

## Prevalence of Couple Human Immunodeficiency Virus (HIV) Discordance, and Prevention of New HIV Infection in the Negative Partner in Enugu, South-East Nigeria

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### Abstract

**Background:** A large number of cohabiting HIV discordant couples do not know each other's HIV status. The negative partners are unknowingly very vulnerable to HIV infections in such settings.

**Objectives:** To determine the prevalence of HIV discordance among cohabiting couples in Enugu, review the literature on their health challenges, and discuss how to prevent new HIV infection in the negative partners.

**Methods:** This was a retrospective study. The Couple HIV Testing and Counseling (CHTC) register in Enugu State University Teaching Hospital; Enugu was evaluated from October 31, 2012 back to January 1, 2009. Relevant data was analyzed using Excel 2007 software, and presented in percentages.

**Results:** A total of 387 (i.e. 774 sexual partners) couples accessed the CHTC. Twenty eight (28/774, 3.6%) partners opted out while 746 (746, 96.4%) were tested. One hundred and nineteen (119/373, 31.9%) couples were discordant, 185 (185/373, 49.6%) were concordant negative, while 69 (69/373, 18.5%) were concordant positive. Eighty one (81/119, 68.1%) of the discordant female partners tested positive while 38 (38/119, 31.9%) males tested positive.

**Conclusion:** Many cohabiting couples in Enugu were HIV discordant. The HIV positive female partners were about twice the HIV positive male partners. The HIV negative partners in such health challenging settings are vulnerable to new HIV infections, and need protection to remain negative.

**Keywords:** HIV; Couple; Discordance; Vulnerable Negative Partners; Enugu; Nigeria

### Background

A large number of cohabiting HIV discordant couples do not know each other's HIV status. The negative partners are unknowingly very vulnerable to HIV infections in such settings, and most of the negative partners do not know how to protect themselves [1-7].

High incidences of new HIV infections in the negative partners have been reported in Zambia and Rwanda. HIV deoxyribonucleic acid sequencing researches in Uganda and Zambia confirmed that 64% and 87% of the new infections in the negative partners were respectively from the HIV positive cohabiting partners [8,9]. High viral load is usually associated with high rate of HIV transmission [10]. Other risk factors associated with HIV transmission in heterosexual discordant couples include lack of male circumcision, [11] the presence of other sexually transmitted infections, [12,13] ignorance of self or partner's HIV status and limited understanding of HIV discordance within couples [7]. Majority of the HIV transmissions among couples or sexual partners can be prevented with effective interventions like CHTC and condom use [4], rights-focused behavior changes, prompt sexual transmitted infection screenings and treatments, male medical circumcision, [11] antiretroviral treatment as prevention, [14] and Pre- and post-exposure prophylaxes (PrEP and PEP) [15]. Preventative vaccines and functional cure will be the ideal methods of the prevention when they become available for clinical use. The benefits of adequate suppression of viral replication with highly active antiretroviral therapy (HAART) in the positive partner are enormous, and include reduced risk of infecting the negative partner, safer conception, prevention of mother to child HIV transmission, increased marital cohesion, reduced

partner violence, decrease morbidity and mortality in the HIV positive partners. This study assessed the prevalence of HIV discordance among couples who accessed CHTC in Enugu, and we reviewed the literature on new HIV infection preventions and other health challenges among HIV discordant couples.

### Justification

The HIV negative partners in HIV discordant couples relationships are at very high risks of becoming infected with HIV and they need protections. Knowing the prevalence of HIV discordance in such setting, creating awareness on how to protect them and help them meet their health needs are of critical importance. No such research has been reported in this study population. It gives insight into the magnitude of HIV discordance and the cost implications of adopting the current World Health Organization (April 2012) [14] guidelines on the use of antiretroviral drug-based intervention as HIV treatment as prevention in such discordant relationship.

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## Subjects and Methods

Enugu State University Teaching Hospital (ESUTH) Enugu is a state owned health institution that became a teaching hospital in June 2006. The institution started providing comprehensive HIV services in January 2009. A trained couple nurse counselor provided the pre-test couple counseling to couples who access the daily HIV testing and counseling services in the hospital. Couples who accepted the test were tested by the laboratory scientist in the small laboratory attached to the special clinic. Rapid serial HIV antibody testing technique was used in the laboratory. Client blood sample was screened for HIV antibodies with determine reagent. A positive test result was then confirmed with another reagent like Un-Gold before the client was declared HIV positive. The HIV test results were released the same day to the couples through the couple nurse counselor who provided post-test counseling. The concordant HIV negative couples were counseled to remain negative through rights-focused behavioral changes and the elimination of risk behaviors identified during the counseling. The concordant HIV positive couples were counseled and referred to the appropriate clinics for continuation of care. Discordant couples were counseled on how to protect the negative partners while trying to meet their health challenges and the need for regular follow up assessments. Positive discordant partners whose CD4 counts were less than 500 were started on HAART. Treatment as prevention is not yet the protocol in our setting because of several constrains.

## Inclusion and Exclusion Criteria

Couples or sexual partners who had HIV pre- test and post-test counseling and were tested were included in the study. Couples who opted out and clients without their sexual partner were excluded from the study.

Ethical clearance was obtained from the ESUTH ethical committee when the study was about to commence. The authors funded the research and we have no competing interests to declare.

## Results

Table 1 showed that 774 sexual partners were counseled for CHTC. Twenty eight (3.6%) sexual partners (i.e. 14 couples) opted out while 746 (96.6%) were tested. Majority of the clients were of age 20-30 years 386 (49.9%), Christians 750 (96.9%), and urban residents 618 (79.8%).

Figure 1 and Table 2 showed the outcomes of the couple HIV tests. One hundred and eighty five (185/373, 49.6%) of the couples were concordant negative, 69 (69/373, 18.5%) were concordant positive while 119 (119/373, 31.9%) were discordant. Eighty one (81/119, 68.1%) of the discordant female partners tested positive while 38 (38/119, 31.9%) males tested positive.

## Discussion

The prevalence of HIV discordance among heterosexual couples in this study is 31.9%. Several studies in Sub-Saharan Africa have shown similar high prevalence rates of HIV discordance as in this study [6,16]. The rates, however, ranged from 2% in Rwanda to 13% in Zimbabwe and Lesotho in a population-based study [3]. It can be as high as 75% in some countries [17]. In Nigeria 7.7 to 78.8% of HIV positive antenatal attendees have HIV negative partners [16]. The HIV negative partners in such discordant relationships are at critical risks of becoming infected. Women are twice more vulnerable than men in such relationship [5]. About 68.1% of the females in this study were the positive partner while 31.9% were males. The high prevalence of HIV couple discordance in this study may be because the study was a hospital-based study.

Discordant couples are significant sources of new HIV infections in Sub-Saharan Africa. The rate of HIV transmission in discordant heterosexual partners ranged from 10% in Kenya to 56% in Rwanda [18]. The risk of HIV transmission is reported to be between 20 to 25 % per year [2,4]. It depends on coital frequency (1 in 500 contact) [19], high viral load [10], and the presences of sexual transmitted infections and opportunistic infections [12,13].

The discordant couples have a lot of health challenges, and needs

Variable in year	Frequency	Percentage
<20	30	3.9
20-30	386	49.9
31-40	290	37.5
>40	68	8.8
Total	774	100
<b>Educational level</b>		
Primary education	34	4.4
Secondary education	430	55.6
Tertiary education	310	40.1
Total	774	100
<b>Religion</b>		
Christianity	750	96.9
Islam	10	1.3
Others	14	1.8
Total	774	100
<b>Residence</b>		
Rural	156	20.2
Urban	618	79.8
Total	774	100
<b>Client HIV testing</b>		
Number opted out	28	3.6
Number tested	746	96.6
Total	774	100

Table 1: Socio demographic characteristics of the clients.

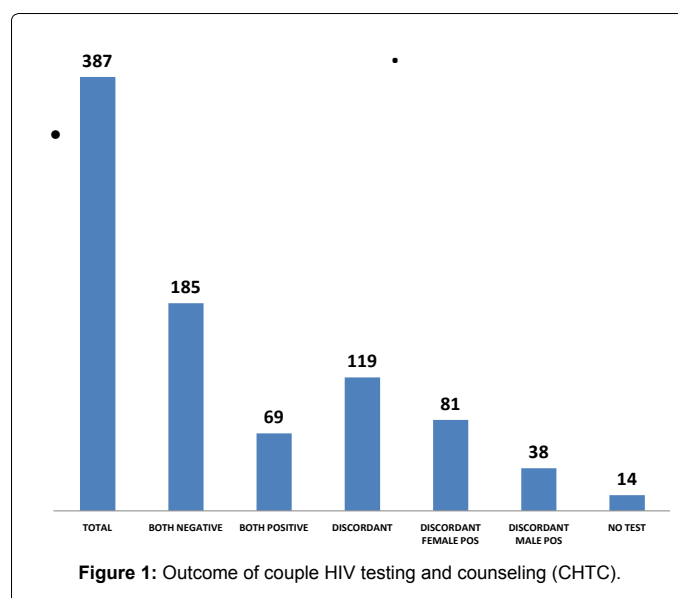


Figure 1: Outcome of couple HIV testing and counseling (CHTC).

Variables	Number	Percentage
Both partners negative	185	49.6
Both partners positive	69	18.5
Discordant couples	119	31.9
Total	373	100

Table 2: Results of couple HIV testing and counseling.

that can make them take high risk behaviors. These needs include: to have a satisfying sexual life, safer conception, desired pregnancy, uninfected children, treatment for infertility, contraception to prevent unwanted pregnancy and screening for cancers. The discordant couples can meet some of these needs with effective interventions that reduce the risks of infecting the HIV negative partner. These interventions include CHTC and identification of at risk negative partner, correct and consistent use of condoms, male medical circumcision, PrEP and PEP, use of HAART as treatment as prevention on the positive partner to protect the negative partner. Sperm washing, sperm donations and assisted reproduction technology are other options.

Correct and consistent use of the condoms have been reported to reduce the rate of HIV transmission from 20-25% to 3-7% [3,4]. Male medical circumcision was effective in reducing HIV transmission by 38-66% [11,20]. PrEP with oral tenofovir are known to reduce transmission by 67% and 75% when combined with emtricitabine as truvada [15].

Conception is a serious issue in a discordant relationship and a common cause of unsafe sexual risk behavior. Correct and consistent use of condoms, sexual transmitted infections and opportunistic infections treatments, and early initiation of highly antiretroviral therapy for maximal suppress viral replication before attempting to conceive are strategies that can be employed to reduce the risk of HIV transmission in such situation.

Safer conceptions can be achieved when the woman is positive and the man is negative through artificial insemination with the negative husband's sperm [21]. Another option is timed unprotected intercourse during ovulation when the woman on HAART had undetectable viral load [22]. PrEP and PEP can also be given to the man before and after the exposure [14].

When the woman is negative and the man is positive, safer conceptions can be achieved by sperm donation from a negative male. When this option is not acceptable, sperm washing and intrauterine insemination are safe and effective risk reduction methods. PrEP and PEP can be offered to the HIV negative woman before and after the timed unprotected intercourse during ovulation when the positive man has had maximal viral suppression with highly antiretroviral therapy.

### Limitations of the Study

The study was a retrospective hospital-based study and the couple HIV discordant prevalence rate may be higher than population-based studies. The serial HIV antibody screening test could give false negative or positive results.

### Recommendations

HIV testing and counseling centers should be encouraged to practice testing of sexual partners or groups of sexual contacts, and giving out the same day results to encourage mutual disclosure of partners' status, identify and protect negative partners from acquiring new HIV infections.

### Conclusions

A large number of cohabiting couples are HIV discordant. The negative partners in such settings are very vulnerable to HIV infections. Sexual risk behaviors and unsafe sex can be under taken when the discordant couples are trying to satisfy their sexual desire and achieve desired pregnancy. This study discussed the available treatment options for the discordant couples to meet their needs at reduced rate of infecting the negative partner.

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