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Interventions to Prevent HIV Transmission in Serodiscordant Couples

This evidence review is part of a series on HIV prevention and control produced by the National Collaborating Centre for Infectious Diseases. It is intended to inform public health practitioners and community-based workers and guide their practice.

Why Target Serodiscordant Couples for HIV Prevention?

Many people living with HIV/AIDS (PHA) are in an ongoing sexual relationship with an HIV-negative partner. These couples are referred to as discordant, serodiscordant, or serodivergent couples. HIV-negative individuals in discordant partnerships are at risk of infection. For example, recent data suggest that globally, over 50% of new HIV infections in mature generalized epidemics occur within discordant relationships (1). In low prevalence settings such as Canada and the U.S., transmission within discordant relationships remains a concern (2). A modelling analysis of 3723 U.S. men and women with HIV indicated that more than 30 new infections could be expected among their discordant partners within three months based on present behaviours (2).

Globally, there have been limited efforts aimed at preventing HIV infection among serodiscordant couples. The purpose of this paper is to review the literature for prevention interventions that target either men who have sex with men (MSM) or heterosexual discordant couples.

What is the Prevalence of Discordant Relationships?

The percentage of discordant couples in Africa ranges from 3–20% of the general population (3). In a Texan study of three prenatal sites, 40% of HIV-positive pregnant women (N = 80) had discordant partners and 36% had partners of unknown HIV status (4). In a survey of 507 San Francisco HIV-positive MSM, half had a primary or casual discordant partner (5). Data from a study of young (age <30 years) HIV-negative MSM conducted by George et al, showed that 27% of those identifying as White immigrants born outside of Canada (N = 95) were having sex with a seropositive partner,

Highlights

- HIV-negative partners of PHAs are at risk of HIV acquisition.
- Several reviews conclude that condom interventions among discordant couples prevent HIV transmission.
- HIV testing with counselling and support is effective in preventing HIV among discordant couples and should be promoted as a major prevention strategy.
- Some early research suggests that HIV transmission rates are reduced when PHAs are on HAART with "complete" viral suppression.

compared to 10% of non-White immigrants (N = 108) (6). In comparison, 20% of Canadian-born white MSM (N = 907) and 19% of non-White Canadian-born MSM (N = 38) were having sex with a seropositive partner.

Is Being in a Discordant Relationship a Risk for HIV?

The Vangard project reported that from 2001–2003, the majority of seroconversions from their Vancouver MSM cohort (N = 1040) occurred in 15% of men who reported discordant receptive unprotected anal intercourse (UAI) (7). In a Montreal cohort of HIV-negative MSM (N = 1587), 75% reported being single, approximately 40% had more than 2 regular partners, and 33% had more than 5 casual partners (8). During the first six month follow-up, 19% of participants had UAI with serodiscordant/casual partners, which was the main risk factor for HIV transmission (8).

Globally, there have been limited efforts aimed at preventing HIV infection among serodiscordant couples.

Weinhart assessed the sexual behaviours of discordant couples in four U.S. cities. Participants consisted of 3723 PHAs: 1918 MSM, 978 women, and 827 heterosexual men (2). Women were more likely to engage in unprotected intercourse with discordant partners (19%), compared to MSM (16%), and heterosexual males (13%). A study by Semple of heterosexual PHAs (20 men, 27 women), found that in a four-month period, women reported 15 acts of unprotected vaginal intercourse with discordant partners compared to one act among men (9). Within the study, 85% of women and 50% of men were in a steady relationship with an HIV-negative or unknown status partner (9). In another study, 19% of 304 HIV-positive injection drug users (IDUs) engaged in unprotected intercourse with discordant partners (10). Among this sample, alcohol consumption was associated with inconsistent condom use. This association also exists among non-IDU HIV-positive populations (11–13).

How can Sexual Transmission Risk be Reduced?

Discordant couples who know their status and are properly counselled and supported, and use condoms consistently, can reduce HIV transmission risk from 50–88%, based on a 90% probability taking into account condom breakage, slippage, and incorrect use (2, 9). Condoms are protective against HIV infection; two systematic reviews showed that consistent condom use for all acts of penetrative vaginal intercourse reduced HIV incidence in discordant relationships by 80–90% (14, 15). Other strategies used effectively by discordant couples in Uganda and U.S. to prevent HIV included abstinence, HIV counselling and testing, use of a barrier method other than condoms, or the practice of non-penetrative sex (3).

Does Antiretroviral Therapy decrease Sexual Transmission?

Even though evidence suggests that highly active antiretroviral therapy (HAART) reduces HIV transmission, HIV is still present in blood plasma and the genital tract of men and women living with HIV (16, 17). If a person's viral load is below the limit of detection of a particular assay, s/he will receive an "undetectable" result; however, an undetectable result does not indicate the absence of HIV in blood. Therefore, PHAs on HAART should use condoms consistently to prevent transmission to HIV-negative partners.

Highly Active Antiretroviral Treatment

Reviews of observational studies reported reduced sexual transmission in discordant couples when the PHA was taking HAART (16, 17). In a Spanish study by Castilla et al, 49% of discordant heterosexual couples were being treated with HAART between 1999 and 2003 (N = 393) (14). The seroconversion rate of partners of PHAs not on HAART was 9%, compared to 0% in couples taking HAART ($p = 0.01$), and this was maintained after adjusting for unprotected coital acts. In another study of 93 discordant heterosexual couples, six seroconversions occurred, all when the PHA was not taking HAART (19). A study of 62 discordant pregnant couples reported one case of vertical transmission (transmission of mother to unborn child) and no cases of horizontal transmission (transmission from infected individual to an uninfected individual) when the PHA was on HAART (20). In a Ugandan prospective study of PHAs initiating HAART, analysis of a subset of 49 HIV-positive participants, who were sexually active with their cohabitating HIV-negative partners, showed that HAART in conjunction with prevention counselling and partner voluntary counselling (VCT) and testing reduced HIV transmission risk. When VCT was conducted after one year on HAART, only one HIV-negative spouse of an HIV-positive index participant had seroconverted (21). However, caution should be exercised when interpreting this finding, as this subset of 49 study subjects represented only 5% of the initial cohort (N = 926).

Prophylaxis

Currently, HIV prophylaxis is used widely for occupational exposure and to prevent vertical transmission. Policies exist in some U.S., Canadian, U.K., and European jurisdictions for administration of non-occupational post-exposure prophylaxis (nPEP) in cases of sexual exposure from a source that is likely to be HIV-infected (22). nPEP should be administered no later than 72 hours, but ideally within the first 6–12 hours of exposure (22). The typical regimen is a 28-day course of either dual-nucleoside agents or triple-combination regimens with a protease inhibitor. Risk compensation (increases in risky behaviour caused by perceptions of reduced risk) has been a concern with nPEP, but little evidence of harm has been found;

however, nPEP is not recommended when exposure is recurrent. Among 242 British subjects requesting nPEP in 1999, 50% were sexually exposed while in a discordant relationship (22). In a U.S. study of 100 nPEP recipients, the majority of index events involved UAI (58%) or condom failures (18%) (23). Of those dispensed the full 28 days of medication (N = 84), 75% completed the treatment, which suggests nPEP's feasibility.

Pre-exposure prophylaxis (PrEP) is currently being evaluated in seven clinical trials with discordant couples, drug users, sex workers, and MSM (17). PrEP involves taking tenofovir and/or emtricitabine once daily. Tenofovir was chosen due to its ease of administration, tolerable safety profile, and efficacy for prevention of SIV infection in macaques as indicated by data.

What does the Evidence say about Testing, Counselling, and Disclosure?

An effective strategy to reduce transmission in discordant couples is for the HIV-negative partner to go for regular HIV testing and counselling. When people recognize their vulnerability to HIV, they significantly decrease risky sexual behaviours (2). HIV counselling and testing with follow-up have resulted in sustained increases in condom use from 3% at baseline to 80% after testing among discordant couples in Zambia (24) and from 5 to 71% in Congo (3). No studies were found among Canadian discordant couples.

The California Partners Study II randomised 101 heterosexual discordant couples to four one-on-one counselling sessions; for (a) the couple, or (b) only the HIV-positive partner (25). The counselling included risk reduction, gender dynamics, and communication skills. Couples in both arms reported statistically significant increases in consistent condom use after 12 months (22% vs. 34%). A U.S. randomised controlled trial of 248 HIV-negative MSM assessed whether one standard counselling session (SC), plus counselling on high-risk sexual behaviours, would decrease UAI (26). Significant decreases were found in UAI for interventionists with discordant casual partners (66–26%) compared with the SC group, but UAI did not decrease with primary partners.

Non-disclosure of HIV status to primary partners may occur due to fears of rejection and discrimination, feelings of shame, and a desire to maintain secrecy (27, 28). The reasons why partners may disclose include trust, anticipated support, and protection of their partner against possible transmission. In a study by Kumar and colleagues (27), the majority of newly seropositive heterosexuals disclosed to their primary partners (71%), but those with casual partners disclosed only occasionally (26%). They found no gender differences.

In a study conducted in four U.S. cities among 742 HIV-positive MSM in a primary relationship, 29% were discordant and 12% were unknown/untested (28). While over 93% of men who knew their primary partner's status disclosed, only 42% of those with a primary partner of unknown/untested status disclosed. Most non-disclosure occurred in the context of consistent condom usage. This study is in contrast with two reviews that found that there was no relationship between disclosure and safer sex (29, 30). These reviews suggest that PHAs will reduce their risk behaviours upon learning of their status, regardless of whether they disclose to their primary seronegative partner or not (31). If they are "never" condom users, disclosing may not lead to behavioural change or to fewer episodes of unprotected sex. The key to protected sex, the reviewers suggest, is whether the partners have explicitly discussed using protection and reached an agreement about it.

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Is Social Support linked to decreased Mortality?

Social support, the emotional or tangible support from others, is an important determinant of health (32). In particular, greater emotional support is strongly associated with decreased mortality (33). A Swiss study (N = 3736, 29% women) claimed that individuals on HAART in stable partnerships benefited from slower disease progression (32). Progression to AIDS or death was significantly less within stable partnerships, even after adjusting for disease severity, mental health, drug adherence, and treatment efficacy. Also significant was the increase in CD4 count by 50–100 (cells/mm^3) above baseline. The authors speculate that drug adherence and decreased depression could account for these observations. One U.S. study based on cognitive behavioural therapy proved successful with helping discordant couples reduce depression, anxiety, and increase marital satisfaction (34).

Research Gaps

Interventions are needed that help couples to develop coping skills, increase social support, reduce anxieties, and improve health outcomes. Intervention studies are required to: (a) identify alternative strategies to condom use alone to reduce the risk of HIV transmission, (b) increase testing and disclosure, and (c) investigate nPEP and pre-exposure prophylaxis in discordant couples. More epidemiological and intervention studies are needed in the Canadian context.

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