syphilis were 0.014% and 0.086%, with co-infection rate of 1 out of 351 cases. Co-infections was not statistically significantly associated with any of the diseases (X^2 of 3.013 and p value of 0.006) despite only 205(58.3%) having low estimated sexual risk scores.*

Conclusion: *Though co-infection prevalence rate is low, HBV and syphilis screening should be included in pre-HAART care, and towards encouragement of sexual behavioural change among PLHIVs.*

Key words*: PLHIVs, Co-infections, Prevalence, Syphilis, HBV.*

Introduction

Around the world, millions of people are infected with some kind of Sexually Transmitted Infection (STI), making them a major global public health problem. Human immunodeficiency virus (HIV), hepatitis B and C viruses (HBV and HCV) are the three most common chronic viral infections in this category (Sarabanan et al., 2007). Their common modes of transmission are the denominator shared by these infectious diseases of humans (Alter, 2006, McGovern, 2007). Worldwide, chronic HBV infection affects about 10% of HIV-infected patients(Puoti, 2002).

In sub-Saharan Africa, it is estimated that 25 million people are infected with the HIV virus, and another 50 million people are HBV positive(Ocama, Opio and Lee, 2005)

The prevalence of chronic HBV co-infection among HIV-infected individuals in areas of low HBV endemicity has been reported to range from 6% to 14% (Alter, 2006; Spradlong et al., 2010). Prevalence figures are scarce in Nigeria and co-infection often remain undiagnosed in resource-limited settings because routine testing of both infections are not a part of most of the national programmes and guidelines.

The fact that HBV and HIV share certain epidemiological characteristics such as risk populations and transmission routes with syphilis puts HIV positive individuals at risk of co-infection with hepatitis B or syphilis or both. Co-infection with HIV has a major impact on the natural history, diagnosis, progression, morbidity, and mortality of HBV infection, most especially in the era of HAART (McGovern and Shermanm, 2009)

The rate of progression and complications from viral hepatitis has been reported to be accelerated in patients with HIV co-infection. HIV/HBV co-infected individuals are 6 times more likely to develop chronic hepatitis B than HIV negative individuals and this is more likely to occur in HIV infected men with lower $CD4^+$ cells(McGovern B, 2007).

Studies have shown that the clinical manifestations of certain STDs such as syphilis and HBV could facilitate the transmission of HIV. With syphilis, there is an increase in the shedding of HIV in co-infected individuals, because of the presence of a chancre which provides a mechanical break in the protective skin barrier, allowing access to the spread of HIV. The course of acute HBV may be modified in the presence of HIV infection, with a lower incidence of icteric illness and lower rates of spontaneous clearance of HBV. Thus a thorough understanding of the risk factors is a cornerstone for designing effective prevention and control interventions (Ezzati et al., 2002)

With the advent of human right, there has been an increase in the incidence of gay relationships. Possible occurrences of genital infections from deep penetrative anal and other form of sexual intercourse are common. Situation is worsened with the outburst of high risk group such as MSM and IDU. This research determined the prevalence and some determinants of co-infection of hepatitis and syphilis among PLHIVs seen at the Calabar General Hospital in Southern Nigeria.

Methods

Study area: Calabar is the capital of Cross rivers state, and the General Hospital is one of the predominant health facility in the state providing health care at the secondary level. The HIV prevalence in the state was 5.2%, a bit higher than the national average put at 5.1% (NACA 2010). The hospital received funding from NGOs funding HIV activities at one level or the other. The project site have an estimate of about 500 clients in HIV care. Syphilis and hepatitis test are not routinely carried out as part of the comprehensive care for HIV diagnosed clients

Study population: consists of registered HIV positive clients on ART aged 15 years and above and who has been receiving treatment within the hospital for at least 6 months.

Study design: descriptive crops sectional study among PLHIVs

Sample size estimation: Using the modified Leslie Fischer's formula for calculation of sample size for population less than 10,000 and p of 0.5, a sample size of 234 was calculated and this was increased to 260 to account for cases of attrition for any reason.

Sampling methods: A multi staged sampling method was employed in sample selection. In the 1st stage, 2 of the 4 clinic days were selected using simple balloting. In stage 2 on a clinic day, an alternative clinic week was randomly selected by simple balloting, and questions were randomly allocated to each selected clinic day. On a clinic day, a sampling frame of all diagnosed clients in the HAART clinic was made and a systematic sampling of 1 in 3 was used in selecting subjects for the study, and this continued until allocated questionnaires got exhausted.

Ethical approval: was obtained from LAUTECH Teaching Hospital Health Research ethics committee. Further permission was obtained from the site project director. A written informed consent was obtained from each client who eventually took part in the study.

Data collection: Laboratory scientists attached to the ART clinic conducted all the laboratory tests. A structured checklist specifically drafted to compliment the laboratory investigation was administered by trained ART nurses who could speak the local language. Variables in the checklist include socio-demographic characteristics, pattern of use of ART, current sexual risk behaviour.

Laboratory analysis

Blood was collected by routine phlebotomy and tested for hepatitis B surface antigen (HBsAg) using a one-step lateral flow rapid chromatographic immunoassay that qualitatively detects HBsAg. Antibodies used were developed against whole hepatitis B antigen isolated from HBV (Acumen labs and diagnostic centre, Bangalore, India) and has a relative sensitivity greater than 99.0%, relative specificity is 97.0%, and accuracy of 98.5%.

HIV 1/2 was tested according to the Nigerian national serial algorithm using Determine test kits (Abbot, Japan for Inverness Medical, Japan) first, which is a qualitative immunochromatographic assay that detects HIV 1 and 2 antibodies using recombinant antigens and synthetic peptides. While a positive Determine connotes HIV positive and further testing done using UniGold, a negative determine was

recorded as negative. VDRL screening test was used to label subjects as positive or non-reactive to the Syphilis test.

Data analysis: data collected was cleaned and entered into the SPSS software version 17.0 after validating data entered using double entry technique and searching for outlier values. Frequency tables and chart were generated. Correlation between socio-demographic data and other variables and prevalence of co-infections were carried out using bi-variate and multivariate data analysis. Statistically significant *p* values was set at <0.05 for all inferential statistics.

Results

Table 1 shows the distribution of the patients screened for Hepatitis B virus and syphilis according to sex and age range. 4.8 percent of the patients were within the age range less than 20, 39.2% within 21-30, 32% within 31-40, 17% within 41-50 and 7% was above 51.

Table 2 showed the results obtained for the HBV and Syphilis, 0.014% of the patients comprising 0.0057% males and 0.0086% females were positive for HBV. 0.0086 percent comprising male and female were positive for Syphilis in which 0.026% were male and 0.06% were female. Table 2 also shows that the female had a higher percent rate of the infection in both HBV (0.0086%) compare to male (0.0057%)while Syphilis show (0.06%) in female as against (0.026%) in male. There was a single case of co-infection of both HBV and syphilis.

Table 3 showed that 91(26.0%) of respondents had a CD4 cell count of less than 350, 269(76.9%) had calculated ART adherence percentage of 90-95% while 205(58.3%) had low estimated sexual risk scores.

Discussions

The prevalence of HBV among HIV patients in this study was 0.014% while that of Syphilis was 0.086% while co-infections was very very low in prevalence. This proportion is less when compared to several other studies within and outside Nigerian (Okocha et al., 2012; Pittman et al., 2014, Ankur et al., 2012). This may not be unconnected to the fact that most of the studies used high risk sexual group such as MSM and sex workers. However is still shows that prevalence of single infection and co-infections are not uncommon in the study area.

The rate of syphilis in the study was lower than the 2.7% projected by the National Behavioral Survey for syphilis infection among Nigerians. Syphilis and HIV are both transmitted sexually hence it is not surprising that more people were co-infected with syphilis than hepatitis. HIV has several effects on syphilis as it relate to its presentation, diagnosis, disease progression, and therapy. Syphilis however thus responsible for the risk of HIV transmission and acquisition due to presentation of causing genital ulcers. Sexually active men and women are prone to risk of infection with syphilis than HBV. Meanwhile, the incidence of co-infection of both HBV and Syphilis in HIV infected patients were not predominant(Ankur et al., 2014)

Co-infection of HBV and syphilis were found only in patients on ART while none were found on NART. A simple cross tabulation of these two variables showed no statistical significant association with X^2 of 3.013 and p value of 0.016. This is supported by another study (Silverman et al., 2008). Liver cirrhosis, cancer and subsequent death may eventually be due to untreated hepatitis, association between hepatitis and elevation of liver enzyme are also reported. There are some highlighted challenges that are likely to be encountered in treatment of patients who were co-infected with hepatitis as in which HAART regimen to use, how to reduce further hepatic damage, and when to initiate the patient on HAART, as in resource-limited settings with limited ARV options.

In conclusion, this study have shown that co-infections of HIV/HBV and HIV/Syphilis occur in our environment just like any other communities due to the fact that we shared some characteristics like transmission pathways, synergistic effects of these viruses and the effects of hepatitis and syphilis on presentation, morbidity, and mortality of HIV infection. Though co-infection prevalence rate is low, HBV and syphilis screening should be included among the investigations to be done by pre-HAART and this

could also an indication for community education and screening and encouragement of sexual behavioural change.

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Table 1: Distribution of HIV patients according to Age and Sex.

Range	**Number screened for hepatitis B virus and Syphilis antibodies**					
	Male	Male (%)	Female	Female (%)	Total	%Total
>20	6	0.017094017	11	0.031339031	17	0.048433
20-30	55	0.156695157	82	0.233618234	137	0.390313
30-40	44	0.125356125	68	0.193732194	112	0.319088
40-50	23	0.065527066	37	0.105413105	60	0.17094
>60	9	0.025641026	16	0.045584046	25	0.071225
TOTAL	**137**	**0.39031339**	**214**	**0.60968661**	**351**	1

Table 2: Prevalence of hepatitis B and syphilis antibodies

Tests carried out	Number of samples tested	Number of samples positive		Total
		Male (%)	Female (%)	
HBsAg	351	2(0.0057%)	3(0.0086%)	**5(0.014%)**
Syphilis Ab	351	9(0.026%)	21(0.06%)	**30(0.086%)**

Table 3: HIV management and sexual behavior pattern

	n	%
CD4 count at time of examinations		
<350 cells	91	26.0
>350 cells	260	74.0
Calculated ART adherence %		
<90%	32	9.1
90-95%	269	76.9
>95%	50	14.0
Estimated sexual risk score		
High	146	41.7
Low	205	58.3