

Hepatitis C Virus and Human Immunodeficiency Virus Co-Infection among Pregnant Women in South-South, Nigeria

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ABSTRACT

Background: Hepatitis C virus (HCV) and human immunodeficiency virus (HIV) infections are major health problems worldwide. HCV/HIV co-infection has been shown to increase the frequency of liver disease and also maternal-fetal transmission of HCV. Little data exist on the prevalence of co-infection of these viruses in our Obstetric population. This study was therefore designed to determine the seroprevalence of co-infection of HCV/HIV among pregnant women in South-South, Nigeria.

Methodology: This was a cross-sectional study done among antenatal attendees at the Sacred Heart Hospital, Obudu, Cross-Rivers State, Nigeria, from 1st January to 30th June 2010.

Results: Out of the 836 pregnant women studied, 24(2.87%) tested positive for HCV antibodies. Thirty eight (4.5%) were positive for HIV and 2(8.3%) had HCV/HIV co-infection. The mean age and parity of seropositive women were 25.5 ± 4.5 years and 2.2 ± 1.1 respectively.

Conclusion: The seroprevalence of HCV/HIV co-infection was high contrary to the absence of dual infection of the viruses in a previous study in the same region of the country. Concerted efforts need to be made towards reducing the seroprevalence through awareness campaigns, testing for the virus as well as development of vaccine among other preventive measures.

Key words: Hepatitis C virus, HIV, Pregnant women, co-infection, Nigeria.

Introduction

Hepatitis C virus (HCV) and Human immunodeficiency virus (HIV) infections are major health problems worldwide¹. HCV is said to account for 130 million chronic infections while HIV is said to account for an estimated 33 million^{1, 2}. Internationally, the prevalence of HCV infection varies from 0.14 to 6%³. In Africa, an extremely high seroprevalence rate of 13 to 22% has been reported in Egypt. In some parts of USA and Europe, rates of as low as 0.04 to 1.2% has been reported⁴.

Of the 33 million people living with HIV worldwide, Sub-Saharan Africa remain the most heavily affected, accounting for two thirds (67%) of all people living with HIV and for three quarters(75%) of AIDS death in 2003. An estimated 1.9 million people were newly infected with HIV in sub-Saharan Africa in 2007, bringing to 22 million the number of people living with HIV⁵.

Nigeria reported her first case of HIV/AIDS in a 13 year-old girl in 1986 and since then it has been estimated that 850,000 adults and children have

died of AIDS by the end of 2001⁶. Also there has been a progressive increase in the incidence of HIV in pregnancy. The national prevalence of adult HIV has risen progressively from 1.8% in 1991 to 3.8% in 1993, 4.5% in 1996 and 5.4% in 1999. The prevalence of 5.8%, 5.0% and 4.4% were documented in 2001, 2003 and 2007 respectively among antenatal women⁶.

The prevalence of HCV/HIV co- infection is however said to average about 35% in the USA and Europe, but in clinical populations where there is a great prevalence of intravenous drug use as a risk factor for acquiring HIV, this value may be as high as 80-90%⁷⁻⁹. HCV/HIV co-infection appears to worsen HCV infection with studies showing more severe fibrosis, a higher frequency of cirrhosis, and increased deaths from liver disease⁹. Liver disease caused by HCV infection is now the leading cause of morbidity and mortality among HIV-infected patients in the developed world, where classic opportunistic complications of severe immunodeficiency have declined drastically as a result of the widespread use of highly active antiretroviral therapy (HAART)¹⁰.

HIV infection significantly modifies the natural history of HCV infection. The impact of HCV on HIV is however debatable¹¹⁻¹⁶. Some researchers expressed the opinion that the state of permanent immune activation provided by chronic HCV infection might act deleteriously in HIV positive individuals favoring transcription within infected cells and the more rapid destruction of CD4 T lymphocytes¹⁴.

On the other hand, the immune recovery seen after beginning effective antiretroviral therapy could be partly blunted in individuals with HCV infection as a result of similar mechanism or through the infection of immune cells by HCV itself¹⁴. In addition, the presence of HCV may decrease tolerability of highly active antiretroviral regimes for HIV treatment due to increase in hepatotoxicity^{1,12}.

Before 1992, the mode of acquisition of HCV infection in children was predominantly via transfusion of blood products. After the implementation of universal testing of blood products, transmission from the mother to child became the leading source of HCV infection in children¹⁷. HCV/HIV co-infection is believed to also increase the chance of maternal fetal transmission of HCV¹¹⁻¹⁶. Although, HCV ribonucleic acid (RNA) has been demonstrated in breast milk, breastfeeding has not been proven to be a means of vertical transmission of the infection¹⁷.

HCV treatment should be considered in stable HIV individuals with pegylated interferon combined with ribavirin. However, for all treatment regimes published co-infected patients had a lower sustained viral response rate compared to HCV mono-infected patients¹. In addition to protecting their own health, pregnant women with detectable HIV levels are often encouraged to take anti-retroviral (ARV) drugs as a way of reducing the risk of passing the virus to their babies.

Understanding the epidemiology of HCV and HIV co-infection in pregnant women is therefore important because of vertical transmission risks and also to inform clinical management.

There is however little published data on HCV and HCV/HIV co-infection among the Obstetric population in Nigeria. This study was therefore designed to determine the prevalence of co-infection with HCV/HIV among pregnant women attending antenatal clinic in a mission hospital in South-South, Nigeria.

Methodology

This was a cross-sectional study done among 836 antenatal attendees at the Sacred Heart hospital, Obudu, Cross-Rivers State, Nigeria, from 1st January to 30th June 2010. The hospital has a 33 bed maternity unit that records more than 1000 deliveries per annum. Patients from private clinics, Primary Health Care Centers (PHC), and maternity homes are referred to the hospital which is the largest and more equipped health center in the area. It has facilities to perform ultrasonography and basic laboratory investigations. Obstetricians and Gynecologists along with medical officers, registered nurses and midwives offer maternity services to patients admitted to the unit.

The hospital management gave ethical clearance and approval for the study. The subjects were recruited into the study after given consent. They were pre-test counseled. Seven milliliters of blood were collected from each of the subjects. The samples were all coded and confidentially labeled. HIV test was carried out using determine HIV-1/2 (Abbott laboratories, Illinois, USA) and Uni-gold HIV-1/2 (trinity biotech PLC, James town, New York, USA) test kits, while Stat-pak HIV-1/2 (chembio Diagno; systems Inc, New York, USA) test kit was used as a tie breaker for sero-discordant results according to the manufacturer's instructions. The HCV antibodies test was done using rapid chromatographic immunoassay with ACON HCV one step test kit (ACON Laboratories Inc, San Diego, CA92121, USA) in accordance with the manufacturer's instructions.

Data collected included: age, occupation, educational level, parity and serological status of subjects for HCV and HIV. Liver function test was done for only seropositive subjects. The data was analyzed using Epi info statistical software version 3.2.2. Chi square was used as a test of statistics. P-value of = 0.05 was considered statistically significant.

Results

Out of the 836 women tested, 24(2.87%) were positive for HCV, 38(4.5%) were positive for HIV, while 2(8.3%) had HCV/HIV co-infection. The mean age and parity of the seropositive women was 25.5 ± 4.5 years and 2.2 ± 1.1 respectively. Half (50%) of the women had secondary level of education, 25% had tertiary, 8.3% had primary and 16.7% had no formal education. Most (37.5%) of them were involved in one form of trading/business or the other. Twenty five percent (25.0%) of them were students, 16.7% were civil servants, 16.7%

farmers and 4.2% teachers. HCV/HIV co-infection though high was not statistically significant ($P=0.37$).

TABLES

TABLE I: Socio-demographic characteristics of HCV seropositive subjects.

Socio-demographic characteristics	N=24	%
Age group		
d20	5	20.8
21-25	7	29.2
26-30	9	37.5
31-35	3	12.5
Educational status		
None	4	16.7
Primary	2	8.3
Secondary	12	50.0
Tertiary	6	25.0
Occupation		
Schooling	6	25.0
Trading	9	37.5
Civil servants	4	16.7
Farming	4	16.7
Teaching	1	4.2
Parity		
0	2	8.30
1-2	12	50.0
3-4	9	37.5
>4	1	4.20

TABLE II: HCV/HIV serological status of the 836 subjects studied.

	HIV positive	HIV negative	Total
HCV positive	2	22	24
HCV negative	36	776	812
Total	38	798	836

$$\chi^2 = 0.82$$

$$P = 0.37$$

Discussion

The prevalence of HCV in this study was 2.87% which is higher than the reported prevalence of 1.86% in Benin¹⁸. It is also higher than the 0.5% reported among blood donors in Port Harcourt. The rate is more than the 1.86% reported among pregnant women in America, 1.86% in Cameroon, 0.2%-1.7% in Canada, 0.9% in Taiwan and 1.0% in French Obstetric populations. The prevalence is however less than the 13% to 22% reported in Egypt^{3, 18}. The rate of HIV in this study 4.5% is marginally higher than the 2007 national rate of 4.4% but lower than the 12% prevalence for Cross-Rivers State where this study was carried out. The low prevalence of HIV among pregnant women in this study may be due to the increase awareness and aggressive campaign strategies aimed at reducing the spread of HIV infection in the state by both government and non-governmental organizations.

The prevalence rate of HCV and HIV co-infection in this study 8.3% was however high. An earlier similar prevalence study in Benin did not find any dual infection of HCV and HIV¹⁸. The co-infection rate was lower than the 12% reported in Europe¹⁹, 30% reported in USA and 63.4% among Spanish women²⁰. The studies done in both USA and Spain identified intravenous drug usage (IDU) as a strong risk factor for the high prevalence rates of HCV/HIV co-infection.

A study done among asymptomatic pregnant women in Maharashtra, India, reported HCV/HIV co-infection of 7.27%²¹. This rate is comparable with the one reported in this study. However, a seroprevalence of as high as 92% was reported in Manipur, India, among HIV seropositive intravenous drug users (IDUs)²². African studies reported seroprevalence of HCV/HIV co-infection of 1.51% in Tanzania, 1.2% in Abidjan Cote d'Ivoire, 6.7% in Cameroon²⁰.

The seroprevalence of HCV/HIV co-infection reported in this study is higher than that in other parts of Africa. This is disturbing given that our subjects do not have the history of intravenous drug usage. This finding may be explained by the high seroprevalence rate of HIV in this study which was 4.5%, though marginally higher than the 4.4% national value²³. Medical experts and the general public should be concerned, given that several studies have demonstrated that HCV/HIV co-infection worsens liver pathology with higher frequency of cirrhosis and increased deaths due to liver disease.

Research has also demonstrated that HCV/HIV co-infection may increase the rate of maternal fetal transmission of either HCV or HIV^{11, 13, 24-26}. Although, perinatal transmission of HCV is confined almost always to women with detectable HCV ribonucleic acid (RNA) in the peripheral blood by the polymerase chain reaction (PCR); it is recommended that all children born to women with anti-HCV antibodies should be tested for HCV²⁶. Anti-HIV antibody test is not carried out on children born to HIV infected mothers until they attain the age of 18 months and above. The PCR test is done in this case if need be. Unfortunately, we did not have facilities in our study center to test for viral load in mothers and babies.

Caesarean delivery has been recommended by various researchers for women co-infected with HCV and HIV. However, to date and unlike in HIV infection, there are no proven cost effective

strategies to reduce vertical transmission of HCV²⁷⁻²⁹. The subjects in this study were not offered caesarean section based on their HCV status but those who had HCV/HIV co-infection were counseled for Caesarean delivery based on the Prevention of Mother-To-Child Transmission (PMTCT) of HIV guidelines. They were also referred to the PMTCT program for highly active anti-retroviral therapy (HAART).

Knowing the HIV status of a pregnant woman is essential to MTCT prevention. Initially, HIV testing of pregnant women was restricted to those with identifiable risk factors. However, testing only high risk pregnant women failed to identify many HIV-infected women. Therefore, in 1995 the Centers for Disease Control and prevention (CDC) recommended offering HIV testing to pregnant women regardless of perceived or documented risk³⁰. In 2001, CDC recommended that HIV testing be a routine part of prenatal care for all women. The recommendations were refined in 2003 to include “opt-out” testing, whereby pregnant women are notified that HIV testing is one of a number of routine prenatal tests to be performed unless she declines³⁰. This principle is not so with screening for other viral infections including HCV despite its similarity with HIV in terms of epidemiological characteristics and means of transmission. Some researchers have even doubted the cost effectiveness of routine screening for HCV in pregnancy despite the fact that the prevalence of the infection is on the increase. This position may need to be revisited in the nearby future.

The available therapies for the treatment of HCV are contra-indicated in pregnancy; ribavirin for its teratogenicity and interferon for its possible effects on fetal growth³¹. It has been opined that the measurement of alanine aminotransferase (ALT) level is an important non-specific laboratory test in HCV infected persons. It is believed to be a means of identifying hepatic disease and the best test to monitor HCV infection and efficacy of therapy³²⁻³³. However, observational studies have shown that hepatitis C virus carrier's do have normal ALT levels. Less than 10% of HCV infected persons are said to have elevated transaminases^{20, 34}. The liver enzymes in the subjects studied did not show any derangement.

The high seroprevalence of HCV/HIV co-infection in this study is a wakeup call to the public, medical experts and policy makers in Nigeria. Concerted efforts should be made by all stake holders in the health sector to halt the progress of the disease. The

fight against HIV/AIDS is commendable. It is however, time to; in addition, focus on some of these other infections in pregnancy that affects not only the health of mothers but their babies. Increase awareness through enlightenment programmes, counseling of women, testing for the virus, and development of vaccines should be considered among several other preventive measures.

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