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Human Immunodeficiency Virus Types 1 and 2: Sero-prevalence and Risk Factors Among a Nigerian Rural Population of Women of Child-bearing Age.

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Abstract:

BACKGROUND: Human immunodeficiency virus (HIV) still continues to ravage the world since its discovery about three decades ago in spite of global intervention efforts. Women are the most infected, majority of which are found in sub-saharan Africa.
OBJECTIVE: We set out to determine the sero-prevalence of HIV-1 and HIV-2 and to evaluate risk factors among women of child-bearing age in Obi Local Government Area, Nasarawa State, Nigeria.
METHODS: In a cross-sectional study, blood samples were randomly collected by venepuncture from 426 women aged 16-40 years, between February and April 2002; after having obtained ethical clearance, informed consent, structured questionnaires were self-administered. rLAV EIA (Bio-Rad Laboratories, USA) and vironostika microelisa (Organon Teknika, USA) were both used for initial and confirmatory tests respectively.
RESULTS: Overall 48 (11.3 %) were sero-positive for HIV. Of these, 38 (8.9 %) had HIV-1 and 10 (2.3 %) had HIV-2. Those aged 16-20 years had the highest prevalence rate of 13.9 % (38). Subjects who had history of STIs and multiple sex partners were significantly more likely to be infected.
CONCLUSION: The high prevalence with a worse situation in the young age brackets underscores the necessity for sustainable intervention initiatives among women with the youth as a special focus. Efforts for vaccine development should take into consideration the reality of HIV-2 in Nigeria.

Keywords: HIV-1, HIV-2, Prevalence, Risk Factors, Women

Introduction:

With 33.2 million people still living with human immunodeficiency virus (HIV) worldwide, 15.4 million of which are women and over 6,800 daily new infections[1], HIV is incontrovertibly more than a menacing problem. HIV type 1 (HIV-1) and type 2 (HIV-2) are the aetiological agents of acquired immunodeficiency syndrome (AIDS) and both types have similar modes of transmission: sexual, parental and mother to child.[2] Notwithstanding, there exists unique differences between HIV-1 and HIV-2 in terms of origin, rate of transmission, disease progression, and geographical restriction.[2]

HIV-2 infection exhibits a longer clinical latency period, slower progression toward disease, lower viral burden, especially during the clinical asymptomatic stage, and decreased transmissibility than does HIV-1 infection.[2, 3] HIV-2 is restricted primarily to West Africa (Nigeria is in this region), although the prevalence of HIV-2 is a growing concern in certain parts of Europe and in the Southwestern region of India.[3] Many HIV-2 strains naturally have amino acids that confer drug resistance and may thus decrease the therapeutic potential of some anti-retroviral agents. Unlike HIV-1, many HIV-2-infected individuals appear not to progress to AIDS at all.[3]

The first clinical evidence of AIDS was reported in 1981 and HIV was first isolated in 1983 and described as the cause of AIDS in 1984.[4, 5, 6] AIDS has now become a pandemic within sub-saharan Africa, which includes Nigeria. More women are infected than men in sub-saharan Africa, and women are being infected with HIV at earlier ages than men.[1] The AIDS epidemic in Nigeria is generalized, with infection primarily occurring through heterosexual transmission.[4] The first case of AIDS in Nigeria was reported in a sexually active 13-year-old girl in 1986.[7] Since then prevalence rates have risen to 5.8 % with a drop to 5.0 % in 2003 and a further drop to 4.4% in 2005.[8]

There are no published data on the sero-prevalence of HIV among women of child-bearing age in Obi Local Government Area (LGA), Nasarawa State, Nigeria. We therefore, set out to establish the sero-prevalence of HIV-1 and HIV-2, including some possible risk factors for infection in this population.

Materials and Methods:

Study Area

Nigeria, a sub-saharan African country, has an area of 923, 768 km2 and is situated in West Africa. It is administratively divided into 36 states plus the Federal Capital Territory, Abuja7, and has a population of 140 million people. Obi LGA is in Nasarawa State, Nigeria. Nasarawa State has a population of 2, 040, 097 people9.

Study Population

Women of child-bearing age between 16-40 years in Obi LGA were considered for this study. The predominant occupation of people in this area is agriculture, but it is a common practice for single women and divorcees to travel long distances, especially to cities like Lagos and Kano for commercial sex. Some cultural practices common among this population include clitoridectomy (believed to ease

child delivery) by persons with no education, acupuncture, tattooing, ear piercing and circumcision.

A much higher sample size than that obtained by the application of a formula for the determination of minimum sample size (n) at 95% confidence limit10, was used thus:

n = (Z/M)2 P (1-P), where P = local prevalence, M = width of the confidence interval = 0.05 and Z = 1.96

Ethical Consideration

Clearance from the Nasarawa State's Health Research Ethics Committee was obtained in line with the code of ethics for biomedical research involving human subjects. Prior to sample collections, informed consent of each subject was obtained. The study was designed to be anonymous and unlinked, hence volunteers were not informed of their HIV status; so pre- and post- test counseling was unnecessary.

Specimen Collection and Analysis

Socio-demographic information on all subjects was obtained using structurally designed questionnaires. 5 ml of blood sample was then aseptically collected by venepuncture of the cubital vein from each of the 426 subjects using sterile disposable needles and syringes. The samples were then placed in EDTA and the plasma separated and stored separately in sample vials at -200 c until analyzed.

Applying strategy II of the WHO, samples were first tested using rLAV EIA (Bio-Rad Laboratories, USA). All reactive samples were then confirmed with vironostika microelisa (Organon Teknika, USA). Assays were done according to the manufacturers' instructions.

Statistical Analysis

The data was subjected to statistical analysis using SPSS version 13.0 statistical package. Pearson chi-squares were calculated, and p values ≤ 0.05 were considered statistically significant.

Results:

Of the 426 samples analyzed 48 (11.3 %) were sero-positive for HIV. Out of these 38 (8.9 %) had HIV-1 and 10 (2.3 %) had HIV-2. Those aged 16-20 years had the highest prevalence rate of 13.9 % (38) (table 1). Subjects with the history of STIs and those who had multiple sex partners were more likely to be infected (table 2).

Table 1: Age Distribution of HIV Infection Among the Nigerian Child-bearing Age Women.

Age (Years)	No. Tested	No. positive	HIV-1	HIV-2
16-20	274	38(13.9%)	28 (10.2%)	10 (3.6%)
21- 25	74	6 (8.1%)	6(8.1%)	0 (0.0%)
26- 30	32	2 (6.3%)	2(6.3%)	0 (0.0%)
31-35	20	0 (0.0%)	0(0.0%)	0 (0.0%)
36-40	26	2 (7.7%)	2 (7.7%)	0 (0.0%)
Total	426	48 (11.3%)	38 (8.9%)	10 (2.3%)
P > 0.05				

Table 2: Sero-prevalence of HIV by Risk Factors Among the Nigerian Child-bearing Age Women.

Risk Factor value	No. Tested	No. Positive (%)	x2	P
No. of Sex Partners				
1	156	20 (12.8)		
2	14	2 (14.3)		
≥3	50	14 (28.0)	10.304	0.016
Declined	206			
Blood Transfusion in 5 Years				
Yes	18	4 (22.2)		
No	354	38 (10.7)	0.065	0.799
Declined	54	6 (11.1)		
History of STIs				
Yes	36	16 (44.4)		
No	260	18 (6.9)	40.000	0.000
Declined	130	14 (10.8)		
Marital Status				
Single	240	20 (9.8)		
Married	198	24 (12.12)	3.975	0.410
Divorcee	12	4 (33.3)		
Widow	8	0		
Declined	4	0		

Discussion:

Our findings further confirm the unfortunate reality of this dreaded virus in Nigeria. The sero-prevalence rate of 11.3% observed in this study agrees with the 8 – 16 % range reported among the rural populations of child-bearing women in Zambia[11], but it is higher than that reported among women who attended antenatal clinics in Nasarawa State (10.8 % in 1999, 8.1 % in 2001 and 6.5 % in 2004).[12,13] However, our result is similar to the 13.5 % and 9.3 % reported in 2001 and 2003 respectively among women who attended antenatal clinics in Benue State[12,13] which shares boundary with Nasarawa State. Several factors may explain this, namely subject selection criteria, smallness of sample population vis a vis the larger population, cultural practices, poverty and migration.

The HIV-1 sero-prevalence of 8.9 % is much lower than the 29 % rate reported by Allen et al, among women of child-bearing age in Kigali, Rwanda.[14] Cultural and geographical differences between Rwanda and Nigeria which may influence risk exposures may account for this. The HIV-2 sero-prevalence rate of 2.3 % in this study has similarity with the 1.5 % and 3.6 % reported in the North Central and North West Zones of Nigeria respectively; but is lower than the 7.1 % reported in the South East zone.[12]

We observed that the age group 16-20 years had the highest sero-prevalence rate. This supports the 2002 Nigerian Federal Government report that the age bracket 15-19 years had the highest prevalence in three of the six zones of Nigeria. However, this doesn't quite agree with the 2004 report that discovered a uniform pattern of highest prevalence among the 20-24 years age bracket (in

three zones) and the 25-29 age group (in two zones).[12,13] It is generally accepted that HIV infection in the younger age brackets is indicative of the level of newer infections. The lack of infection within the age group 31-35 years may be as a result of the small number of samples within the age bracket, and not necessarily a true reflection of the real situation.

There was a significant association of the number of sex partners with infection, and this supports data presented in global reports.[1] Although the history of blood transfusion was not significantly linked to infection in this study, some reports revealed that about 10-15 % of HIV transmission in Africa was related to blood transfusion.[1,13] The discordance in our findings may be attributed to the strict implementation of policies that ensure only screened blood and blood products are used for transfusion. This was not the practice in some sub-urban health centres some years ago in Nigeria.

We observed a highly significant association of the history of STIs with the infection rate, which is consistent with other reports.[1,13] However, the history of STIs was based on information available on questionnaires; hence a future study that could include a test of STIs for all study participants may reveal a more accurate picture of the situation.

The divorcees were more likely to be infected than the married and single participants, but the sample size in this class of people was not large enough to reach statistical significance. However, this may be a reflection of the actual situation since the divorcees in the study area were more prone to having multiple sex partners.

It is obvious that the infection of women of child-bearing age with this dreaded virus portends serious danger for both heterosexual and vertical transmissions, hence posing a significant threat to the global efforts at combating the epidemic. Intervention initiatives should have younger women as a special focus group. Global vaccine initiatives should also take into consideration the reality of HIV-2 in Nigeria.

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