

Original Article

Seroprevalence of Hepatitis C Virus in HIV/AIDS Patients in Jos, Nigeria

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Abstract

Introduction: Hepatitis C Virus (HCV) infection is a life threatening infection and is more serious in people living with HIV/AIDS (PLWHA). It leads to liver damage more quickly and may also affect the treatment of HIV infection. This study was aimed at determining the seroprevalence of HCV, possible risk factors for HCV infection and highlighting the importance of HCV screening in PLWHA in Jos, Nigeria. **Materials and Methods:** One hundred and eighty two blood samples were collected from confirmed HIV-positive patients attending clinics at the Faith Alive Hospital in Jos for the detection of anti-hepatitis C antibodies. An enzyme linked immunosorbent assay (ELISA), DIAL-ABTM HCV Ab test kit (DIALAB GmbH, Australia) was used for the analysis. **Results:** Sixty one of the 182 samples tested positive giving a co-infection rate of 33.9%. Old age and low educational levels of the patients were found to be associated with HCV/HIV co-infection ($P < 0.05$). However, the patient's occupation and marital status and the possible risk factors analyzed which included: histories of blood transfusion, sexually transmitted infection (STIs) apart from HIV, surgery, multiple sex partners and injecting drug use were not associated with HCV infection ($P > 0.05$) for the subjects screened. Also, the CD4 cell count ranges of patients and the use of antiretroviral therapy were not associated with HCV infection ($P > 0.05$). **Conclusion:** The high HCV/HIV co-infection rate observed indicates a possible increase in the development of chronic liver diseases and hepatocellular carcinoma in these patients. Therefore, increasing education on HCV infection and routine screening of HIV patients for anti-HCV antibodies is critical. **Key words:** Hepatitis C virus, people living with HIV/AIDS (PLWHA), anti-hepatitis C antibodies, chronic liver diseases, hepatocellular carcinoma.

Introduction

Hepatitis C is a fast growing, life threatening disease. HCV is a blood borne pathogen. Unlike HIV, which dies in under a minute outside the body, HCV survives as an infectious

virus in dried blood for several days¹. Worldwide, about 4 to 5 million people have both HIV and hepatitis C².

Studies in Nigeria on the prevalence rate of HCV shows 2.1% in the general population, 3.6-8.0% in blood donors, 5.1% in high risk population, 8.2% in HIV – infected population and 21.9% in HIV-1 positive pregnant women^{3,4,5,6}. HCV infection is more serious in HIV-infected persons. It leads to liver damage more quickly. Co-infection of HCV may also affect the treatment of HIV infection⁷.

Although, unknown to infected persons, HIV makes HCV progress more quickly as well as makes HIV treatment more complicated. This is mainly because the liver which is affected by HCV processes most HIV drugs¹. Since the health effects of co-infection can be severe, early screening and detection are critical².

The virus is transmitted primarily through blood and blood products⁸. Transmission of HCV through blood transfusion and drug use has been well documented⁹. Following the widespread use of highly antiretroviral therapy (HAART), AIDS mortality has progressively decreased, while chronic hepatitis, linked primarily to HCV, have become one of the leading causes of morbidity and mortality^{10, 11, 12}. In treating HCV/HIV co-infection, an increase or a drop in the CD4 count of patients is unlikely to reflect a real change in the immune system¹. This study sort to determine the prevalence of HCV infection among a cohort of HIV patients in Jos, Nigeria.

Materials and Methods

Subjects

One hundred and eighty two (182) PLWHA attending clinics at the Faith Alive Hospital in Jos were recruited for the detection of anti-hepatitis C antibodies after obtaining ethical clearance. An informed consent form and a structured questionnaire were used to obtain each patient's acceptance

and the following information: sex, age, occupation, marital status, educational status, history of blood transfusion, history of STIs apart from HIV, history of organ transplant, history of surgery, having multiple sex partners, engaging in injecting drug use and the use of antiretroviral drugs, while the current CD4 count of each patient was obtained from the hospital data with their consent.

Collection of Specimens

Between the months of May and August 2007, venous blood samples (5ml each) were aseptically collected from HIV infected subjects. Each sample was dispensed into an ethylene diamine tetra acetic acid (EDTA) container immediately after collection and gently mixed to avoid coagulation. Plasma was separated from each blood sample (when the red blood cells were settled) as early as possible to avoid haemolysis and the plasma samples were stored at -20°C until analysis.

Detection of anti-HCV antibodies

Two DIALAB ELISA kits were used for the detection of anti-HCV antibodies and the analysis was as specified by the manufacturers.

Results

Sixty one of the 182 samples tested positive giving a co-infection rate of 33.9%. The prevalence of anti-HCV antibodies was higher among males; with 18 (40.9%) positive patients out of 44 screened whereas 43 (23.5%) females were positive out of 138 screened. HCV infection was recorded in all age groups analyzed with the exception of ages 11-20.

Seropositivity was high among subjects above 50 years with 5 (50%) patients positive for anti-HCV antibodies out of 10 screened. These demographic features [sex and age group distribution (Figure 1)] were found to be associated with HCV/HIV co-infection. Others including; educational status (Figure 2), marital status (Table 1) and occupation (Table 2) were also analyzed. The educational status of the patients was also found to be associated ($P<0.05$) with HCV/HIV co-infection. HCV seroprevalence was higher among subjects with only a primary level of education with 23 (45.1%) patients positive for anti-HCV antibodies out of the 51 screened.

In relation to the occupation and marital status of subjects, HCV seropositivity was higher among subjects in the civil service with 18 (45.0%) patients positive for anti-HCV an-

tibodies out of the 40 screened and subjects who were widowed with 15 (41.7%) positive patients out of the 36 screened. But these parameters were not associated ($P>0.05$) to HCV/HIV co-infection. Factors that have been documented as risk factors including: history of blood transfusion, history of STIs apart from HIV, history of surgery, having multiple sex partners, and injecting drug use were also analyzed (Table 3). No association ($P>0.05$) was observed between these factors and HCV co-infection in this study. Out of the total of 33 patients screened who have had at least a blood transfusion, 13 (39.4%) were positive; 37 of 111 subjects with a history of STI (33.3%) were positive; 12 of 32 subjects that have had surgery in the past (37.5%) were positive for anti-HCV and only 6 of 96 IDUs (37.5%) were positive to anti-HCV.

The CD4 cell count of the patients (Table 4) had no association ($P>0.05$) with HCV infection. Anti-HCV antibodies in PLWHA in relation to their CD4 cell count showed that out of the total of 37 patients screened with CD4 counts between 1-200 cells/ μL , 12 (32.4%) were positive, 63 with CD4 counts between 201-400 cells/ μL , 23 (36.5%) were positive; of 40 with CD4 counts between 401-600 cells/ μL , 13 (32.5%) were positive; of 23 with CD4 counts between 601-800 cells/ μL , 6 (26.1%) were positive; of 11 with CD4 counts between 801-1000 cells/ μL , 3 (27.3%) were positive; and of the 8 with CD4 counts above 1000 cells/ μL , 4 (50.0%) were positive. While in relation to the use of anti-retroviral therapy, a total of 90 patients were screened and 33 (36.7%) were positive for anti-HCV antibodies.

Discussion

In this study, the seroprevalence of anti HCV antibodies in PLWHA is 33.9%. This is similar to studies carried out in United States of America/Europe (35%)¹³ and in Brazil (36.2%)¹⁴. On the contrary, this rate is higher than 5.1%, 8.2% and 5.7% among HIV/HCV co-infected individuals in Nigeria^{3,5,15} and 21.9% among HIV-1 positive pregnant women in Jos, Nigeria⁶. This demonstrates an increase in the rate of HCV infection in Nigeria. It was observed in this study that the prevalence of HCV co-infection in PLWHA rises with disease progression. Judging by the high rate of seropositivity and statistically significant association ($P<0.05$) in subjects who are adults (above 50 years) we suggest that they may have been infected with HCV earlier in life and may already have degenerating liver diseases (Figure 1). It was also observed that the prevalence of anti-HCV antibodies was higher in males (40.9%) than in females (23.5%) which agrees with the findings by Inyama et al. (2005)¹⁵ where the prevalence of HCV antibodies was

higher among males (7.5%; 95% CI 3.83-11.09%) than among females (4.5%; 95% CI 2.10 – 6.88%).

HCV/HIV co-infection was high in subjects with low educational levels (Figure 2). This has a significant association ($P<0.05$) with HCV/HIV co-infection and may be an important risk factor that reflects inadequate knowledge about the virus and its mode of transmission. This correlates with findings on the educational level of HCV/HIV-1 positive pregnant women in the study by Nimzing et al. (2006)⁶. This finding is revealing as the low level of education might affect the reliability of information regarding the modes of transmission of HCV in these patients. Intravenous drug use is regarded as a serious social misnomer punishable by serving various jail terms in Nigeria and often under reported due to withholding of information by adherents.

The findings of this research also show a relatively higher prevalence rate of HCV/HIV co-infection among subjects in the civil service (45.0%) (Table 2) and among widowed subjects (41.7%) (Table 1). The reason for higher frequency of HCV/HIV co-infection in these groups is obscure and had no statistically significant association ($P>0.05$).

HIV shares common routes of infection with HCV¹² even though this route of transmission of HCV appears to be less efficient than HIV-1¹⁶. In this study, no significant association ($P>0.05$) of HCV infection with sexual transmission was recorded (Table 3). Assessing other possible risk factors (Table 3) of HCV transmission, it was observed that the histories of blood transfusions, STIs apart from HIV, surgery and injecting drug use had no statistically significant association with HCV/HIV co-infection. Reasons for this is unknown but it is known that injecting drug use is an overwhelming risk factor for HCV infection in the Western world while it is infrequently reported practice in Nigeria. The social stigma associated with this habit in our society as well as low level of education of most subjects might have resulted in probable under-reporting of this practice in our study population. It is however, generally thought to be a rare feature in Nigeria.

In this study, no statistically significant association ($P>0.05$) was recorded for HCV/HIV co-infection by the CD4 cell count range (Table 4) of patient. This agrees with the findings of Collins and Swan in 2007¹.

Therefore, the high prevalence of HCV/HIV co-infection in this study can probably be attributable to inadequate information about HCV and negligence of medical diagnostic screening practices by people in the developing nations. This study shows the importance of routine HCV screening

for PLWHA. Preventive intervention steps should be taken to reduce HCV/HIV co-infection and more research works aimed at determining the risk factors for HCV/HIV co-infection is necessary.

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Table 1. HCV Seroprevalence in HIV Positive Patients by Marital Status

Marital Status	Total No. of Patients Screened	Total No./% of Positive Patients
Single	44	11 (25.0%)
Married	91	33 (36.3%)
Divorced	11	2 (18.2%)
Widowed	36	15 (41.7%)
	182	61 (33.9%)

$\chi^2 = 3.97$; $P > 0.05$

Table 2. HCV Seroprevalence in HIV Positive Patients by Occupation

Occupation	Total No. of Patients Screened	Total No./% of Positive Patients
None	50	15 (30.0%)
Student	17	2 (11.8%)
Civil Servants	40	18 (45.0%)
Business	57	18 (31.6%)
Farmers	18	8 (44.4%)
	182	61 (33.9%)

$\chi^2 = 7.32$; $P > 0.05$

Table 3. HCV Seroprevalence in HIV Positive Patients by Possible Risk Characteristics

Risk Characteristics	Total No. of Patients Screened	Total No./% of Positive Patients	Chi-Square Value	P-Value
History of blood transfusion				
YES	33	13 (39.4%)	0.625	P>0.05
NO	149	48 (32.2%)		
History of STIs				
YES	111	37 (33.3%)	0.004	P>0.05
NO	71	24 (33.8%)		
History of Surgery				
YES	32	12 (37.5%)	0.276	P>0.05
NO	150	49 (32.7%)		
Multiple Sex Partners				
YES	96	29 (30.2%)	0.998	P>0.05
NO	86	32 (37.2%)		
Injecting Drug Use				
YES	16	6 (37.5%)	0.125	P>0.05
NO	166	55 (33.1%)		

Table 4. HCV Seroprevalence in HIV positive patients by CD4 cell count range

CD4 count range (Cells/ μ L)	Total No. of Patients Screened	Total No./% of Positive Patients
1-200	37	12 (32.4%)
201-400	63	23 (36.5%)
401-600	40	13 (32.5%)
601-800	23	6 (26.1%)
801-1000	11	3(27.3%)
above 1000	8	4 (50.0%)
	182	61 (33.9%)

$\chi^2 = 2.03$; P>0.05

Figure 1. Sex and Age Group Distribution of HCV Seroprevalence in HIV positive patients

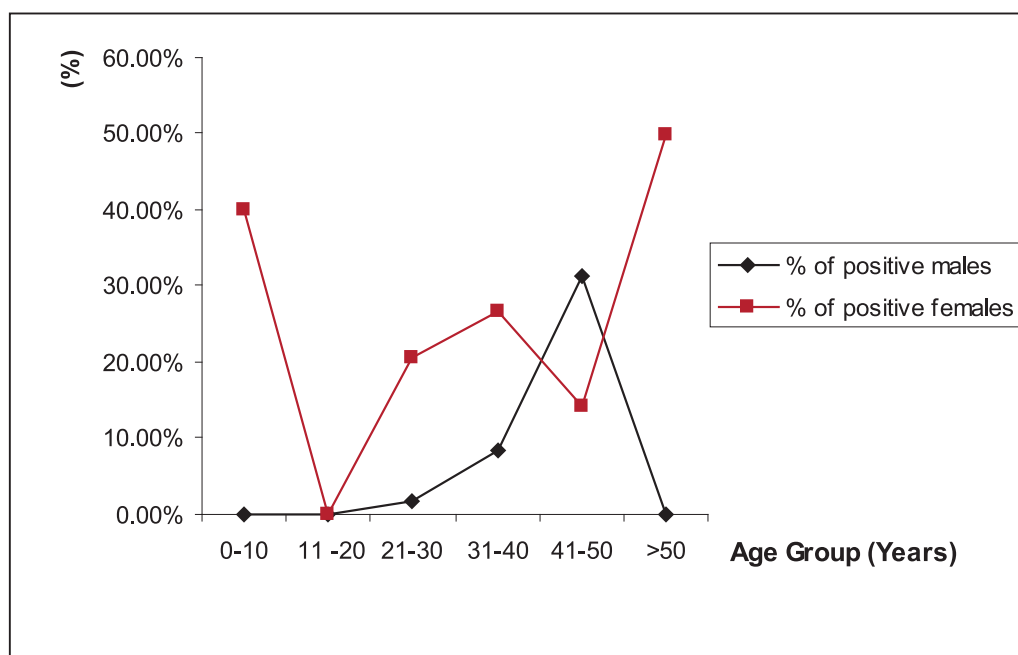


Figure 2. HCV Seroprevalence in HIV positive patients by Educational Status

