PREGNANCY AND TRANSMISSION OF HUMAN IMMUNODEFIENCY VIRUS (HIV) AMONG SERODISCORDANT COUPLES IN JOS UNIVERSITY TEACHING HOSPITAL

BY

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ABSTRACT

BACKGROUND*: Serodiscordant couples, have been used to study heterosexual transmission risk because of the high frequency of sexual acts that occur in stable relationships. The hormonal changes during pregnancy could influence heterosexual transmission in serodiscordant relationships. The prevalence of serodiscordant relationship is high in Jos and there are conflicting reports on the incidence of seroconversion among serodiscordant couples. Also, the factors responsible for seroconversion are not well understood and the foregoing reasons stimulated this study.*

METHODOLOGY: *This was a prospective cohort study of HIV seropositive pregnant women and their seronegative male partners who were attending the antenatal /prevention of mother-to-child transmission of HIV clinic of the Jos University Teaching Hospital.*

RESULTS*:*

Out of the forty-nine (49) couples studied, only one seroconverted giving an incidence of 1/49 (20.4 per 1000 couple). The mean gestational age at initial testing was 21.4 weeks and that at repeat testing was 38.8 weeks with an average follow up time of 11.49 weeks. The average age was 32.81yrs, out of these 29 had tertiary education (59.2%). The predominant ethnic group was Berom (24.5%) and majority (44.9%) of the participants were civil servants. The mean frequency of sexual intercourse per week was 2.55 times, (36.7%) do not use condoms during sexual intercourse and only (9.7%) always use condom during sexual intercourse.

CONCLUSION:

The incidence of HIV transmission to the male uninfected partner in a serodiscodant setting in Jos during pregnancy is low but its occurrence in this study suggests the need to re-test the seronegative male partners after every pregnancy.

KEYWORDS*: pregnancy, human immunodeficiency virus, serodiscordance, seroconversion*

INTRODUCTION

It is now 34 years since the first report of Acquired immune deficiency syndrome (AIDS) appeared among homosexuals in Los Angeles, USA[1]. Over this period dramatic progress has been made in the battle against Human immunodeficiency virus (HIV) in the prevention and treatment arenas both in Nigeria and globally. Despite all this progress, new infections continue to occur. In 2012, there were an estimated 2.5 million persons newly infected with HIV globally.[2] Nearly all new infections (with the exceptions of mother-to-child transmissions and blood product-related transmissions) occur within the context of a discordant relationship - someone infected with HIV is passing on the infection to someone uninfected with HIV through unprotected sexual intercourse. Serodiscordance, in which one person in a couple is HIV-infected and the other person is HIV-uninfected, is a common phenomenon. In a multicentre collaborative study across East and Southern Africa, 49% of the enrolled heterosexual couples were HIV serodiscordant and in a study done in Jos, partner disclosure of HIV status among HIV positive mothers serodiscordant rate was noted to be

34.6%[15] while in Port Harcourt, Nigeria, the prevalence of serodiscordance was even higher, about 48%, among couples receiving antiretroviral therapy.[16] HIV transmission within stable serodiscordant partnerships is thought to contribute substantially to the HIV epidemic in sub-Saharan Africa[14]. In 2012, 34.0 million people were living with HIV of whom 15.7 million are women and some of their partners are HIV seronegative.

In sub-Saharan Africa, women account for 60% of HIV infected adults[4]. Many African countries with high HIV, fertility rates and women are pregnant for a substantial portion of their adult years[5]. Physiologic changes during gestation – including high levels of progesterone which can induce systemic or genital mucosal immunologic changes[5 6] – may increase the risk for women to acquire HIV during pregnancy and pregnant HIV infected women to transmit to their sexual partners. Unprotected sex associated with efforts to conceive and continued during pregnancy may also increase HIV risk.[7]

Over the decade the epidemic once dominated by infected males has become progressively feminized, the number of children infected is also growing and the need for an effective and comprehensive approach for the prevention of HIV transmission among serodiscordant couples.[3] Studies have estimated that in several sub-Saharan African countries, approximately two-thirds of infected couples are serodiscordant. Therefore, developing effective HIV prevention interventions that target serodiscordant couples could potentially contribute to reducing HIV transmission in Nigeria. Moreover, provision of services to HIV serodiscordant couples to help them manage their status is an essential component of comprehensive HIV responses[8].

The risk of HIV heterosexual transmission through unprotected intercourse depends on many factors, including the frequency of intercourse, sexual practices (i.e., vaginal vs. anal intercourse), presence of concurrent STIs such as genital ulcerative disease, HIV virus load in plasma, semen and vaginal secretions, disease stage and CD4 cell count, use of antiretroviral therapy, particularly highly active antiretroviral therapy (HAART), and other factors such as personal hygiene and male circumcision[9]. It is possible that the HIV epidemic is fuelled by several factors, including early initiation of sexual activity, overall lack of adherence to condoms and the frequent presence of multiple sexual partners[10]. HAART has been clearly demonstrated to be of profound benefit to patients with HIV by prolonging and improving their quality of life. Nevertheless, in

VARIABLE	FREQUENCY	PERCENTAGE
Age(years)		
25-29	15	30.6
30-34	12	24.5
35-39	21	42.9
40-44	1	2.0
Educational level		
Primary	4	8.2
Secondary	16	32.7
Tertiary	29	59.2
Ethnicity		
Berom	12	24.5
Hausa	4	8.2
Igbo	3	6.1
Mugwavel	9	18.4
Others	21	42.9
Occupation		
Artisans	3	6.1
Business	12	24.5
Civil Servants	22	44.9
Housewives	7	14.3
Students	5	10.2

The mean age of the study participant is 32.81yrs SD 4.68yrs
The mean follow up time 18.59 weeks, SD 7.62 weeks

Table 2: FACTORS ASSOCIATED WITH RISK OF TRANSMISSION

VARIABLES	FREQUENCY	PERCENTAGE
Freq Of Sexual Intercourse/Week		
1	15	30.6
2	8	16.3
3	13	26.5
4	11	22.4
5	1	2.0
6	1	2.0
Number Of Sexual Partners		
1	47	96.0
3	1	2.0
4	1	2.0
1	47	96.0
STI Symptoms		
No	47	95.9
Yes	2	4.1
Use During Coitus		
No	18	36.7
Yes	31	63.3
Freq Of Use		
Always	3	9.7
Occasionally	28	92.3
TOTAL	**31**	**100.0**
Smoking		
No	48	98.0
Yes	1	2.0
Take Alcohol		
No	44	89.8
Yes	5	10.2

The mean frequency of sexual intercourse was 2.55 times. standard deviation 1.30 times.

Table 3: REPEAT TEST RESULT (INCIDENCE OF SEROCONVERSION)

BASELINE RESULT	NEGATIVE	POSITIVE	TOTAL
Negative	48	1	49
Positive	0	0	0
Total	48	1	49

The incidence of seroconversion in study participants is $1/49 \times 100 = 0.020$
The mean gestational age at start of study =21.4weeks, SD =7.1weeks
The mean gestational age at the repeat test result = 38.8 weeks, SD = 2.2 weeks

Table 4: FACTORS ASSOCIATED WITH TRANSMISSION 2

VARIABLES	NEGATIVE	POSITIVE	TOTAL
CD4 Count			
<350	11	1	12
>350	37	0	37
RR 0.91677 , CI = 0.7729 – 1.0872 ,Fisher exact 0.2449			
Viral Load			
Detectable	32	1	33
Undetectable	16	0	16
RR 0.9697, CI 0.9129 - 1.0300 ,Fisher exact 0.6735			
Use of Condom During Coitus			
No	18	0	18
Yes	30	1	31
RR =1.0333, CI = 0.9690 - 1.1019			
STI Symptoms			
No	46	1	47
Yes	2	0	2
RR = 0.9789 CI = 0.9383 - 1.0209, Fisher exact 0.9592			
Smoking			
No	47	1	48
Yes	1	0	1
RR = 0.9792 CI = 0.9396 - 1.0204, Fisher exact 0.9796			
Take Alcohol			
No	43	1	44
Yes	5	0	5
RR = 0.9773, CI = 0.9342 - 1.0223, Fisher exact = 0.8980			

DISCUSSION

Pregnancy is associated with increased risk of transmission to seronegative male partners because of hormonal changes and increase in genital viral shedding.[17] In this study the incidence of seroconversion among seronegative male partners was 1/49 (20.4 per 1000 couple). This incidence is low and not statistically significant but for a disease of important public health implication of this magnitude and small study sample size it is clinically significant in the advocacy of reducing transmission in a high prevalence setting like Jos. Previous studies have reported seroconversion rates of 3.46 per 100 persons/year during pregnancy among Sub- Saharan African women but in that study, the sample size was quite bigger, duration of follow up was extended to puerperium and among most of the male seronegative partners some of their pregnant seropositve partners were not on drugs (ARVS). This might be responsible for this high rate of transmission.[7]

Another study in China reported a seroincidence of 1.17 per 100 person-years which is still higher than this study in Jos; again, the study was done in non-pregnant HIV positive and their seronegative male partners compared.[19] Other studies have reported seroconversion rates of 10.9 per 100 woman years.[18] This is quite higher than the incidence in this study but the study attempted at comparing rural and urban settings and adjusted risk was similar to a study in China.

The mean follow-up time in this study was 18.59 weeks with standard deviation of 6.62 weeks and mean gestational age at presentation was 21.4 weeks. This has a significant clinical correlation with late antenatal presentation of our women generally and is worth noting. The significance of this is in counselling patients on early antenatal visits, especially for patients that hitherto do not know their HIV status.

The risk of HIV heterosexual transmission include the frequency of intercourse, sexual practices, presence of concurrent STIs such as genital ulcerative disease, HIV virus load in plasma, vaginal secretions, disease stage, CD4 cell count, use of antiretroviral

therapy, particularly highly active antiretroviral therapy (HAART), and other factors such as personal hygiene and male circumcision. Another key determinant of prevention of transmission among serodiscordant couple is the correct, consistent use of condoms. In this study, the mean frequency of sexual intercourse was 2.55 times per week and only two of the patients had history suggestive of STI (4.1%) which may be responsible for the low incidence rate. Despite the high awareness and investment in advocacy in prevention of new infections by use of barrier contraception (condom), most of the participants were not using it (36.7%). Among those using condoms only a few used it consistently and correctly (9.7%), majority used it occasionally .This study is quite timely and apt at this critical period to put all hands on deck to redouble our campaign for the use of barrier contraceptives. In a study done in Lusaka, Zambia on condom and nonoxynol-9 use, the incidence of HIV infection in serodiscordant couples and the rate of seroconversion was higher among those who used condoms less likely (10.7/100) compared to those who used condoms (2.3/100). Another work done in 2002 on condom effectiveness in reducing heterosexual HIV transmission also revealed that correct and consistent use of condoms can substantially reduce the rate of transmission. Weller S et al in a study on condom effectiveness in reducing heterosexual HIV transmission also concluded that consistent use of condom resulted in an 80% reduction in HIV incidence.

Substance abuse, alcohol consumption and cigarette smoking are associated with an increased risk of HIV infection. These substances may increase HIV risk by reducing users' inhibitions to engage in risky sexual behaviours. In this study, most of the participants neither took alcohol nor smoked cigarettes. Even when adjusted, it was not statistically significant but this may be due to a small sample size.

The main determinants of transmission in this study would appear to be a detectable viral load and a low CD4 cell count as the only case of seroconversion during pregnancy occurred in this category of participants. Although this was not statistically significant, and no seroconversion was seen among partners when the CD4 cell count was above 350, it does call for longer observations in a bigger cohort. Consideration must be given to the use of antiretroviral therapy as HIV prevention in serodiscordant settings in Nigeria since this has been shown to secure virologic suppression and block transmission in up to 96% of cases.[20]

CONCLUSION

The incidence of HIV transmission to the male uninfected partner in a serodiscodant setting in Jos during pregnancy is low but its occurrence in this study suggests the need to re-test the negative male partners after every pregnancy.

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