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The seroprevalence of hepatitis B surface antigen and human immunodeficiency virus among pregnant women in Anambra state, Nigeria.

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Abstract:

Human immunodeficiency (HIV) and hepatitis B (HIB) viruses are two distinct viruses that share mode of transmission and risk factors. To assess the seroprevalence of HIV, hepatitis B surface antigen (HbsAg) and their co-infection among pregnant women in

Anambra State, Nigeria. Sera samples from 1120 pregnant women aged 16-50 years attending ante-natal clinics in Awka between July, 2002 and July, 2003 were tested for HIV I and HIV2 and HbsAg.

Ninety-six(8.6%) of the women were seropositive for HIV, 104(9.3%) for HbsAg and 8(0.7%) for both HIV and HbsAg. The 96 HIV seropositives, 83(86.5%) were positive for HIV-1, 12(12.5%) for HIV-2 and 1(1.0%) for both HIV-1 & 2. Significant infection rates for HIV, HBV and HIV/HBV co-infection were associated with age groups; 16-20 years and 21-30 years, marital status and occupation of the subjects. The prevalence rates of the infections were inversely associated with increase in educational status. In conclusion both HIV and HBV are endemic in Nigeria and comutive testing of pregnant ladies are recommended.

Key Words: HIV, HBV, Ante-natal women, Awka.

Introduction:

Both HBV and HIV share similar mode of transmission and risk factors¹, HIV-infected people are frequently co-infected with HBV. Hepatitis B virus infection is associated with significant morbidity and mortality in patients with HIV infection^{3,4}.

Co-infection of HIV with HBV affects change number of patients worldwide⁵. Among people with HIV, 70 to 90% have been found to have HBV exposure, while 10 to 15% have chronic HBV infection⁶. Although, very few co-infection studies have been carried out in Africa but since sub-Saharan Africa is a home of about 29.4 million HIV infected people, high HIV/HBV confection is expected. However results are contradictory. While in Kenya, 32(78%) out of 41 patients with AIDS had serological evidence of exposure to HBV⁷, a study among pregnant women attending ante-natal clinics in Burkina Faso, showed a low co-infection rate of 0.88%⁸. This study was designed to find the situation in Nigeria.

Materials and Methods:

Anambra State is one of the thirty-six states in Nigeria. It is located in southeastern Nigeria, and has two General Hospital and several private hospitals.

One thousand, one hundred and twenty (1120) pregnant women attending ante-natal clinics at the General Hospitals and three private hospitals between July, 2002 and July, 2003 were randomly studied. Information on socio-economic and demographic status was obtained using questionnaire forms. To obtain plasma, venous blood was collected into EDTA bottles, centrifuged and plasma separated for HIV and HBV assays. Hepatitis B surface antigen determination was done using an in vitro diagnostic kit called Hep B stat-pak ultra fast (chembio diagnostic systems USA) which is an immunochromatographic sandwich method. The specificity of this method in positive samples was rechecked by an ELISA Kit (Wellcome Laboratory, UK).

HIV antibody assay was carried out with an ACON HIV-1/2 Rapid Human immunodeficiency virus test strip (ACON Laboratories, USA) a qualitative membrane-based immunoassay technique. All seropositive samples were further confirmed and differentiated into HIV-1 and HIV-2 using immunocomb HIV-1/2.Biospots (organics, Israel). Two kits were used based on WHO recommendation of two different testing strategies (algorithms) involving ELISA and/or simple or rapid assays for surveillance⁹. Incomplete questionnaires and inconclusive test results were discarded.

Statistical analysis was achieved using Chi-square (X^2) analysis for discrete variables. Values for $P < 0.05$ were considered statistically significant.

The study was approved by hospital administrators and informed consents were taken from participants.

Results:

Of the 1120 sera samples examined; 96(8.6%), 104(9.3%) and 8(0.7%) were seropositive for HIV, HbsAg and HIV-HbsAg co-infection respectively. Table 1 shows sub-types of HIV as HIV-1 with prevalence rate of 86.5% HIV-2 12.5%, while HIV-1/HIV-2 co-infection (1.0%) occurred in only one subject.

Age distribution of affected patients are shown in table2 had the highest prevalence for HIV (12.1%) and HIV/HBV co-infection (1.1%). There was statistically significance difference between prevalence rates in 2nd, 3rd and 4th decade.

Table 3 shows prevalence in concordance with marital and educational and occupations.

Table 3 shows that widowed/divorced women had higher prevalence of HIV, HBV infection ($P < 0.001$).

More educated women had less prevalence of HBV infection. This rate was highest among students as compared to other occupations. The rate of HIV infection was also highest in

students. (P value <0.001). Rate of co-infection was not different among different occupations and was not correlated with level of education.

Table 1: Distribution of HIV-1, HIV-2 and HIV-1/HIV-2 among the 1120 pregnant women.

Infection	No(%) Positive for HIV
HIV-1	83(86.5)
HIV-2	12(12.5)
HIV-1/ HIV-2	1(1.0)
Total	96(100%)

Percentage is based on the number of subjects positive for HIV infection.

Table 2: Age distribution of affected patients.

	Married	Widowed /divorced	Unmarried	Total	16-20	21-30	31-40	41-50	Total	Primary	Post-primary	Tertiary
HIV	7.7	44.4	17.6	8.6	7.3	12.1	7.6	3.5	8.6	9.5	9.1	3.1
HBs Ag	6.0	66.7	51.5	9.3	12.1	10.6	10.5	3.5	9.3	10.7	9.8	2.3
HIV/HBs Ag	0.4	11.1	4.4	0.7	0.8	1.1	0.3	0.4	0.7	1.0	0.7	0.0

Table 3: Prevalence in concordance with marital and educational and occupations

	Primary	Post-primary	Tertiary	Total	Housewives	Farmers	Students	Civil servants	Business women	Total
HIV	9.5	9.1	3.1	8.6	2.9	5.6	27.4	7.0	7.9	8.6
HBs Ag	10.7	9.8	2.3	9.3	5.9	5.6	29.8	3.9	11.0	9.3
HIV/HBs Ag	1.0	0.7	0.0	0.7	0.0	1.3	2.3	0.8	0.3	0.7

Discussion

Co-infection with HIV and HBV is more common than that with HIV and hepatitis C virus (HCV), although more attention has been given to HCV co-infection as a result of its higher frequency of chronic disease³. In this study, 8.6%, 9.3% and 0.7% of the pregnant population examined were found positive for HIV, HBV and HIV/HBV co-infection respectively.

Prevalence rates of HIV among pregnant women in Nigeria differ significantly at inter-states level and with age^{10,11,12}. The 8.6% for HIV infection recorded in this study far exceeds the recorded values a few years ago. This could be attributed to the different social and cultural life styles of people in the different states and possibly due to the higher sensitivity of the kits used. A study of the prevalence rates of HIV types 1 and 2 indicates that HIV-1 is more prevalence (86.5%) than HIV-2 (8.9%), corroborating the report that the HIV-AIDS epidemic in Nigeria is as a result of HIV-1 infection and not HIV-2, despite the fact that Nigeria is in west Africa, a region with predominantly HIV-2 infection¹³. However, HIV-1 and HIV-2 co-infections are still low^{11,14}.

In all epidemiological studies, age has always proved to be the most important factor. The age of acquiring infection is the major determinant of the incidence and prevalence rates. In this survey, the difference in prevalence of HIV, HBV and HIV/HBV co-infection in various age groups indicate that this factor plays an important role in the prevalence rates. The age groups 16-20 years and 21-30 years showed the highest prevalence for HBV and HIV respectively ($P < 0.05$). Similarly, 21-30 years age group also had the highest for HIV/HBV co-infection (1.1%) ($P > 0.05$). This is because of the high sexual activity within these age brackets. The high prevalence of HIV and HBV among these age groups is in line with the report that persons within the ages 25 to 35 years are mostly affected with HIV/AIDS¹⁵. The center for disease control reported that at least 38% of women infected are through heterosexual contact with HIV positive partner¹⁶. Since HBV has similar routes of transmission and risk factors as HIV, increased prevalence of HIV will translate to increase in HBV prevalence.

Many of these women are involved in illicit and unprotected sex with men, who entice them with money.

Furthermore, it has been reported that over 60% of sexually active respondents in Nigeria have two or more sexual partners¹⁷, while condom use has remained low^{18,19}. Indeed most Nigerian men prefer not to use condoms at all.

In relation to marital status, carriage rates for HIV, HBV and HIV/HBV co-infection were highest among the widowed/divorced group, followed closely by the unmarried group (Table 2). This is consistent with a report from Jos, Plateau State, Nigeria²⁰. The high prevalence in these groups in comparison with the married may be due to the fact that they are unmarried/unattached and thus free to indulge in more sexual activity.

Another important factor in the survey was the level of education. The prevalence of HIV, HBV and their co-infection was inversely associated with increased educational status. Thus, the less educated women had the highest prevalence rates indicating the influence of education and public enlightenment/awareness on the carrier rates of these infections. The main goal of determining those occupational groups at high risk is to take measures to prevent infections in these groups. The prevalence rate was highest among the student. This corroborates the finding that, even though Nigerian students studied were knowledgeable about contraction routes for HIV/AIDS they were not deterred from engaging in unprotected sexual intercourse²¹. This mandates for emphasis on education in this group.

The high detection of antibodies to HIV-1 and HIV-2, HbsAg and HIV/HBsAg in this study shows that both viruses are widespread in the area. Furthermore, these findings among pregnant women indicate the high risk for vertical HIV and HBV transmission in our community. It buttresses the need for an urgent and vigorous prospective monitoring/screening of all ante-natal women and infants born to HIV or HBV seropositive mothers. It is appropriate to recommend creation of HIV/HBV clinics in all government hospitals/health centers to serve for enlightenment of our communities as well as enhanced and intensive screening centers for these infections. Mass immunization program for HBV for the entire population is also very necessary, since it is cost-effective with respect to medical cost alone.

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