Anti-HCV antibody among newly diagnosed HIV patients in Ughelli, a suburban area of Delta State Nigeria.

Ogbodo Ekene Newton[1,2], Otue Akpevwe Oghene[2], Iheanyi Omezuruike Okonko[2]

1. Department of Microbiology & Immunology, University of Nottingham, United Kingdom
2. Medical Microbiology Unit, Department of Microbiology, University of Port Harcourt, P.M.B. 5323, Choba, East-West Road, Port Harcourt, Rivers State, 500102, Nigeria

Abstract

Background: Human immunodeficiency virus (HIV) and hepatitis C virus (HCV) share common routes of infection and as such, co-infection is expected. Co-infection of the two viruses is of great medical importance as it determines the effect of drugs used for treatment at various stages.

Objective: This interplay between HIV and HCV sets the tone for the objective of this study which is to ascertain the seroprevalence of HCV among newly diagnosed HIV patients in Ughelli, a suburban area of Delta State, Nigeria.

Methods: A total of 200 newly diagnosed HIV-positive patients were recruited for this study. Each of the sera was tested for anti-HCV antibody using SWE-life HCV ultra rapid test strip. Appropriate questionnaires were used to ascertain other important information which include social behaviour such as whether the patients were MSM (males), IDU, tattoo and/or have received blood transfusion in the past.

Results: The prevalence of HCV among the study population was determined to be 15.0%. A higher seroprevalence was observed among females (16.5%) than in males (13.0%). A higher seroprevalence was also observed among age groups >26 years (16.0%) than in age-groups 14-25 years (13.0%) and 2-13 years (0.0%). Of the 7 patients with tattoos, 1(14.3%) tested positive for HCV compared to 29(15.0%) with no tattoos. We found no significant correlation with transfusion, intravenous drug use (IDU), men that have sex with men (MSM), tattooing and the seroprevalence of HCV. However, significant correlation existed with age, sex and HCV prevalence.

Conclusion: This study reports a 15.0% seroprevalence of HCV among newly diagnosed HIV patients and that is alarmingly well above several other studies done in the past in Nigeria and other countries of sub-Saharan Africa. Planned prevention, screening, and treatment are needed to reduce further transmission and morbidity. Future studies involving HCV-RNA assays are needed.

Keywords: HIV, HCV, Hepatitis, co-infection, intravenous drug use.

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Introduction

The human immunodeficiency virus (HIV) and hepatitis C virus (HCV) are known to share common routes of transmission which include blood contact, mother-to-child and sexual intercourse (both vertical and horizontal transmission)[1,2]. There are relative variations in their infectivity with the different routes. HCV however, has a higher tendency of being contacted parenterally[3,4]. Due to the similarities in their routes of transmission, epidemiologists have demonstrated the potential of co-infection. Globally, the infection burden of the hepatitis C alone is about 2.3% affecting up to 150-200 million people while that of HIV is about 0.8% with an estimated number of 32.2–38.8 million people living with HIV worldwide[5-7].

Sub-Saharan Africa has the highest prevalence of HIV infection (4.7%) with 25 million people living with the virus. In Nigeria, the estimated number of people leaving with HIV is about 3 million[7]. In addition to this high prevalence, UNAIDS reports certain behavioural changes which could encourage increased HIV infection and also predispose infected individuals to HCV infection in sub-Saharan Africa. These changes include a decrease in the use of condoms and/or increase in the number of sexual partners. The report also revealed no

Corresponding author:
Iheanyi Omezuruike Okonko
Medical Microbiology Unit,
Department of Microbiology,
University of Port Harcourt,
P.M.B. 5323, Choba,
East-West Road, Port Harcourt,
Rivers State, 500102, Nigeria
Tel.: +234 803 538 0891
E-mail: iheanyi.okonko@uniport.edu.ng

noticeable change in HIV burden among intravenous drug users (IDU)[7].

HCV occurrence among people living with HIV has long been reported. This is of great medical importance as 80% HCV infection are usually found to be chronic, especially when the patient is infected through blood contact such as intravenous drug use (IDUs) and blood transfusion[4,8,9]. In general, the overall clinical outcome of HCV infection could be self-limiting in which case there is clearance of infection, persistent showing or high clinical manifestation such as liver cirrhosis and subsequently liver failure or hepatocellular carcinoma[3,10,11].

In recent times, several researches establish a relationship between HIV and progression of HCV infection and show that at each stage, co-infection with HIV influences the clinical outcome of the HCV infection[3,10,12]. Mehta and colleagues[13] reported the inability of HCV patients with history of IDUs who were co-infected with HIV to clear HCV from their system compared to when they were infected with HIV alone. Reports show that 20.0% of HCV acutely infected individuals clear the virus. This number is reduced to 5.0%-10.0% when infected with HIV and is even lower with lower CD4+ lymphocyte counts[9,12,14]. Rapid progression of persistent HCV to cirrhosis and/or hepatocellular carcinoma has also been shown to be associated with HIV co-infection[15-18].

Apart from the influence of HIV on the progression of HCV infection, reports also suggest that there are higher chances of the HCV-HIV co-infected patients to develop HAART-associated hepatotoxicity due to treatment of the HIV with antiretroviral drugs[3,19]. This situation is worth paying adequate attention to during drug administration. On the other hand, studies are still ongoing to establish influence of HCV on the progression of HIV[3,20-22].

This interplay between HIV and HCV sets the tone for the objective of this study which is to ascertain the seroprevalence of HCV among newly diagnosed HIV patients in Ughelli, a suburban area of Delta State, Nigeria. This would help in the clinical management of the HIV-HCV co-infected patients especially in the choice and administration of highly active antiretroviral therapy (HAART) and will reduce the high incidence of drug-induced hepatoxicity commonly found among HIV-HCV patients which reported in several journals[23,24,25,26].

Materials and methods

Study area

Ughelli North local government area of Delta State, Nigeria has a population of about 321,028 people with a land mass of 1440 square Kilometre (NPC, 2006). It is a semi-urban area with predominantly Urhobo ethnic group but due to oil exploration in the area there is heavy influx of several other ethnic groups from all over Nigeria. The General hospital, Ughelli lies along the border belt that connects Delta State and Rivers State. The hospital serves both children and adult patients in a primarily semi-urban area of Delta State, Nigeria. Therefore, the hospital provides a wide coverage of the population in this region.

Study population

The samples for this study were collected from newly diagnosed HIV patients attending the General hospital Ughelli, Delta State, Nigeria after due permission was obtained from the hospital management/ethical committee. Blood samples were collected from two hundred consented HIV patients.

Patient eligibility and inclusion criteria

Out-patients ≥2 years of age present at the participating hospital who voluntarily provided informed consent/assent to participate in the study were eligible. As the in the case of minors who their parents/guardian voluntarily provided informed consent/assent to participate in the study were eligible. All those unwilling to provide informed consent/assent for participating in the study and those aged below 2 years were not eligible.

Sample collection and processing

Samples were collected from two hundred (200) participants (including men, women and children) who were newly diagnosed of HIV. Appropriate questionnaires were used to ascertain other important information which include social behaviours such as whether the patients were MSM (as in the case of males), IDU, tattoo and/or have received blood transfusion in the past. Samples were collected between June 2012 and February 2013 from consented/assented participants after due permission was obtained from the hospital management/ethical committee. Five millilitres of venous blood was collected aseptically from the participants

into sterile ethylene-diamine-tetra-acetate (EDTA) bottles and centrifuged at 1300 x g for 10min. Plasma from the samples were stored in two aliquots at -20^{0}C before carrying out other laboratory procedures.

Serological analysis

Plasma was tested for the presence of anti-HCV antibody using in vitro diagnostic kit, SWE-life HCV ultra rapid test strip, a qualitative, solid phase two site sandwich immunoassay. Samples were analysed and results interpreted according to the manufacturer's specifications. Each sample was tested in duplicate to ensure reproducibility.

Data analysis

All data was collected both from the questionnaire and the test results. The former was used for demographical analysis while the latter data was analysed to determine a relationship of co-infection between HIV and HCV among newly diagnosed HIV patient using statistical difference assessed by student t-test. Prism 6 software was used for these analyses.

Results

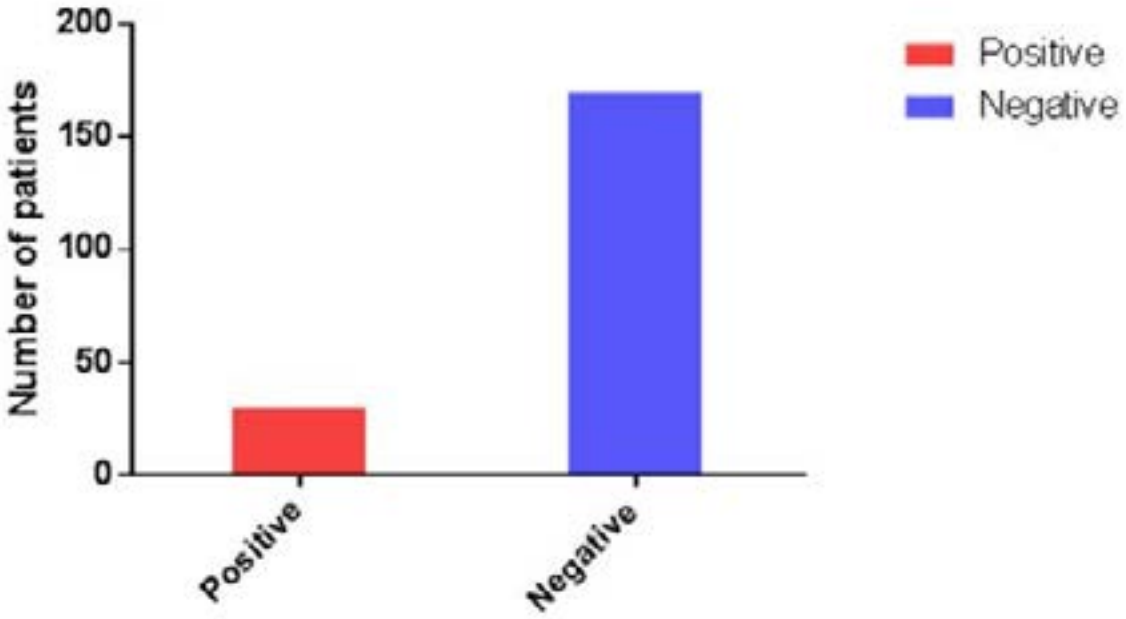
A total of two hundred patients' blood samples of newly diagnosed of HIV were analysed for anti-HCV antibody. One hundred and fifteen (57.5%) were females out of the total number while eighty five (42.5%) were males (Table 1). Based on age the highest number of the patient was the age bracket 26 years and above (73.0%, n=146) followed by age bracket 14-25 years (25.0%, n=50) and age bracket 2-13 years were the least (2.0%, n=4) Table 1. One hundred and ninety six (98.0%) of our participants had no history of blood transfusion. Based on social behavior, none (0.0%) of our participant admitted to be involved in intravenous drugs or men that sleep with men (0.0%). Seven (3.5%) had traditional tattoos while 193(96.5%) had no tattoo (Table 1).

Table 1: Baseline characteristics of the participants

Variables	**No. Tested (%)**
Sex	
Males	85(42.5)
Females	115(57.5)
Age groups (years)	
2-13	4(2.0)
14-25	50(25.0)
26 & above	146(73.0)
Predisposition factors	
Intravenous drug users (IDUs)	
Yes	0(0.0)
No	200(100.0)
Blood/blood product transfusion	
Yes	4(2.0)
No	196(98.0)
men that have sex with men (MSM)	
Yes	0(0.0)
No	200(100.0)
Tattoo	
Yes	7(3.5)
No	193(96.5)
Total	**200(100.0)**

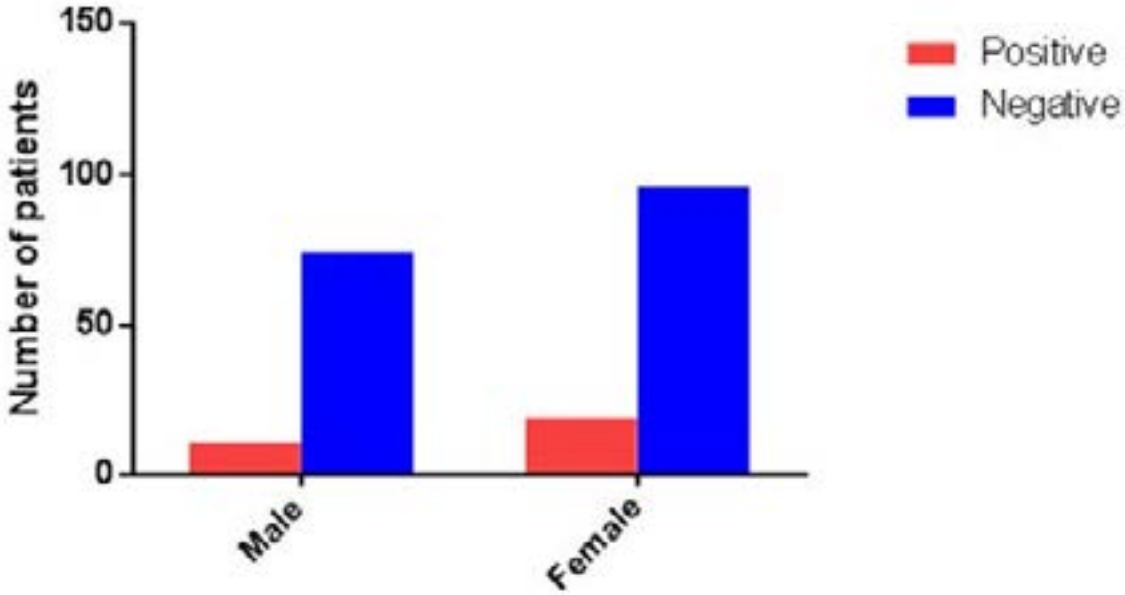
Of the 200 patients tested, 30(15.0%) were positive for HCV while 170 (85.0%) were negative (Figure 1).

Figure 1: HCV prevalence among newly diagnosed HIV patients



The sex-related prevalence showed that females had higher prevalence compared to the male (13.0%) with the females as high as 16.5% (Figure 2). This sex-related difference was statistically significant ($p<0.05$).

Figure 2: HCV prevalence among people living with HIV by gender Significantly associated ($p<0.05$)



Age-related prevalence showed a higher prevalence among age bracket 26 years and above (16.0%) compared to their counterparts in age bracket 14-25 years with a prevalence of 13.0%. However, zero prevalence was found among age bracket 2-13 years of age (Figure 3). This age difference was also statistically significant ($p<0.05$).

Figure 3: HCV prevalence among people living HIV according age groups Significantly associated (p<0.05)

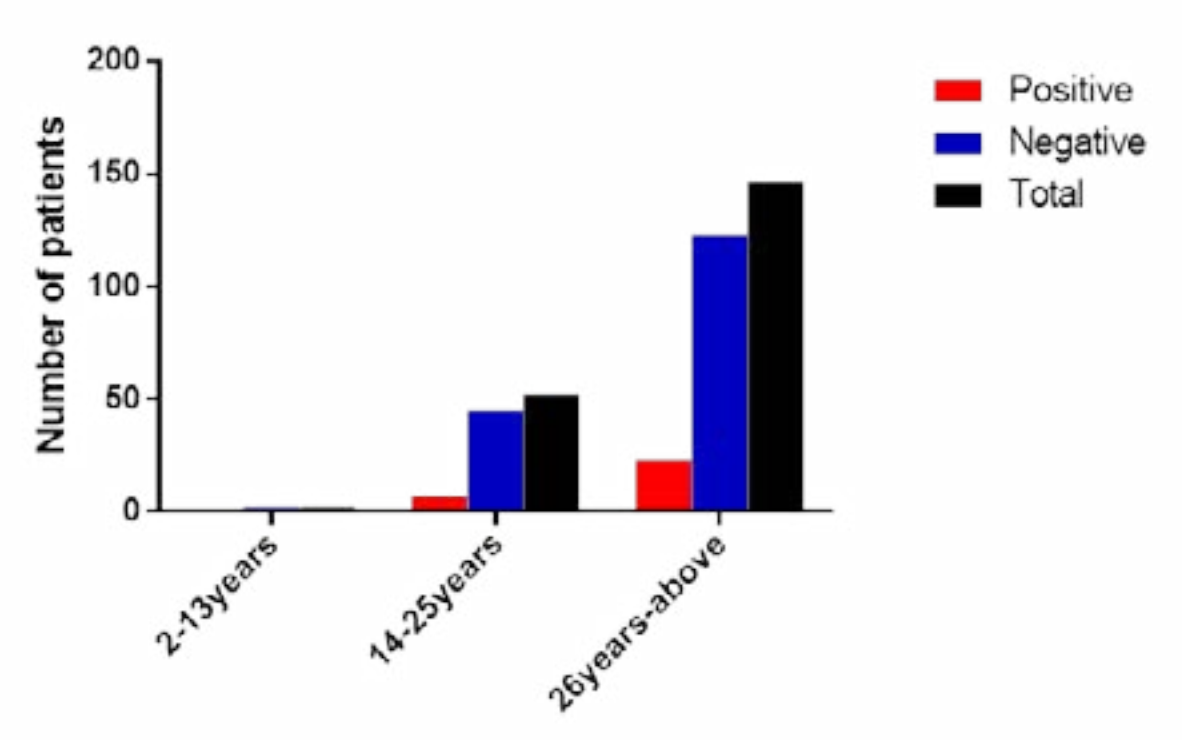


Table 2 shows the predisposition factors and seropositive outcomes of newly diagnosed HIV patients tested for HCV antibody. Of the 7 patients with tattoos, 1(14.3%) tested positive for HCV compared to 29(15.0%) with no tattoo. Other predisposing factors such as IDU, MSM and blood transfusion were not significantly significant in this study (Table 2).

Table 2: Predisposition factors and seropositive outcomes of newly diagnosed HIV patients tested for HCV antibody

Predisposition factors	No. Tested (%)	No. Positive (%)	P value
Intravenous drug users (IDUs)			
Yes	0(0.0)	0(0.0)	
No	200(100.0)	30(15.0)	P>0.05
Blood/blood product transfusion			
Yes	4(2.0)	0(0.0)	
No	196(98.0)	30(15.3)	P>0.05
men that have sex with men (MSM)			
Yes	0(0.0)	0(0.0)	
No	200(100.0)	30(15.0)	P>0.05
Tattoo			
Yes	7(3.5)	1(14.3)	
No	193(96.5)	29(15.0)	P>0.05
Total	**200(100.0)**	**30(15.0)**	

Discussion

The objective of this study was to ascertain the seroprevalence of HCV among newly diagnosed HIV patients in Ughelli, a suburban area of Delta State, Nigeria. Of the 200 participants tested, 30(15.0%) were positive for HCV. The study showed statistically significant ($p<0.05$) sex and age-related differences. Since the introduction of highly active antiretroviral therapy (HAART) into the treatment of HIV, the world has experienced high reduction in HIV-related deaths. Notwithstanding, studies have shown that co-infection with other viruses has in fact dented this achievement recorded by the introduction of HAART. One of such virus is HCV, one of the most common causes of chronic viral hepatitis, which has remained the commonest cause of serious liver diseases among HIV-infected individuals[27-30]. As highlighted earlier, human immunodeficiency virus (HIV) and hepatitis C virus(HCV) have common routes of infection making it possible for both viruses to co-infect the same individual[1,2,31]. Of the 32.2–38.8 million people living with HIV, about 7 million individual (approximately 20.0-25.0%) are reported to be co-infected with HCV. Prevalence varies with geographical region[32,33].

In sub-Saharan Africa, it is estimated that the prevalence of HCV among HIV-infected individuals is about 3.0-7.0%[5,34,35]. This figure is much lower than the figure obtained in our study (15.0%) (Figure 1). Our figure is also higher than what was obtained in similar studies in Kenya, East Africa (10.0%), Senegal, West Africa (1.6%) and South Africa (13.4%)[36-38] but lower than that of another Eastern Africa state, Tanzania (18.1%)[39]. The difference in prevalence could be due to differences in social behaviour of the individuals involved in this study and population size of the individual countries[40]. Our result is consistent with previous results obtained elsewhere in South Western Nigeria by Balogun and colleagues (14.7%)[41].

Among our participants, the HCV prevalence among the females (17.0%) is higher than in males (13.0%) (Figure 2), $p= 0.8479$. This is not statistically significant. This is in agreement with other past studies carried out in Nigeria[41,42]. This could be due to the fact that barring other routes of contracting HIV and HCV, women are more likely to contract both viruses through unprotected sexual intercourse[43].

The age 26 years and above in our study (Figure 3) was found to have the highest prevalence (16.0%) while 14-25 years and 0-13 years are 13.0% and 0.0% respectively. The result is at par with other figures from parts of the world, which shows that there is higher chances of co-infection of HIV and HCV in an individual increases with age[39,44]. As expected, there is higher sexual involvement at this age and higher tendency to contact the disease parenterally[31].

As earlier stated, blood transfusion, IDU, men that have sex with men (MSM) and tattooing are important factors in HIV and HCV transmission but there was no statistical correlation between HIV and HCV infection and blood transfusion, IDU and tattooing in our study. Of the 200 participants, 4 received blood/blood product in the past, none was admitted to being an IDU or MSM and 7 had tattoos, but only one tested positive to anti-HCV. This might be because most of the infections are mostly through heterosexual activity other than those routes in this part of the world[45]. Though, Ogunro et al.[46] reported association of scarification marks on women with infections like hepatitis C viral infection, presence of tattoos did not significantly influence HCV prevalence among these study population. A study with a larger sample size in the same hospital might reveal otherwise. Alter et al.[47] reported a strong association of the receipt of a blood transfusion before 1990 with HCV infection. In the same vein, Reddy et al.[48] observed that the risk of dual HBV-HCV infection was greater among chronic renal failure patients, due to the frequent exposure to blood from transfusions and extracorporeal circulation during hemodialysis. However, Bini and Perumalswami[49] also observed no association between blood transfusion prior to 1992 and HCV infection in the U.S. However in line with the assertion of Oje et al.[50], screening of blood and blood products from donors is routinely done in all blood banks and in most health care facilities in Nigeria before transfusion. This present study also reinforces the routine and compulsory screening of all blood and blood products before transfusion or organ transplantation.

Limitations

This study was not able to perform viral loads and did not attempt to assay for the presence of HCV-RNA. However, the need for experienced staff, special laboratory conditions and equipment and the need for standardization are drawbacks of HCV RNA assays in comparison with HCV core Ag and anti-HCV antibody tests used in this study[51,52]. Future studies involving HCV-RNA assays are needed. Nevertheless, the findings of this present study can serve to direct any

national effort aimed toward minimizing the spread of these viruses in Delta State, Nigeria. Nonetheless, our results are consistent with other studies[50,53,54], and are relevant for improving the care of HIV/AIDS patients in Nigeria.

Conclusion

The 15% seroprevalence of HCV reported among newly diagnosed HIV patients in this study is alarmingly well above several other studies done in the past in Nigeria and other countries of sub-Saharan Africa. Planned prevention, screening, and treatment are needed to reduce further transmission and morbidity. We recommend parallel enlightenment programme with HIV, to educate the populace on the dangers of both infections and proper behaviour on the part of those who already have either of the two infections. We also recommend further studies at molecular level on the influence of HCV on HIV progression.

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