

## Seroprevalence of Hepatitis B Surface Antigen [HBsAg] Co-infections among HIV Positive Individuals.

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**Abstract:** Confection with Hepatitis B virus (HBV) and HIV is common, with 70-90% of HIV-infected individuals in the United States having evidence of past or active infection with HBV. However, in Asia and sub-Saharan Africa, where vertical and early childhood exposure are the most common modes of transmission, respectively. Therefore, the prevalence of HBV among HIV-infected individuals is higher at an estimated 20-30%. One hundred and eighty-eight (188) HIV confirmed subjects on Highly Active Anti-retroviral Therapy (HAART), attending General Hospital Pankshin, Plateau state Nigeria, were enrolled for the study. Consent of the volunteers was sought after which a well-structured questionnaire was issued to volunteers to obtain social and demographic data. Overall result showed that, sixty-six 66(35%) were positive for the hepatitis B surface antigen (HBsAg). Gender distributions showed that 18(9.6) were males compared to 48 (25.5%) females. The mean value for CD4+ cell absolute count and values of alanine transaminase value for HBsAg positive subjects were determined with values ranging between 211-361 cells/ $\mu$ l and 25.0-27.3 I.u respectively, this is in contrast to the CD4+ cell absolute count, and alanine transaminase values for HBsAg negative subjects whose values ranged from 181-472 cells/ $\mu$ l and 14.3-28.3 I.u respectively. Similarly, the CD4+ count of HIV/HBV co-infected subjects, who were noted to respond to HAART recorded a better outcome. It is therefore needful that all HIV positive patients be screened for HBsAg, while patients who lack the HBsAb and do not have the HBsAg positivity or occult HBV should be vaccinated against HBV so as to influence the clinical management of subjects on HARRT.

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**Key Words:** HIV, HBV, Co-infection, HARRT.

### 1. Introduction:

**Human** immunodeficiency Virus (HIV) and Hepatitis B virus (HBV) are common chronic viral infections all over the world. They share similar transmission routes including sexual, blood-blood contact, and injecting drug usage (Saravanan et al., 2007; Koziel and Peters, 2007). Co-infection with HIV and HBV is very common in certain populations, such as intravenous drug users (IDUs) who often share the contaminated needles/syringes for intravenous drug injection. It has been reported that the world prevalence of HIV-HCV co-infection among IDUs can surpass 90% in certain populations (Maier and Wu 2002; Aceijas and Rhodes, 2000). It has been observed that HBV/HIV co-infection leads to increased morbidity and mortality as compared to HIV or HBV mono-infections, (Thio, 2009). The ever increasing burden of these infections has become a growing concern [Nikolopoulos, et al., 2009]. With increased access to antiretroviral drugs for HIV patients, migrating populations and social networking by intravenous drug use, cases of HBV and HCV co infections have been on the rise (Lacombe, et al 2010), coupled with the dramatic rise in survival rates of these individuals (Sulkowski, 2000). As a result of

these factors, cases of hepatic diseases have also been on the rise (Sulkowski, 2002). In high-endemicity areas of Africa and Asia, most HBV infections occur in the first 5 years of life. Perinatal transmission predominates in East and Southeast Asia; in Africa, most HBV transmission occurs before the age of 5 years, through close contact within households, medical procedures, traditional scarification, and, possibly, additional unidentified mechanisms (Merican, et al., 2000; Vardas, et al 1999).

The vertical transmission rate may be lower in Africa than in Asia partly because of a lower prevalence of hepatitis B e antigen (HBeAg) in Africa, a major determinant of perinatal transmission (Roingard et al., 1993). For these reasons, the prevalence of HBsAg reactivity in persons living with HIV infection from high HBV-endemicity areas reflects population prevalence. However, the prevalence of HBsAg reactivity could be slightly higher in persons who are HIV positive than in the general population, 10% of HBV infections are acquired by adults, even in high-endemicity areas, because of transmission by sexual exposure and blood products; reactivation of HBV infection can occur in subjects with advanced HIV infection who have

already cleared HBsAg. Finally, worldwide prevalence of HBV co-infection could be estimated to be 5%–10% in persons living with HIV infection. In countries where HAART is now available, liver failure has emerged as a major cause of death in HIV-infected individuals. Data from the Data Collection on Adverse Events of Anti-HIV Drugs (D: A: D) study suggest that hepatitis B accounts for 2% of deaths among HIV-infected persons with access to HAART [Weber, 2006]. This relatively high liver-related mortality is due to the accelerated course of hepatitis B in HIV-seropositive patients. Persistent HBeAg reactivity and persistent high levels of HBV DNA have been associated with an increased progression of hepatitis B in HIV co-infected persons [Puoti, 2006].

## 2. Materials And Method

### Study Area

The study was conducted among out patients attending the Pankshin General hospital in Pankshin LGA of Plateau state.

### Study population

One hundred and eighty-eight (188) HIV confirmed subjects on Highly Active Anti-retroviral Therapy (HAART), attending General Hospital Pankshin, Plateau state Nigeria, were enrolled for the study. This involves HIV-Positive patients on HAART attending the hospital.

### Questionnaire

A well-structured questionnaire was issued to obtain the demographic and other relevant data.

### Ethical Clearance

Ethical clearance was sought and obtained from Pankshin General Hospital, Plateau state

### Sample Collection and analysis

3mls of venous blood was collected, duly Labelled and allowed to clot and sera carefully separated into cryovial tubes and stored prior to the test at 2-8 ° c, and stored at -20 ° C prior use.

### HBsAg Testing

#### Method

3<sup>rd</sup> Generation ELISA kit (clinotech diagnostics 3<sup>rd</sup> generation), was used for the assay of samples collected.

## Principle

The clinotec diagnostic HBsAg micro titre wells were pre coated with monoclonal antibodies specific for HBsAg, the sera of particular subjects was added to the micro well with horseradish peroxidase (HRP) HBsAg if present will form antibody- HBsAg-antibody-enzyme complex, specific immuno complex formed is captured on the solid phase. After washing to remove sample serum proteins and unbound HRP-conjugate, chromogen solutions containing TetraMethylbenzidine (TMB) and urea peroxide are added to the wells. In the presence of Ag-Ab complex sandwich immunocomplex, the colourless chromogen is hydrolysed by the bound HRP conjugate to a blue coloured product. The blue colour turns yellow after the stop solution (sulphuric acid) is added to it. The amount of colour can be measured and it is proportional to the amount of antigen in the sample. Wells containing sample negative for HBsAg remain colourless.

## 3. Results

One hundred and eighty-eight HIV – positive subjects already on HAART for the period of three months to five years were in this study. Out of the one hundred and eighty eight (188) samples screened. 137(73%) were females and males 51(27%) as shown in (Table. I).

Out of the total number of 188 patient screened for hepatitis B surface antigen, 66 (sixty-six) were screened positive (35%) and 122 samples were negative (65%) as shown (Table .II).

The positivity prevalence of Hepatitis B surface antigen (HBsAg) were distributed among age group, as seen on table (.III) with each age group percentage.

The mean CD4 absolute count for the hepatitis B surface antigen positive samples shows that the males were 361 cells/μl while 211 was recorded for the females subjects screened (Table. IV). The mean CD4 absolute count and Enzyme Alanine transaminase mean value within age group is as shown in (table. V&VI).

Table 1: Total Distribution Of Samples Screened

Sex	No. Of Sample Screened	Percentage %
Males	51	27
Females	137	73
Total	188	100

Table 2: Distribution of Positive Samples Screened For HBsAg Based On Sex

Sex	No.Of Positve.	%	No Of Negative	%
Males	18	27	33	27
Females	48	73	89	73
Total	66	100	122	100

Table 3: Distribution Of Positive Samples Screened Based on Age of subjects screened

Age	Male	%	Female	%
0-10	1	0.53	0	0
11-20	0	0	2	1.06
21-30	5	2.65	25	13.29
31-40	7	3.72	15	7.95
41-50	5	2.65	6	3.19
<b>Total</b>	<b>18</b>	<b>9.6</b>	<b>48</b>	<b>25.5</b>

Table 4: CD4+ Absolute Count Value And Alt Value For Hbsag Positive Subjects

Sex	No.	Cd4+(Abs) Count	Alt Value.
Males	18	361	25.0
Females	48	211	27.3

Table 5: Mean CD4 +Absolute Count For Hbsag Negative Subjects

Age	No Of Samples	CD4+(ABS)Value
0-10	6	388
11-20	13	472
21-30	33	385
31-40	47	331
41-50	16	387
51-60	4	471
60+	3	181.

#### 4. Discussion

Hepatitis B virus in HIV infected individuals varies with the population studied (Alter; 2005). Hepatitis B virus is a well-documented opportunistic pathogen among HIV infected individuals, Thio; (2002). From the result obtained in this study a total of one hundred and eighty-eight subjects screened sixty-six (66), were sero-positive to the HBsAg; This is in agreement to the study conducted by Dhannvijay et al 1999, in a study in central states of India where 28% of HIV infected individuals harbored the Hepatitis B virus. However a low prevalence was recorded in a study by Ramanamma and Ramani (2000) 14.3% Hepatitis B positive cases. In another study conducted by Zago, et al, (2007) in a Brazilian STD clinic 37.6% of the HIV Positive attendees screened were positive for HBsAg, which is similar to the result recorded in this study. Further works in the Europe confirmed that, Hepatitis B virus infection has been found in 6-14% of HIV positive patients, (UNAIDS, 2005), the multidimensional immune suppression by HIV could compromise one's ability to recover spontaneously from acute hepatitis B virus infection, thus leading to a chronic disease. The prevalence of hepatitis B

surface antigen (HBsAg) among HIV individuals particularly in sub Saharan African has been given less attention, thus, there is a need for further studies and documentation and records in the sub Saharan Africa.

Considering gender; a higher 25.5% positivity was recorded amongst the female's subjects. This is contrary to the agreement with studies of Avikar, et al 2000, De los Angeles et al 2004 and Konopniki et al 2005); which recoded a higher rate of male HIV positive patients associated with HBV compared to females. However, on regional bases Lesi et al (2008); in Lagos reported prevalence's of 9.2% for Hepatitis B virus in Nigeria, while in Northern India, the ranges were 2.5%-5.3% for HBV co infection in HIV positive individuals as reported by Gupta, (2006). A study conducted by Tripathi et al (2007) reported prevalence of 77.3% among prisoners in Italy. In the study, results show 35% prevalence of the Hepatitis B surface antigen among the population studied.

The low CD4+ count obtained in subjects who are HBsAg, positive may suggest a more severe clinical course of HIV than those who are HBsAg. Negative. The HIV may destroy the CD4+-

lymphocytes, which are normally activated to combat HBV infection and stop disease initiation and progression. Table.V, shows that the mean value of CD4+ absolute count between the age groups record a mean age of 37years which showed increased in CD4+ absolute count .The best prognostic indicator of progression to aids in HIV infection is the number of CD4+ cells in the peripheral blood, if this number is less than 200/ $\mu$ l, there will be probable continued decline in CD4+ number, in such a patients leading to full blown AIDS. From the result of the CD4+ count and ALT(Alanine transaminase) assayed, for HBsAg positive samples it was observed that , despite an increase in the value of CD4+ count the enzyme level was found to be on steady increase, contrary it was observed that individuals that are negative for the HBsAg showed an appreciable rise in ALT. This could be attributed to the effects of the HAART on those patients. A sudden increase in blood levels of alanine transaminase , an enzyme that indicates liver inflammation amongst HIV/HBV co infected individuals, such a sudden increase may be as a result of the commencement of HAART.

### Conclusion

There is an increasing evidence of Hepatitis B surface antigen (HBsAg) positivity among HIV – positive patients from this study. This is probably due to the shared transmission pathways; hence the phenomenon of HIV and hepatitis B virus co infection is a cause for concern. Treatment of either hepatitis B virus or HIV is complex because of pharmacokinetics interactions' with components of HAART regimens. The medical community in Nigeria needs to be alert on this issue, while vaccination be encourage for those not yet infected. Also there should be periodic review of co infected patients more often .The CD4+ and enzyme alanine transaminase of co-infected patients should be a priority in care and monitoring of all co-infected patients most importantly, the general public should be educated on the e danger involved in a dual infection of HBV/HIV.

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