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evidence review

Reducing the risk of Sexual HIV transmission for adult women

Heterosexual transmission of HIV is the highest risk category for women and probably accounts for over 90% of incident female HIV infections globally (1). Tens of millions of women are exposed to possible HIV infection through their male partners' previous sexual experiences. This article focuses on interventions aimed at adult women who are at

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.

risk because a sexual partner is known to be HIV infected or whose status has not been disclosed. The purpose is to address issues relevant to women in an ongoing relationship as well as women engaging in casual sexual encounters. This review

Highlights

- Interventions that train women in self-efficacy, motivational enhancement, and social support and skills training for sexual risk reduction are the most effective.
- Interventions with longer interpersonal and intrapersonal skills training (3 to 6 hours) or motivational training (one hour or more), and that include an eroticizing component are more effective at reducing the number of sexual occasions and partners.
- Support from partners, families, and health care providers predict stronger intentions to use condoms among women.
- Female-controlled methods of HIV prevention should be developed and promoted.
- HIV strategies other than condoms should be recommended to women by their health care providers. These strategies include: dual protection (using spermicidal foam, cream or gel, diaphragm or cervical cap in addition to the male condom), abstinence or refusing sex, engaging in non-penetrative sex, leaving a relationship due to STI concerns, or undergoing mutual HIV testing.

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does not address the opportunity to combine reproductive health including family planning, prenatal and maternal services with HIV prevention. These interventions are incredibly important for women and their male partners and will be addressed in a subsequent synthesis piece. It also does not address the issues for adult women who use injection drugs (IDU), 'sex for pay' or sexual assault. These topics are addressed in other NCCID evidence reviews.

In Canada in 2005, 27% of the 2483 newly diagnosed HIV infections were among women. At the end of 2005, there were an estimated 11,800 women living with HIV in Canada, accounting for about 20% of the national total. This is a 23% increase from the 9,600 estimated in 2002.

What is the Prevalence of HIV Infection among Women?

Women represent 50% of the people living with HIV/AIDS (PHA) worldwide (2). In Canada in 2005, 27% of the 2483 newly diagnosed HIV infections were among women (3). At the end of 2005, there were an estimated 11,800 women living with HIV in Canada, accounting for about 20% of the national total. This is a 23% increase from the 9,600 estimated in 2002 (3).

What Social Factors Impact HIV Risk?

Social, cultural and political practices greatly aggravate women's HIV risks. These include gender discrimination, poverty, cultural and sexual norms, lack of education, sexual coercion, and violence against women (4). Psychosocial characteristics, such as a pervasive sense of hopelessness, powerlessness, low self-esteem and the presence of emotional disturbance, are also predictive of risky behaviour (1,5,6).

Women with past histories of sexual abuse are more likely to engage in HIV-risk behaviours than women without (1,5,7,8). Further, HIV-positive women are more likely to report past abuse, stress and psychiatric history than HIV-negative women (1,8).

Intimate partner violence contributes to HIV risk behaviour as well. Women with little decision-making power in a relationship are unable to negotiate condom use with violent partners who engage in risky behaviours or who are HIV infected (7,9). In Canada, the incidence of partner violence does not differ markedly across the provinces and regions, but was highest in Alberta (25.5%) and British Columbia (23%) and lowest in Ontario (18.8%) (10).

Other social factors, such as poverty and addiction, are also related to women's risk for HIV infection. Researchers from Syracuse University studied 60 women using the information-motivation-skills model to test the effects of alcohol on safe sex behaviour (11). The results showed a greater motivation to engage in risky behaviour when the women had high doses of alcohol or if they perceived themselves to be intoxicated. Paxton and colleagues (1) also found that drug and alcohol use were associated with the increased likelihood of engaging in unsafe sex.

These determinants of health are complex issues that must be addressed at all levels of society including their legal, political, educational and institutional dimensions. Although not amenable to immediate answers, these determinants are barriers to HIV prevention that are evidence-based and underlie much of the reasons for the continuing growth of the epidemic.

What Biological Factors Impact HIV Risk?

Women are more vulnerable than men to sexual HIV acquisition due to biological factors (12). Women are more than twice as likely as men to contract HIV through unprotected heterosexual sex with an infected partner (4). Susceptibility to HIV also varies throughout a woman's reproductive life. Young women are more vulnerable to HIV than older women, due to high-risk activities and the physiology of an immature genital tract (4,13). Women with vaginal or cervical microbial infections (both sexually transmitted infections [STIs] and other genital tract infections), including bacterial vaginosis, trichomonas, herpes genitalis due to herpes simplex virus 2 (HSV2), gonococci, chancroid and syphilis, are at significantly increased risk (1.5 to 6-fold) of acquiring HIV following sexual exposure with an infected partner (4,13).

Is Menses Associated with Increased Risk?

Heterosexual transmission of HIV from women to men increases during menses due to the presence of blood (14,15). In their 2006 study, Kalichman and researchers (14) found that 31% of men and 26% of women had a lifetime history of engaging in sexual intercourse with coital bleeding (75% of which was due to menses). They report that individuals who engaged in sexual intercourse involving blood were three times more likely to have a lifetime history of an STI.

Is Pregnancy Associated with an Increased Risk?

The association between HIV infection and pregnancy is controversial. A prospective study by Gray and colleagues (16) showed a two-fold increase in the risk of HIV infection during pregnancy. In contrast, Morrison and colleagues (17) reported that neither pregnancy nor lactation placed women at increased risk of HIV acquisition. Both studies made adjustments for changes in behavioural, STIs, and demographic variables.

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What Behavioural Factors Impact HIV Risk?

Vaginal Douching

One recent 10-year prospective study found an association between vaginal washing/douching and HIV susceptibility, after adjusting for other STIs and sexual behaviours (18). Compared with women who did not perform vaginal washing, the risk of HIV transmission increased among women who used water or soap to clean inside the vagina. However, a 2005 meta-analysis found only 12 studies on intravaginal practices linked to HIV and noted that increased HIV transmission with dry sex or douching had limited epidemiological evidence (19). Most were cross-sectional studies comparing HIV infection with self-reported dry sex or douching practices and many did not report associations adjusted for potential behavioural, such as risk taking of partners or networks, or biological confounding variables. Despite the lack of clear causality, understanding this association is of direct relevance to future HIV prevention efforts.

Hormonal Contraception

Prospective studies report that the use of hormonal contraceptives does not significantly increase the risk of HIV acquisition in women (19,20), but these studies are plagued with different methodologies and remain controversial. A recent study suggests that HIV-negative women taking hormonal contraceptives were more susceptible to HIV transmission when they were infected with HSV2; however, these findings need to be confirmed (21).

Is There Evidence Supporting HIV Prevention Interventions for Women?

Interventions Using Skill Training and Motivation

Adult non-drug using women were generally well-informed about the nature of HIV and how it is transmitted (22,23). Longshore and colleagues (23) studied the responses of men and women to sexual risk reduction interventions and found significant gender differences. The most effective interventions for men focused on increasing safer sex commitment through HIV knowledge, but interventions training women in self-efficacy for sexual risk reduction proved to be most effective. Women's self-efficacy was increased by peer norms in favour of safe sex. Other researchers agree that interventions including motivational enhancement, social support and skills training lead to greater risk reduction (5,7,24-26). Interventions with longer interpersonal and intrapersonal skills training (3 to 6 hours) or motivational training (one hour or more) were more effective at reducing the number of sexual occasions and partners (5,7,26).

Abstinence-based Programs

While results of meta-analysis have shown that abstinence-based programs are not effective with youth, no reviews have specifically studied the effectiveness of abstinence-based programs in adult women (27). Abstinence-based programs encourage secondary abstinence (returning to abstinence after sexual activity) whereas abstinence-plus programmes promote abstinence along with safer sex strategies. Abstinence critics argue that emphasizing abstinence over condom use leaves women at risk of infection, because in many parts of the world women are not empowered to insist on abstinence or fidelity (28). Broader sexual repertoires need to be taken into account (29). For example, the issue of recommending non-penetrative

sex (such as mutual masturbation) is seldom tackled. Finally, a central problem is the continuing insistence from major prevention program funders that changing behaviour alone is enough, rather than changing the social context of inequality for women that configures risky behaviours (30).

Interventions Promoting Safe Sex

Interventions for both men and women that improve male condom use, especially among high risk groups, effectively reduce transmission of HIV and other STIs (26,31,32). However, low rates of partner condom use among African American and Brazilian women, as well as most women in resource poor countries, are common. Reasons cited include lack of access, cost, inconvenience, fear of reprisal for unjustified accusations of infidelity, fear of separation, lack of female-dominated decision-making, and negative perceptions about condom use (6,22).

Research indicates that among heterosexual women, condom use is less likely to occur with regular partners and more likely to occur with casual sexual partners (6,7). Further, women need different skills to negotiate condom use. One reviewer found that support from partners and families, and a sense of self-efficacy regarding the use of condoms, predicted stronger intentions to use condoms among women (6). Interventions that target both partners may help to relieve some of the burden placed on women for protection from HIV. In addition, interventions are most efficacious with women who recognize their vulnerability to HIV (1,26,31).

In a meta-analysis, Scott-Sheldon & Johnson (32) evaluated interventions that eroticised safe sex. They said that eroticization is "defined as any sexually arousing, exciting, or pleasurable material that was used to promote safe sexual behaviour." They concluded that an eroticizing component resulted in lower sexual risk on six dimensions: HIV-related knowledge, attitudes toward condoms, condom use, overall behavioural risk, communication with sexual partners, and intercourse frequency. Despite the benefit of eroticizing strategies in interventions, only 5% of the studies retrieved for the meta-analysis included a specific eroticization component.

Female-Controlled and Other Prevention Strategies

Female condoms are currently the only female-controlled means of HIV prevention (33,34). Hoffman and colleagues (33) describe a U.S. study involving 1,159 women who received a female condom promotional message and video, and practiced insertion under expert guidance. After six months, condom-protected sex was significantly higher (50%) than reported at baseline (40%) and one quarter of these were female condom-protected. However, other studies show a low uptake of female condoms, and report problems with insertion (33% to 50% in some studies). Insertion difficulties almost abated (from 25% to 3%) when nurses used a model for instruction (33). Perhaps when taught and used correctly, female condoms may be as effective as male condoms.

Researchers from the University of California San Francisco recently found that the diaphragm added no benefit of protection to the cervix, and therefore no protection against acquiring HIV (35). A diaphragm/condom randomized controlled trial in Zimbabwe and South Africa reported that fewer partners of the diaphragm users actually used condoms, despite instructions to use both methods of protection. In the course of the two-year period, 158 out of the 2472 women given the diaphragms/condoms combination seroconverted, whereas 151 of the 2476 women given only condoms seroconverted.

Microbicides are another potential female-controlled means of HIV prevention. Microbicides are now in phase III studies and may be available by 2010 (31,33,36) (Appendix A). Other strategies that women used in reducing HIV transmission included dual protection (using spermicidal foam, cream or gel, diaphragm or cervical cap in addition to the male condom; 12%), abstinence or refusing sex (10%), engaging in non-penetrative sex (9%), leaving a relationship due to STI concerns (27%), or undergoing mutual HIV testing (13%) (37). There was a 4% increase in the proportion of women always protected against STIs when dual protection was used compared with condom use alone.

Focusing only on women in sexual partnerships ignores men's role in sexual decision-making, and reinforces the belief that women are solely responsible for safer sex. There is also danger in enforcing safer sexual practices without partner support because they might initiate violent acts or abandonment.

Are Interventions Addressing Violence or Abuse Effective?

Hebling & Guimarães (22) note that prevention strategies based on fidelity, monogamy, sexual abstinence, or free distribution of condoms are utopian (12). Power differentials within relationships related to safer sex practices are complicated. For at-risk women, negotiated safety imbedded in intimate relationships may be an effective strategy, provided trust exists within the relationship and testing services and counselling are available (24,32). Focusing only on women in sexual partnerships ignores men's role in sexual decision-making, and reinforces the belief that women are solely responsible for safer sex (7). There is also danger in enforcing safer sexual practices without partner support because they might initiate violent acts or abandonment (6).

One randomized cohort of 147 HIV-positive women with histories of abuse was effective, although it worked with women alone. The intervention group participated in 11 sessions of sexual health training involving communication, problem-solving skills, and peer modelling (8). The study reported a decrease in risky behaviours among the intervention group.

How can Cultural Factors be Effectively Incorporated into Interventions?

For prevention programs to be effective they must be targeted toward specific women's populations and cultures (1,5,6,25). Culturally relevant components include practices, beliefs, values, norms, and ideologies (38). "Sharing Our Stories on Promoting Health and Community Healing: An Aboriginal Women's Health Project" presents the results of a qualitative

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research study focusing on the health of Aboriginal women in Manitoba (39). The authors incorporated traditional medicinal practices of Aboriginal elders in the intervention design. Effective interventions for Latina women emphasize cultural customs, the extended family, peer counselling, and oral tradition (25). Prather and colleagues (38) designed a cultural and gender-relevant motivational and skills-based program using five sessions with African American women. The culturally appropriate tools emphasized communication of Afro-culture such as poems and other readings about Black women. In order to be successful, women's interventions must be guided by principles that reflect the values and beliefs of local culture and communities.

Research Gaps

The evidence presented here on women's HIV prevention interventions was strong in that the sample included 5 meta-analyses, 8 reviews, 3 randomized control trials, and 14 observational studies. More interventions are required that examine HIV risk among women exposed to domestic violence, and focus especially with Aboriginal and Native American women, women of African and Caribbean decent and other affected ethnic groups. Few intervention studies linked female condom use to effective reduction in risky sexual practices.

What can we conclude?

Interventions for women will be more effective if they are tailored to the unique culture of the target population, offer the opportunity to practice negotiation skills and increase motivation, address current and past violence and abuse, and involve multiple, sustained sessions. Prevention interventions should incorporate domestic violence screening, and provide abused women with information on the risk of HIV infection (9). Interventions to reduce a woman's risk of acquiring HIV should promote communication within couples, include men's participation in sexual health issues, and disseminate the eroticization of condoms. Effective interventions also emphasize determinants of health and gender-related influences, including stressors facing women, power imbalances, and sexual assertiveness.

Appendix A

Expected risk reduction associated with techniques to prevent HIV infection

	Expected risk reduction (%)	Behavioural considerations	Availability
Male circumcision	50–75	One time procedure	Currently exists
Male and Female Condoms	80–90	Must be used correctly and consistently	Currently exists
Microbicides	Up to 50	Must be applied before each sex act	At least 5 years before widely available if current studies show efficacy
Pre-exposure antiretroviral prophylaxis (tenofovir)	Unknown	Must take a pill each day	At least 5 years before widely available if current studies show efficacy
Vaccines	25–75	Current vaccine candidates are likely to require multiple doses	At least 10 years before widely available if current studies show efficacy

From: Cassell MM, Halperin DT, Shelton JD, Stanton D. Risk compensation: the Achilles' heel of innovations in HIV prevention? *BMJ* 2006;32:605-607. Available from: <http://www.bmj.com/cgi/content/full/332/7541/605#TBL1>

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