Assessment of Hepatitis B Co-infection among HIV/AIDS Patients Attending Antiretroviral Therapy (ART) Clinic in Garaku, Central Nigeria

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ABSTRACT

This study sought to determine the seroprevalence of HIV/HBV co-infection among patients attending Antiretroviral therapy (ART) clinic in Garaku, a Metropolitan setting, in Central Nigeria. Blood samples were collected from 200 patients attending ART clinic and were screened for Hepatitis B infection using the ACON Hepatitis B surface antigen (HBsAg) Rapid test strip, between January to October, 2013. The overall prevalence of Hepatitis B co-infection was 13.00% (26). The HBV co-infection was more common among females than males, with prevalence rate of 53.85% (14) and 46.15% (12), respectively. Among the study population, persons aged between 32-38 years had the highest prevalence rate of co-infection 53.85% (14) while patients aged 18-24 years had the least prevalence of 7.59% (2). Single patients had more prevalence of HBV co-infection (57.69%) than divorcees (3.85%) with respect to marital status. Heterosexualism was the most occurring (50.00%) high risk factor while injecting drug use and blood transfusion were the least (3.85%) risk factors to HIV/HBV co-infection. Statistically, there was no significant difference between the HIV/HBV co-infection with respect to age, sex, marital status and high risk behavior (p>0.05). Co-infection with hepatitis B virus is common among HIV infected patients in our setting 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. Patients found to be seronegative for HBV should be immunized with HBV vaccine to improve the prognosis of their HIV.

Key words: Hepatitis B, HIV, co-infection, prevalence, ART

INTRODUCTION

Sub-Saharan Africa continues to bear the brunt of the global epidemic of HIV/AIDS, with two thirds of all adults and children with HIV infection living in the sub-continent (UNAIDS, 2006). Viral hepatitis particularly HBV infection is a major public health concern in the region as it affects an estimated population of 350 million and is the commonest cause of primary liver cell carcinoma in sub-Saharan Africa (Lavanchy, 2004). The HIV/AIDS and HBV share similar routes of transmission and their impacts have been persistently high in the sub-Saharan Africa. A person who is infected with both HIV and HBV is said to be HIV/HBV co-infected. The rate of progression and complications from viral hepatitis are accelerated in patients with HIV co-infection (Puoti et al., 2006; Thio, 2009).

After acquiring HBV infection, HIV infected individuals become six times more likely to develop chronic HBV than HIV negative individuals (Bodsworth et al., 1991; Gatanaga et al., 2000).
Consequently, there is increased morbidity and mortality from chronic liver disease among patients with HIV/AIDS. In addition, HIV infected individuals are more likely to lose previously developed protective anti-HBs antibody and develop acute hepatitis B infection; this risk is also associated with lower CD4 counts (Biggar et al., 1987; Laukamn-Josten et al., 1988).

Following initiation of antiretroviral therapy (ART), Immune Reconstitution Inflammatory Syndrome (IRIS) may occur which can lead to worsening liver disease including hepatic decompensation (Drake et al., 2004). In addition, after discontinuation of an ART regimen containing anti-HBV agents, reactivation of hepatitis B can occur (Bellini, 2009). If reactivation occurs, resuming an agent that is active against HBV is required. HIV also hastens the progression of HBV related liver disease. Cirrhosis is more common despite lower ALT levels than in HBV mono-infection and is also more common with lower CD4 counts (Colin et al., 1999; Di Martino et al., 2002).

The impact of co-infection is especially important in regions with widespread use of ART (Hoffmann and Thio, 2007). As the use of ART becomes more prevalent in parts of the world with high HBV endemicity and long term survival increases, it is likely that liver disease from chronic hepatitis B in HIV-infected population may emerge as a greater public health problem than before (Hoffmann and Thio, 2007).

HIV/HBV co-infection increases hepatotoxicity from Highly Active Antiretroviral Therapy (HAART) by three to four folds and the risk may be even greater in those with a higher CD4 + cell count change indicating a role for immune reconstitution. Some studies have also demonstrated decreased response to HAART in the setting of chronic HBV co-infection (Sheng et al., 2004). This problem is further compounded in developing countries like Nigeria by lack of proper funding of research programs on HIV/HBV co-infection, inadequate diagnostic facilities for detecting concurrent diseases in HIV infected patients (e.g., HBV), related hepatotoxicity and lack of effective HBV treatment, all of which could have a great impact on the effective management of this affect population.

In Nigeria, only a few centers carry out routine screening for HBV in HIV positive patients, as it is not yet adopted as a national policy by the government. This lapse may continue to expose a lot of HIV/HBV co-infected patients to HAART related hepatotoxicity and other HBV associated hepatic disorders (Bojuwoye, 1997; Rodriguez-Rosado et al., 1998; Sheng et al., 2004).

With the increasing number of patients accessing HAART in Nigeria, HBV co-infection will continue to be a growing health concern among HIV-positive population in the few decades to come unless and until our government implements a national guideline for the control, as well as management of this potential health threat among HIV-infected persons.

There is paucity of epidemiological information within central Nigeria on the seroprevalence of HBV co-infection among HIV/AIDS patients attending ART clinics. This study sets out to determine the prevalence of Hepatitis B co-infection among HIV infected individuals attending the ART clinic in central Nigeria.

**MATERIALS AND METHODS**

This was a cross-sectional study carried out among HIV positive adults attending ART clinic in General Hospital Garki, Central Nigeria between January to October, 2013. The study subjects were selected randomly without the prior knowledge of their clinical and family history after obtaining informed consent. They were of varying ages ranging from 18-52 and gender. Self administered questionnaire were used to obtain the socio demographic parameters and risk factors for hepatitis B viral infection in the participants.
Sample collection and processing: Blood samples were collected from 200 randomly selected patients who were already tested positive of HIV/AIDS and were consistently attending the ART clinic, their ages range between 18-52 years who had already given their consent. The 5 mL of venous blood were collected using careful procedures for blood collection from the subjects. Testing for Hepatitis B infection was done using the ACON Hepatitis B surface antigen (HBsAg) Rapid test strip (Acon Laboratories Inc. San Diego, CA). This is a rapid chromatographic immunoassay for the qualitative detection of Hepatitis B surface antigens. The test utilizes a combination of monoclonal and polyclonal antibodies to selectively detect elevated levels of HBsAg in whole blood, plasma or serum. The tests and results interpretation were carried out according to manufacturer's instructions while observing universal precautions.

Data analysis: Data was analyzed using Statistical Package for Social Sciences (SPSS) version 16.0. Chi-square test was used to determine the level of association between individual variables and Hepatitis B co-infection. The prevalence of Hepatitis B co-infection was represented in percentage.

RESULTS

A total of 200 patients attending ART clinic comprising 92 (46.00%) males and 108 (54.00%) females with male to female ratio of 1:1.2 were studied. Among patients attending ART clinic 26 (13.00%) cases were also found to be reactive for HBsAg (i.e., HIV/HBV co-infection) while 174 (87%) were non reactive for HbsAg screening. Among those with HIV/HBV co-infection,

<p>| Table 1: Socio demographic features in relation to HBsAg seropositivity among HIV patients attending ART clinic |
|-------------------------------------------------|---------------------------------|---------------------------------|</p>
<table>
<thead>
<tr>
<th>Groups</th>
<th>HIV positives (n = 200)</th>
<th>HIV/HBV coinfection (n = 26)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age group</td>
<td>No.</td>
<td>%</td>
</tr>
<tr>
<td>18-24</td>
<td>15</td>
<td>7.50</td>
</tr>
<tr>
<td>25-31</td>
<td>31</td>
<td>15.50</td>
</tr>
<tr>
<td>32-38</td>
<td>62</td>
<td>31.00</td>
</tr>
<tr>
<td>39-45</td>
<td>48</td>
<td>24.00</td>
</tr>
<tr>
<td>46-52</td>
<td>44</td>
<td>22.00</td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>92</td>
<td>46.00</td>
</tr>
<tr>
<td>Female</td>
<td>108</td>
<td>54.00</td>
</tr>
<tr>
<td>Marital status</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Single</td>
<td>119</td>
<td>59.50</td>
</tr>
<tr>
<td>Married</td>
<td>20</td>
<td>10.00</td>
</tr>
<tr>
<td>Divorce</td>
<td>10</td>
<td>5.00</td>
</tr>
<tr>
<td>Widow/Widower</td>
<td>51</td>
<td>25.50</td>
</tr>
<tr>
<td>High risk behavior</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sex worker</td>
<td>9</td>
<td>4.50</td>
</tr>
<tr>
<td>Blood transfusion</td>
<td>11</td>
<td>5.50</td>
</tr>
<tr>
<td>Heterosexual</td>
<td>110</td>
<td>55.00</td>
</tr>
<tr>
<td>Homosexual</td>
<td>4</td>
<td>2.00</td>
</tr>
<tr>
<td>Alcohol consumption</td>
<td>21</td>
<td>10.50</td>
</tr>
<tr>
<td>Injecting drug use</td>
<td>9</td>
<td>4.50</td>
</tr>
<tr>
<td>Unknown</td>
<td>36</td>
<td>18.00</td>
</tr>
<tr>
<td>Total</td>
<td>200</td>
<td>100.00</td>
</tr>
</tbody>
</table>
12 (46.15%) were males while 14 (53.85%) were females. The highest prevalence of co-infection was seen in age group 32-38 with prevalence of 53.85% (14) whereas age group 18-24 had the least prevalence of 7.69% (2). Singles had the highest prevalence of 57.69% (16) HIV/HBV co-infection while divorcees had the least prevalence 3.85% (1), with respect to marital status. High risk behavior indicated that heterosexuals had the highest prevalence of 50.00% (13) co-infection as injecting drug use and blood transfusion had the least prevalence 3.85% (1), respectively (Table 1). There is no statistically significant difference between the HIV/HBV co-infection with respect to age, sex, marital status and high risk behavior (p>0.05).

DISCUSSION

The prevalence of HIV/HBV co-infection in this study was 13%, confirming the issue of this co-infection among the population in Garaku, the study area in Central Nigeria. A report on a similar study carried out in Kano, North Central Nigeria indicated a prevalence rate of 12.5% (Hamza et al., 2013). These results, together with those obtained in other such studies by other researchers in other regions of Nigeria, 11.9% in Ilhada (Otegbayo et al., 2008), 11.5% in Abuja (Adewole et al., 2009) and 11.8% in Jos (Lar et al., 2013) all in Nigeria, depict the endemic nature of this co-infection in Nigeria. Further related reports of such co-infection have been made of similar studies carried out both within and outside Nigeria by (Ejele et al., 2004; Iwalokun et al., 2006; Nwokedi et al., 2006; Otegbayo et al., 2008; Adewole et al., 2009; Odunukwe et al., 2011), suggesting that the situation with HIV/HBV co-infection in our environment has not changed as inferred by Imade et al. (2004).

The prevalence of hepatitis B virus infection varies from country to country and depends upon a complex mix of behavioural, environmental and host factors. In general, it is lowest in countries or areas with high standards of living (e.g., Australia, North America and North Europe) and highest in countries or areas with low socioeconomic status (e.g., China, Southeast Asia, South America and Africa) (Sood and Malvankar, 2010).

In a similar study in Tanzania, outside of Nigeria involving a cohort of 17,539 HIV infected individuals, 6.2% were co-infected with hepatitis B (Hawkins et al., 2013; Braga et al., 2006), in a similar study in Brazil, got a prevalence of 5.7% which is lower than the prevalence obtained in our study. A US cohort of HIV infected individuals during the past 20 years using 2769 participant showed a prevalence of 39% (1078/2769), of whom 11% had chronic hepatitis B viral infections. However there has been a decline in the US on the overall prevalence over the past two decades (Chun et al., 2010).

In countries with intermediate and high HBV endemcity, the main routes of transmission of HBV are perinatal or in early childhood, in these countries HBV coinfection rates are 10-20% (23-25). In Nigeria, a country where HBV and HIV infection prevalences are high, HBV co-infection occurs in 10-70% of HIV infected individuals (Ejele et al., 2004; Iwalokun et al., 2006).

With respect to gender, this study showed that the prevalence of HIV/HBV co-infection is higher in females with the prevalence of 53.85% and lower in males (46.15%), having a co-infection ratio of 1.17:1. These findings are similar with the report by Okechukwu et al. (2014), who found higher prevalence in female (65.6%) than male (34.4%) with ratio 1.90:1. Another study of 260 HIV positive patients in Abuja, Nigeria, showed higher female preponderance for HIV/HBV co-infection (Adewole et al., 2009).

Age is not an important factor related to the prevalence of Hepatitis B infection in HIV infected individuals as revealed in this study which demonstrated that the participants aged 32-38.9 years had the highest frequency of HBV/HIV co-infection, similar to reported by Adewole et al. (2009),
Lar et al. (2013), Sarkar et al. (2013) and Okechukwu et al. (2014), with similar age ranges of 30-39 years, 36-40 years, 31-40 years and 36-40 years, respectively. This study demonstrated a decreasing prevalence of HBsAg positivity with age. This could be accounted for many routes of transmission which operates in the younger age group with apparent clearing of the infection in older group or death leaving between 5-10% as chronic carriers in older population. In all epidemiological studies, the age of acquiring infection is the major determinant of the incidence and prevalence rates. In this survey, the difference in prevalence of HIV and HIV/HBV co-infection in various age groups indicates that, this factor plays an important role in the prevalence rates (Sarkar et al., 2013).

High risk behavior indicates that heterosexuals have the highest prevalence (50%) of HIV/HBV co-infection. This is because of their unprotected heterosexual lifestyle among the population most affected which is associated with route of transmission. The least risk factor was recorded in blood transfusion and injecting drug use (3.85%). This was because most medical laboratories now carry out HBsAg screenings to all donors before transfusion. HBsAg seropositive donors are not always allowed to donate blood. Drug injection is a western lifestyle which is still fastly and gradually encroaching in our society as such, linking it as a source of hepatitis B in these subjects is not as simple. Subjects which are singles have the highest prevalence (57.69%) of HIV/HBV co-infection. This is probably due to their kind of lifestyles which serve as predisposing factors to hepatitis B infection.

The co-infection of hepatitis B and HIV has been shown to accelerate the progression and complication of HBV replication (Lavanchy, 2004; Puoti et al., 2006). This has been shown to cause loss of previously developed protective anti-HBs antibody leading to development of acute hepatitis B infection in HIV patients; this risk is also associated with lower CD4 counts (Nwolisa et al., 2013). The often used first line Antiretroviral drug combination in ART clinic consist of Lamivudine, Nevirapine and Zidovudine. Lamivudine is indicated in the management of both HIV and Hepatitis B infections, as it has been shown to be effective in reducing both HIV and HBV viral replication. However there has been documented resistance to lamivudine which is likely to complicate the course of the HBV disease in HIV infected patients (Walters et al., 2002; Rouet et al., 2008). Prolonged lamivudine therapy can also result in drug-resistant HBV mutants and has been associated with hepatitis flares (Guan, 2005; Sulkowski, 2008).

CONCLUSION
Our findings confirm that HBV is a major co-morbid infection and a threat to HIV/AIDS patients in Garaku, our study area in Central Nigeria. The relatively high prevalence of HBV infection 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. Greater public health enlightenment in health seeking behavior, safer sex practice and overall health promotion must be intensified if reduction of this hepatitis B viral burden is to be achieved. The HBV vaccination should be intensified among individuals who are at risk of acquiring hepatitis B virus.

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