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# TITLE
# SEROPREVALENCE OF HEPATITIS B AND HEPATITIS C VIRUSES AMONG HIV-POSITIVE SUBJECTS IN IRRUA, EDO STATE.


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## ABSTRACT

### BACKGROUND

HIV/AIDS is one of the greatest public health threats to the human race in our time. There is evidence to suggest that there is a faster progression of HIV, even AIDS-defining illness when co-infections with HCV and HBV exist. Therefore, the present study was carried out to determine the seroprevalence of HBV and HCV infections among HIV-positive subjects in Irrua and its associated risks factors.

This was a one year prospective study in which a serological study for hepatitis B and hepatitis C viruses was performed on 250 HIV positive subjects in Irrua. The subjects were tested for the presence of hepatitis B surface antigen (HBsAg) and anti-HCV antibodies using rapid diagnostic test kits.

### RESULTS.

Of the 250 HIV- positive subjects screened, 26(10.4%) HIV subjects were seropositive for hepatitis B surface antigen (HBsAg). 12(4.8%) for anti-HCV antibody and 1(0.4%) tested positive for both viruses (HBV and HCV). Sex-related prevalence of HBsAg was 17(6.8%) ($P<0.05$) in females and

4(1.6%) of males with only one female (0.4%) co-infected (HBV/HCV) (p> 0.05).

## CONCLUSION

In conclusion, there was moderate prevalence of both HBV and HCV among HIV subjects in Irrua with females having a significantly higher distribution than males and previous history of multiple sexual partners as the major risk factor for the transmission of these viruses. This emphasizes the need for routine screening for both HBV and HCV among HIV positive subjects n Irrua..

KEY WORDS: Hepatitis B virus, Hepatitis C virus, HIV, Seroprevalence.

## INTRODUCTION

HIV/AIDS is one of the greatest public health threats to human race in our time. It is a global problem because there is no country untouched by HIV/AIDS. The burden is greatest in the sub-saharan Africa with high poverty level and low socio-economic status (1). In AIDS epidemic update published by WHO(2), global death rate due to AIDS was about 3.5million people, and people living with HIV infections about 5million people per year. According to the 2005 seroprevalence survey in Nigeria, more than 5 million people were infected with prevalence rate of 4.4%.The highest prevalence in a Nigerian state (Benue) was about 10.8% with females more affected than males(3).

Hepatitis viruses produce acute inflammation of the liver resulting in clinical illness characterized by fever, gastrointestinal symptoms such as nausea and vomiting and jaundice. Current studies have shown that Nigeria is classified among the group of countries endemic for HBV infection, although about 18 million Nigerians are infected (4). Previous studies have also shown that over 200 million people worldwide are estimated to have been infected with hepatitis C virus (5).

The hepatitis B virus (HBV), hepatitis C virus (HCV) and human immunodeficiency virus (HIV) are devastating viruses that share certain epidemiological characteristics such as risk population and transmission routes. This puts the HIV positive individuals at risk of co-infection with either hepatitis B or hepatitis C viruses or both. Hepatitis C virus may accelerate the evolution and progression of liver disease in HIV infected individuals (6), HIV/HBV co-infected patients are also at an increased risk of developing cirrhosis, having higher level of HBV replication and lower rates of spontaneous resolution of previous infections(7).

There is evidence to suggest that there is faster progression of HIV, even AID-defining illness where co-infection(s) exists (8).With the advent of highly active antiretroviral therapy (HAART) and the attendant possibility of HIV patients living longer, it is envisaged that clinicians are more likely to be confronted with issues relating to co-infections. Thus, the purpose of this

study was to determine the prevalence of HBV and HCV infections among HIV-positive subjects in Irrua (a rural/sub-urban area) and to look at the risk factors that are associated with their transmission.

## MATERIALS AND METHODS

Two hundred and fifty (250) HIV positive subjects comprising 65 males and 185 females who presented at the HIV Adult Clinic of Irrua Specialist Teaching Hospital, Irrua between January and December, 2010 were recruited for this study. The subjects were between 20 to 40 years of age (males and females). Informed consent was obtained from each subject and those who had received hepatitis vaccination were excluded from the study .Thereafter, about 3ml of blood sample was obtained by venepunture from each of these subjects and the sample introduced into an EDTA container and mixed and the plasma separated for HBsAg and HCV screening.

HIV I & II screening was carried out following the National guideline for HIV rapid testing with a combination of at least two test kits (Determine and Unigold HIV test kits) for the positive samples. Determine HIV 1/2 test kits have a specificity of 97.96% and sensitivity of 100% (Abbot Japan Co. Ltd) while Unigold HIV test kits have 100% sensitivity and 99.7% specificity (Trinity Biotech plc,Bray.Ireland). Both HBsAg and HCV were carried out using Diaspot one step hepatitis B surface antigen test strips and Diaspot one step hepatitis C virus test strips respectively (Diaspot Diagnostics Inc., USA).These are qualitative, lateral flow immunoassay test kit devices for the detection of both HBsAg and HCV in plasma with a relative sensitivity of 99.0% and relative specificity of 98.6% respectively. The specimen collection, preparation and tests were done according to the manufacturers' instructions. Positive and negative controls were included in each batch of tests to confirm test procedures and also to verify test performance.

A questionnaire was administered to capture the biodata and the risk factors to the infections among the patients who were recruited for the study. A sample of the questionnaire used is shown as appendix 1:

Data were analysed using Epi-info, version 3.3

## RESULTS

Of the 250 HIV subjects screened for HBsAg,26(10.4%) were sero – positive. The prevalence was significantly higher ($P< 0.05$) in females (6.8%) than males (3.6%).Also subjects of age group 31 – 39 had the highest prevalence of 6.4% (Table 1).

Table 2 shows prevalence of hepatitis C among HIV – positive subjects in Irrua . Out of the 250 HIV subjects screened for HCV,12 (4.8%) were sero – positive.The prevalence was significantly higher ($P <0.05$) in females (3.2%) than males (1.6%).

Table 3 shows the prevalence of both HCV and HBV infections among

HIV – positive subjects in Irrua. Of the 250 HIV screened for both HBsAg and HCV.1 (0.4%) recorded triple infections (i.e HIV/HBV/HCV).

Table 4 shows the prevalence of HBV and HCV among HIV subjects according to risks factors. Of the 26(10.4%) sero – positive for HBV. 19 representing 73.1% of the subjects who had previous history of multiple sexual partners recorded the highest rate followed by previous blood transfusion (19.2%) while both unsafe injection and scarification marks accounted for the lower rate of 3.8% each. Previous surgery, I.V .drug abuse and no identifiable risk factor(s) recorded 0%.Also, of the 12 (4.8%) sero-positive for HCV,9 representing 75% of the subjects who had previous history of multiple sexual partners recorded the highest rate followed by previous blood transfusion (16.67%) and scarification marks accounted for the lowest rate of 8.33%.Previous history of multiple sexual partners accounted for 1 representing 100% of HIV subjects co – infected with both HBV and HCV

Table 1 – Prevalence of hepatitis B among HIV – positive individuals in Irrua.

| Characteristics | HIV Only 250(100%) | HIV/HBV + 26(10.4%) | HIV/HBV - | P.value | Remark |
|---|---|---|---|---|---|
| Age group | | 26(10.4%) | 224(89.6%) | < 0.05 | S |
| 20- 29 | 66 (26.4%) | 6(2.4%) | 60(24%) | < 0.05 | S |
| 30-39 | 113(45.2%) | 16(6.4%) | 97(38.8%) | < 0.05 | S |
| 40 and Above Sex | 71(28.4%) | 4(1.6%) | 67(26.8%) | < 0.05 | S |
| Male | 65(26%) | 9(3.6%) | 56 (22.4%) | < 0.05 | S |
| Female | 185(74%) | 17(6.8%) | 168(67.2%) | < 0.05 | S |

Key: S- Significant

Table 2 – Prevalence of hepatitis C among HIV – Positive individuals in Irrua

| Characteristics | HIV Only | HIV/HCV Positive | HIV/HCV Negative | P.Value | Remark |
|---|---|---|---|---|---|
| Total | 250(100%) | 12(4.8%) | 238(95.2%) | < 0.05 | S |
| Age group | | | | | |
| 20-29 | 66(26.4%) | 4(1.6%) | 62(24.8%) | < 0.05 | S |
| 30-39 | 113(45.2%) | 4(2.4%) | 107(42.8%) | < 0.05 | S |
| 40 and above | 71(28.4%) | 2(0.8%) | 69(27.6%) | < 0.05 | S |
| Sex | | | | | |
| Male | 65(26%) | 4(1.6%) | 61(24.4%) | < 0.05 | S |
| Female | 185(74%) | 8(3.2%) | 177(70.8%) | < 0.05 | S |

Key: S- Significant

**Table 3** Prevalence of HIV/HBV/HCV infections among HIV – Positive individuals in Irrua

| Characteristics | HIV alone | HIV/HBV/HCV Positive | HIV/HBV/HCV Negative | P.Value | Remark |
|---|---|---|---|---|---|
| Total | 25(100%) | 1(0.4%) | 249(99.6%) | <0.05 | S |
| Age | | | | | |
| 20-29 | 66(26.4%) | - | 66(24.6%) | >0.05 | NS |
| 30-39 | 113(45.2%) | 1(0.4%) | 112(44.8%) | <0.05 | S |
| 40 & above | 71(28.4%) | - | 71(28.4%) | >0.05 | NS |
| Sex | | | | | |
| Male | 65(26%) | - | 65(26%) | >0.05 | NS |
| Female | 18.5(74%) | 1(0.4%) | 184(73.6%) | <0.05 | S |

**Key:** S- Significant
NS- Non-significant

**Table 4** : Prevalence of Hepatitis B and Hepatitis C viruses in HIV subjects according to risk factors.

| Risk factors | HIV/HBV | HIV/HCV | HIV/HBV/HCV | P.Value | Remark |
|---|---|---|---|---|---|
| Previous blood transfusion | 5(19.2%) | 2(16.67%) | - | >0.05 | NS |
| Previous history of multiple sexual partners | 19(73.1%) | 9(75.0%) | 1(100%) | < 0.05 | S |
| Unsafe injection | 1(3.8%) | - | - | - | NS |
| Scarification marks | 1(3.8%) | 1(8.33%) | - | > 0.05 | NS |
| Previous surgery | - | - | - | | |
| I.V drug abuse | - | - | - | | |
| No identifiable risk factor | - | - | - | | |
| Total | 26(100%) | 12(100%) | 1(100%) | | |

**Key:** S- Significant
NS- Non-significant

## DISCUSSION

The classification of high endemicity of hepatitis B virus (HBV) has been defined as HBsAg greater than 7% in an adult population. The prevalence of HBsAg seropositivity of 10.4% was recorded among HIV subjects in Irrua. In comparison to other studies, the prevalence of HBV infection in this study was higher than 5.7% reported among Brazillian patients(9) and 6.3% among HIV patients in Jos, Nigeria(10), but close to the prevalence of 11.5% in Abuja(11).

In contrast, our finding was not consistent with the prevalence of 15.1% reported in a study in Jos(12),17.1% among commercial sex workers in Nassarawa State (13),18.9% from Fiorianopolis, Brazil among HIV – positive persons (14),21.3% in Ibadan (15) and 23.9% in another study in Jos (10).The reason for the moderate prevalence rate in Irrua may not be unconnected with the rural/sub-urban nature of Irrua among others.

This study also found that the prevalence of HBsAg was significantly higher in females (6.8%) than males (3.6%) ($P<0.05$).These rates disagree with the findings of Otegbayo et al.,(15) who found that the HBsAg prevalence was more common among males than females citing 15.4% against 10.1%. Similarly. Gupta and Singh(16) in a separate study among Indian patients co – infected with HIV and HBV observed the prevalence of 8.55% and 3.39% in males and females respectively. These reports are not consistent with Adewole *et al.*,(11) who reported a ratio of 1:1 for both males and females co-infected with HIV/HBV in North central Nigeria. The reason for the female preponderance in Irrua could be because females are slightly more vulnerable physiologically to HIV infection and other sexually transmitted viruses than males (The area of mucous membrane exposed during intercourse is larger in the females than in the males or that females are more in number among our HIV positive patients, perhaps because females have a more health seeking behaviour compared to their male counterparts).

Furthermore, individuals aged 30-39 years old recorded the highest prevalence rate of 6.4% against 2.4% and 1.6% respectively among the other age groups. This is in consonance with Adewole *et al.*, (11) who reported that individuals less than 40years old have the highest rate of getting infected and that this age group encompasses individuals at greatest sexual activities hence probably showing the mode of transmission of the virus.

From this study also, the prevalence of hepatitis C virus (HCV) infecton among HIV-positive subjects in Irrua was 4.8%. The rate is higher than the 1.03% in Europe, 1.17% in America. 2.15% in South East Asia and 3.9% in Western Pacific (17) and 3.0% reported by Adewole *et al.*,(11) but close to the 4.3% reported among presumed low risk group in Jos (12), 4.6% in Eastern Mediterranean and 5.3% in some countries in Africa (17).This is however in sharp contrast to the reports of 17% in

Brazil (18),19% in Japan (19). The differences in prevalence in these studies could be attributed to differences in sample size and geographical location of the study population unlike this study which was carried out in Irrua, a rural / sub-urban area.

Furthermore, the finding in this study also recorded a higher prevalence of HCV in females (3.2%) than males (1.6%).This is also consistent with the report of Adewole *et al.*,(11) where they reported that females were the most infected with HCV than males. The reason for this may be due to the fact that women are biologically and socially more vulnerable to both viral infections particularly in the third world (20).

Individuals belonging to age group 30 – 39 recorded the highest prevalence of 2.4% against 1.6% and 0.8% respectively among the other age groups. This also correlates with age of greatest sexual activity thus lending credence to the role of sexual transmission (21).These was also no statistically significant ($P>0.05$) association between sex and HCV infection among HIV subjects in Irrua.

However, a very low prevalence rate of 0.4% for both viruses (HBV and HCV) co – infection was recorded among HIV positive subjects in Irrua. This is in agreement with the report of 0.4% by (12) but sharply disagrees with the 1.5% reported in Abuja (11),12% reported in Lagos (22) and 14.9% in Enugu (23).The factors that might have contributed to the very low prevalence of HBV/HCV co – infection among HIV positive subjects in Irrua compared to other areas in Nigeria could be attributed to the following : differences in sample size, geographical location of the study population and other social – cultural practices.

## CONCLUSION

In conclusion, there was a moderate prevalence of both HBV and HCV among HIV subjects in Irrua with females having a significantly higher distribution than males and previous history of multiple sexual partners as the major risk factor for the transmission of these viruses. Therefore, routine screening for both HBV and HCV among HIV subjects should be encouraged. Also, hepatitis B vaccination may reduce the transmission of HBV among HIV positive individuals in Irrua.

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## APPENDIX 1

QUESTIONAIRE OF SERO PREVALENCE OF HBSAG AND HCV

**Bio Data.**

Age:

Sex:

**Risk Factors.**

1. Previous blood transfusion – Yes or No
2. Number of sexual partners – 1 or more.
3. Injections outside the hospital – Yes or No
4. Scarification marks – Yes or No
5. Previous surgery – Yes or No
6. Use of I.V. drugs of abuse – Yes or No
7. Others -