

Full Length Research Paper

A prospective study of three blood-borne viral pathogens among pregnant women attending ante-natal care in Owerri, Nigeria

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A study was conducted between the months of March and August, 2010 to ascertain the rate of mono- and co-infection of three blood-borne viral pathogens namely Human immunodeficiency virus (HIV), Hepatitis C virus (HCV), and Hepatitis B virus (HCV) among 500 pregnant women aged between 21 and 40, attending antenatal clinic at a tertiary health centre in Owerri. The screening of blood samples from the sample population was carried out using immunochromatographic rapid test kits including HIV1/2 test kit (Hi Tech Diagnostic Limited, Nigeria) and Bio Tracer™ HBV and HCV Rapid card test kits (Bio Focus Limited, South Korea). Results revealed that all age groups sampled were positive for HIV, producing a total of 115 (23%) with the age group of 29 to 32 producing the highest infection rate of 32 (6.4%) while the least came from the age groups of 21 to 24 and 37 to 40, with 13 (2.6%) each. The result further revealed that only one case of HBsAg infection was recorded among the sample population within the age group of 37 to 40 with 1 (0.2%). There was no case of HCV recorded among the pregnant women neither was there a co-infection involving HIV and any of the hepatitis viruses. The monthly distribution of the viral pathogens revealed that the highest rate of HIV infection occurred in the month of March with 26 (5.2%), while the least occurred in the month of July with 13 (2.6%). The only HBV infection observed in the sample population was recorded in the month of April while none of the months under review recorded any case of HCV, HIV + HBV, or HIV + HCV coinfections among the studied pregnant women. Though no case of coinfection was recorded in this study, concurrent infection between HIV and the hepatitis viruses is a growing public health concern and enough awareness should be created to check its emergence in this part of Nigeria while the campaign against HIV monoinfection should be intensified to check its spread among the uninfected population.

Key words: Coinfection, pregnant women, monoinfection, Owerri, antenatal, hepatitis, human immunodeficiency virus (HIV).

INTRODUCTION

Improved HIV treatment using the highly active antiretroviral therapy (HAART) has indeed reduced mortality of AIDS patients arising from opportunistic infections. Liver failure occasioned by chronic viral hepatitis has however, emerged as a continued threat, currently accounting for a high rate of hospitalization and death

among people living with HIV/AIDS (De Luca, 2002; Salmon-Ceron et al., 2005). Due to geographic patterns of disease and similar patterns of transmission, notably through intravenous drug abuse, blood transfusion and sexual activity, there are growing cases of coinfection of HIV with hepatitis viruses especially, hepatitis B virus (HBV) and hepatitis C virus (HCV). It is therefore not uncommon to observe coinfection involving HIV and HBV, HIV and HCV, or even all three viruses in one patient alone (Nakwagala and Kagimu, 2002; Gupta and

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Singh, 2006).

While the effect of these hepatitis viruses on HIV disease progression has remained controversial, studies have revealed that the viruses may actually increase the rate of progression to AIDS and AID-related death, impair immune reconstitution, elevate the risk of hepatotoxicity from HAART therapy and lower overall level of CD4 count (CDC, 2001), all symptoms which have been observed to account for a reduced rate of survival for coinfecting patients than for those with HIV monoinfection (Agwale et al., 2004). On the other hand, HIV infection may lead to more aggressive HBV or HCV infection and much more rapid progression to cirrhosis and end stage liver disease (De Luca, 2002; Clifford, 2008).

Coinfection of HIV with HCV is however more common than with HBV and more serious in terms of morbidity (Sherman, 2002), accounting for rates as high as 60 to 90% among intravenous drug users and persons with history of multiple blood transfusion, worldwide (Moshen et al., 2002). Owing to the grave consequences of coinfection involving HIV and the hepatitis viruses and its growing public health importance, it has become absolutely necessary to conduct a study in Owerri, South Eastern, Nigerian, to establish the presence or absence of each of the viruses alone or in combination, using pregnant women who visit a tertiary hospital in Owerri metropolis on clinic days, for their regular antenatal care.

MATERIALS AND METHODS

Study population

The study population included 500 pregnant women selected at random and aged between 21 and 40, who attended antenatal clinic at a tertiary health center in Owerri, South Eastern Nigeria. The purpose of the study was fully explained to them as well as the hospital management and their informed consent obtained in accordance with WHO (TDR, 2002). The study lasted for six months starting from the month of March and ending in August, 2010.

Collection and screening of samples

5 ml blood samples were collected from the pregnant women with the aid of separate syringes and transferred to EDTA bottles, labelled and taken immediately to the laboratory for screening using immunochromatographic rapid test kits including HIV 1/2 test kit (Hi-Tech Diagnostic Limited, Nigeria), Bio Tracer™ HBV rapid card test kit (Bio Focus Limited, South Korea). They were all screened according to manufacturer's instructions. Briefly, the blood samples were transferred into sterile centrifuge tubes and centrifuged at 1,500 rpm for 15 min. The serum produced was decanted into sterile tubes from where 10 µl was transferred into the sample well using 10 µl Eppendorf pipette (Micropipettes and pipette tips). This was followed by addition of 40 to 60 µl of assay diluents. The mixture was allowed to stand on the bench for 20 min before the results were read. In HIV result, appearance of a red band only in the control reaction zone (C) indicated a negative result while in a positive case, in addition to the red band in the control reaction zone (C), another red band appeared in the test reaction zone (1 and/or 2). Similarly for HBV and HCV, the presence of one red band in the control reaction zone (C) was indicative of a negative

result while the presence of two red bands ('T' band and C 'band') within the result window indicated a positive result. For coinfection, the blood sample screened for one viral antibody was also screened for another.

RESULTS

Table 1 represents the age distribution of the pregnant women while Table 2 represents the monthly distribution of the viral pathogens among the pregnant women. As revealed in Table 1, a total number of 115 (23%) of the pregnant women in all the age groups studied were HIV positive with the age group of 29 to 32 producing the highest number, 32 (6.4%) of cases, followed by the age group of 25 to 28 with 30 (6%), while the least was from the age groups of 21 to 24 and 37 to 40 with equal number, 13 (2.6%) of cases, each. As revealed in Table 2, the highest prevalence of HIV infection occurred in the month of March with 26 (5.2%) cases, followed by May with 24 (4.8%) while the least level of prevalence was observed in July with 13 (2.6%). The only case of HBsAg observed was recorded in the month of April with 1 (0.2%), while no month recorded any case of HCV, HIV + HBV or HIV + HCV coinfections.

DISCUSSION

The highest rate of HIV case among these women considered to be in the prime of their reproductive and productive years (Boysen, 2003) is indeed a veritable cause for concern, but however, confirms earlier findings that HIV/AIDS in Owerri, like in other places in the world (UNAIDS, 2006) and other states in Nigeria (Obi et al., 2007) affects younger people in the prime of their life. One reason that could be adduced for this high level of prevalence could be failure to observe fidelity among married couple, a reason, Amadi et al. (2009) also advanced in a similar study on HIV prevalence in Abia State, Nigeria.

The 1 (0.2%) cases for HBsAg and none for HCV recorded in Owerri is quite commendable. It is also noteworthy to applaud the absence of HIV + HBV and HIV + HCV coinfections among the pregnant women observed in the study in Owerri especially when compared with other published results which recorded high prevalence of coinfection between HIV and the hepatitis viruses (Agwale et al., 2004; Dodig and Tavil, 2001; Jiang-Rong et al., 2007; Anuj and Arora, 2008). It could be inferred that the near absence of HBV, the complete absence of HCV, HIV + HBV and HIV + HCV coinfections were achieved probably because the pregnant women were not involved in intravenous drug abuse, had no drug addict sexual partners who could have sexually transmitted the virus to them or received blood not screened for HBV or HCV, the major routes of transmission of the hepatitis viruses (Jian-Rong et al., 2007). However in the case of HIV which is predominantly sexually transmitted

Table 1. Age distribution of pregnant women in a viral coinfection study in Owerri.

Age interval	Frequency	No. (%)									
		HIV		HBV		HCV		HIV+HBV		HIV+HCV	
		+ve	-ve	+ve	-ve	+ve	-ve	+ve	-ve	+ve	-ve
21-24	61(12.2)	13(2.6)	48(9.6)	-	61(12.2)	-	61(12.2)	-	61(12.2)	-	61(12.2)
25-28	111(22.2)	30(6)	81(16.2)	-	111(22.2)	-	111(22.2)	-	111(22.2)	-	111(22.2)
29-32	143(28.6)	32(6.4)	111(12.2)	-	143(28.6)	-	143(28.6)	-	143(28.6)	-	143(28.6)
33-36	90(18)	27(5.4)	63(12.6)	-	90(18)	-	90(18)	-	90(18)	-	90(18)
37-40	95 (19)	13(2.6)	82(16.4)	1	94(18.8)	-	95(19)	-	95(19)	-	95(19)
Total	500(100)	115(23)	385(67)	1(0.2)	499(99.8)	-	500(100)	-	500(100)	-	500(100)

Figures in parenthesis represent percentages. The table also shows that only 1(0.2%) pregnant woman in the age group of 37-40 was positive for HBsAg, whereas no age group produced any positive cases for HCV or co-infection of HIV with HBV or HIV with HCV.

Table 2. Monthly distribution of the viral pathogens among pregnant women in a viral coinfection study in Owerri.

Age interval	Frequency	No. (%)									
		HIV		HBV		HCV		HIV+HBV		HIV+HCV	
		+ve	-ve	+ve	-ve	+ve	-ve	+ve	-ve	+ve	-ve
Mar	75(15)	26(5.2)	49(9.8)	-	75(15)	-	75(15)	-	75(15)	-	75(15)
Apr	85(17)	20(4)	65(13)	1(0.2)	84(16.8)	-	85(17)	-	85(17)	-	85(17)
May	80(16)	24(4.8)	56(11.2)	-	80(16)	-	80(16)	-	80(16)	-	80(16)
Jun	90(18)	15(3)	75(15)	-	90(18)	-	90(18)	-	90(18)	-	90(18)
Jul	90(19)	13(2.6)	82(16.4)	1	94(18.8)	-	95(19)	-	95(19)	-	95(19)
Aug	80(16)	17(3.4)	63(12.6)	-	80(16)	-	80(16)	-	80(16)	-	80(16)
Total	500(100)	115(23)	385(67)	1(0.2)	499(99.8)	-	500(100)	-	500(100)	-	500(100)

Figures in parenthesis represent percentages.

(Dieterich, 2000), the comparatively high percentage of occurrence over the months confirms reports (WHO, 1987) that 90% of global HIV cases are transmitted through sexual intercourse with infected partners.

No specific reason could be given for the high or

low prevalence of HIV infection recorded in the months of March with 26 (5.2%) and July with 13 (2.6%), respectively, and only one case of HBsAg recorded in the month of April with 1 (0.2%) as observed in Table 2, since no particular month has been established to be associated with high

level of sexual promiscuity that could predispose to the sexually transmitted diseases (STDs). However, it could be assumed that the month with the least prevalence was one in which calls for, use of protective devices such as condoms during sexual intercourse and abstinence from

indiscriminate sex, were heeded.

As a result of the prevalence of HIV positive cases among pregnant women observed in Owerri, it has become compelling to call upon the Imo State Government and other health care providers in the state to renew and intensify the campaign on mutual fidelity among married couples. Equally to be intensified is the campaign on the need for intending couples and youths to abstain from pre-marital sex. The Federal and State governments should endeavour to continue to make available anti-retroviral drugs and continue to freely distribute them to HIV infected patients. Since no observation was made for HCV and only one case observed for HBsAg, it could be concluded that none of the pregnant women received un-screened blood, indulged in, or had partners who indulged in drug abuse, the major routes of infection for the two hepatitis viruses. This good moral behaviour should be sustained and encouraged. Similarly, efforts aimed at screening every blood or products prior to its transfusion should be sustained. Finally, while cases of HCV could be said to exist in other States in Nigeria like Edo (Mutimer et al., 1994), Lagos (Halim and Ajayi, 2000) and Oyo (Aliyu, 1996), the same could not be said of Imo as this study has revealed.

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