Concurrent Infection of HIV-1 and HIV-2 Serotypes in Adamawa State Nigeria

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Abstract: This study was conducted in some highly patronized health institutions in Adamawa State of Nigeria to assess the frequency of HIV-1 and HIV-2 serotypes in the state with the aim of determining the rate of concurrent infection between the serotypes. Prior to sampling, ethical approval was obtained from the selected health institutions and the consent of the subjects was sought. Randomly selected one thousand five hundred and twenty (1520) apparently healthy subjects seeking medical tests for traveling passport, driving license, employment and blood donors or some volunteers who came to the institutions to visit patients participated in the study. On the overall, 12.1, 0.51 and 1.60% frequency rates were recorded for HIV-1, HIV-2 and HIV-1+2 infections, respectively. The prevalence of infection varies significantly by settlement (P<0.05). There was no significant difference in the distribution of the serotypes by age and gender (P>0.05) and by marital status (P>0.05).

Key words: HIV-1 - HIV-2 - concurrent - infection - Nigeria

INTRODUCTION

The discovery of HIV/AIDS dates back to 1981 in United State of America (USA) among homosexual men [1-3]. About two years later, scientists in U.S.A and Paris laboratories, Robert Gallo and Montagnier respectively discovered the causative agent which was subsequently named lymphadenopaty Associated Virus (LAV) in Paris while in USA it was named Human Lymphocyte-T Virus (HTLV). By 1986, World Health Council on AIDS [4, 5] renamed the virus as Human Immunodeficiency Virus, which is now HIV type-1. In 1986 in Portugal, another form of HIV was found in men who were said to have migrated from Guinea Bissau, an Africa country [6]. This form was slightly different from HIV-1, it was then named HIV-2.

Human immunodeficiency virus type-1 is more infectious and commoner all over the world while HIV-2 is less virulent and more prevalent in West-Africa than the rest of the world. Infection with HIV-1 is very deadly while co-infection with the two serotypes can be more serious than mono-infection. The emergence of these subtypes had been attributed to poor compliance to anti-retroviral drugs among HIV population [6]. These multiple serotypes and cross transmission among already infected people probably explain the high rate of full blown AIDS among HIV infected victims in the continent. These subtypes could also pose a serious challenge against the development of HIV vaccine in the nearest future.

Current research findings has shown that Africa is the hardest hit continent with the dreaded virus recording about 11% of the global rate [7]. The people living with the virus in Africa is about 30 million with the Southern and Eastern Africa being the most severely affected regions [8]. In Central Africa Republic, a research conducted among some antenatal women [9] revealed 12.2% of HIV-1 while 52% prevalence rate of HIV-1 and HIV-2 was recorded in Zambia among some couples attending sexually transmitted infection clinics [10].

However, in Adamawa State Nigeria, there have been a paucity of published information on the distribution of HIV serotypes. This study was therefore focused on assessing the frequency of HIV-1 and HIV-2 in the State with the aim of determining the rate of co-infection between them.

MATERIALS AND METHODS

Study population: One thousand five hundred and twenty subjects aged 15-64 years attending some selected health institutions in Adamawa State, Nigeria were randomly
screened for HIV antibodies. The subjects were apparently healthy people seeking medical check-up for military recruitment, employment, marriage, blood donation, traveling passport, driving license and from some volunteered patient relations. Prior to commencement of the research, ethical approval was obtained from the State Ministry of Health and the authority of the selected health facilities. Informed consent of the subjects was also sought.

Specimen collection and laboratory testing: After sterilizing the antecubital fossa of the arm with methylated spirit, five milliliters of blood was collected from each subject by vein puncture, put in plain test-tube and kept at room temperature for about 20 minutes before spinning to remove the serum needed for the HIV antibodies typing. Commercial Capillus HIV Kit (Trinity, Biotech, United Kingdom) was used for detecting the antibodies while another commercial HIV Kit, Standard Diagnostic (Bioline, Korea) was employed to differentiate all positive cases into HIV serotypes-1, HIV-2 and HIV-1+2. Also, structured questionnaire was administered to every subject examined to obtain some demographic information regarding their age, gender and marital status. Data obtain were statistically analyzed using Chi-square ($X^2$) Test.

**RESULTS**

The overall seroprevalence of HIV infection in urban settlement was 187 (12.3%) while it was 20(1.9%) in the rural area (Table 1). Statistical analysis showed that a significant difference in the distribution of the serotypes by settlement (P<0.05). The age range of the subject study was 15-64 years and the highest prevalence of HIV-1+2 concurrent infection 13(0.85%) was recorded within 15-24 years age-group. Both males and females had a higher rate 14(0.92%) of concurrent infection than males as shown in Table 2. However, statistically, there was difference in the frequency of the infection by age and gender (P>0.05). Based on procession of husband or not, the subjects were categorized into single, married and divorced. The highest rate 14(0.92%) of concurrent infection was recorded among the singles (Table 3). Also statistical analysis showed no significant difference in the distribution of the serotypes with respect to marital status (P>0.05).

**DISCUSSION**

In spite of the persistent war against HIV/AIDS world all over, an amazing prevalence rate (14.2%) of the infection was still recorded in this part of the globe comprising of 12.1%, HIV-1, 0.51% HIV-2 and 1.6%, HIV-1+2 serotypes. The overall findings disagree with the result of national HIV surveillance in which 4.6% was reported for the same State [11]. The reason for the disparity could probably be attributed to the difference in sampling and assay methods. Higher prevalence of HIV-1 serotype recorded in this study (12.1%) is in agreement with some previous reports [11-14] Also, observation of concurrent infection between HIV-1 and HIV-2 serotypes is in consonance with earlier report [6]. Environmental, genetic and economic factors and non-compliance with anti-retroviral therapy regimen by HIV patients could be some of the predisposing factors for the prevalence of concurrent infection in this part of the world.
By settlement consideration, a higher prevalence of HIV infection (12.3%) was recorded in urban centres than in the rural areas with (1.9%). Statistical analysis showed a significant difference in the distribution of HIV serotypes in relation to settlement (P<0.05). The reason was probably due to difference in social activities of the subjects. In urban settlement, the distribution of commercial sex workers (prostitutes) is higher than in the rural. Also, night parties, watching pornographic films and some other immoral sexual behaviours are commoner in big cities than in villages. All these explained why higher prevalence of the infection was recorded in urban settlement. Non-restriction of aliens from ECOWAS countries in and out of Nigeria could encourage their settlement in urban centres where social infrastructures are readily available. Consequently this unscreened apparently healthy population can contribute to the prevalence of the infection in the country as a whole and in the urban centers in particular.

When the rate of infection was assessed with respect to age, the highest prevalence rate of HIV-1 (2.8%), HIV-2 (0.3%) and HIV-1+2 (0.85%) were all recorded within the age group 15-24 years while no case of HIV-2 and concurrent infection was recorded within 55-64 years age bracket. Statistically, there was no significant difference in the distribution of HIV-serotypes by age (P>0.05). This study compares favorably with previous studies [15, 16] where the highest prevalence rate of sexually transmitted infections was also recorded within the same age-bracket.

Similarly, the gender related prevalence study showed that females had higher rates of HIV-1 (8.5%), HIV-2 (0.32) and concurrent infection (0.92%) than their male counterparts with 3.5%, 0.1% and 0.72% rate respectively. The variation of HIV serotypes with respect to gender could probably be attributed to unequal number of males and females examined in study. It could also be due to difference in the anatomical structures of genito-urinary tract which makes females more vulnerable to sexually transmitted infections. Socio-economic inequalities and gender violence against young females could also be some contributing factors to their higher susceptibility to infections. Poverty among young woman is a vital factor predisposing them to higher rate of infection. In order to survive, many of the young women could resolve to keeping multiple sex-partners or completely take to prostitution with the consequently high rate of sexually transmitted infections. Statistically however, there was no significant difference in the distribution of HIV-serotypes by gender (P>0.05). Distribution of HIV-serotypes by marital status showed that out of the total 191 positive cases recorded, single subjects were most frequently infected by HIV-1(5.0%), HIV-2 (3.2%) and HIV-1+2 (3.8%). The reason for this could be due to youthful exorbitance among the single subjects which could probably lead to some risky sexual behaviours and may eventually result to sexually transmitted infection. Similarly, most single subjects are probably still considering the virus as not real, therefore going about their sexual behaviour that could lead to infection. Statistical analysis showed no significant variation in the frequency HIV-serotypes by marital status (P>0.05). This study agrees with previous one [17] which reported no significant association between HIV infection rate and marital status.

In conclusion, to bring down the rate of the infection in this part of the globe, there should be a change of attitudes, behaviours and perception towards sex. Keeping multiple sex-partners should be discouraged and the rate of broken marriage should be controlled by government through legislation. Finally, the success of Millenium Development Goals (MDGs) on HIV control requires a private-public partnership. Government efforts can only be fruitful with the collaboration of private health institutions. Prostitution is an index of poverty and moral decadends and should therefore be abolished in Africa. Youths, especially adult females should be empowered and be provided with alternative means of livelihood.

REFERENCES