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HIV Prevention Interventions for Men Who Have Sex With Men

This paper examines the evidence and effectiveness of prevention interventions that reduce the transmission of HIV primarily in HIV-negative men who have sex with men (MSM). Prevention interventions for HIV-positive men will also be examined in relation to their HIV-negative partners.

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.

Who are 'Men Who Have Sex With Men' (MSM)?

MSM are not a single homogenous group but refers to any man who has sex with another man whether he self identifies as gay, bisexual or heterosexual (1). They have many different identities and associated

Highlights

- There is strong evidence that preventive behaviour interventions, including motivational, skill-building, self-efficacy, and eroticized components, conducted over multiple sessions were the most effective for HIV-negative MSM.
- Intervention studies such as needle exchange, supervised injection facilities, detoxification and methadone programs targeted at MSM injection drug users are also effective in reducing high-risk behaviours.
- Evidence-based Internet interventions are growing in number and present an opportunity to reach rural, closeted, or hard-to-reach MSM for HIV risk reduction.
- A combination of these interventions can be recommended by health care providers to MSM who report recent high risk activities.

risks for HIV. In this review, MSM refers to men who have sex with men but who do not 'self-identify' with a particular group.

The HIV prevention needs of MSM vary according to lifestyle and other factors such as ethnicity. In a North Carolina study of newly diagnosed HIV-positive men (n=1105, aged 18 to 30), 15% were bisexual (2). Compared with gay men, bisexual men were more likely to report over 10 sex partners in the year before diagnosis, or have sex partners who were also bisexual. A review of 24 studies by Millet, Malebranche, Mason, and Spikes (3) found that African-American MSM are more likely than MSM of other ethnic groups to be bisexual; and, compared with white MSM, are less likely to disclose their bisexual or homosexual activities. However, African-American MSM who did not disclose their gay or bisexual activities engaged in a lower prevalence of HIV risk behaviours than those who did disclose. Studies of bisexual men suggest that masculine role expectations and stigma surrounding both HIV and homosexuality may effectively ensure that non-heterosexual preferences and practices remain hidden in the African-American community (4).

What is the HIV Prevalence among MSM?

MSM represent the majority of people living with HIV/AIDS (PHA) in Canada (58.9%) and the majority of new infections (45%) in 2005. Of newly diagnosed HIV infections in the U.S. during 2004, the U.S. Centers for Disease Control (CDC) estimated that approximately 70% were among MSM (5). MSM have high transmission rates in other parts of the world (6), and recent increases in the number of new infections have been observed in European countries (7,8). HIV prevalence in MSM varies widely by country and region—from 0.1% in the Middle East to 36.5% in Latin America and 46% among African-Americans (9-11). The accuracy of reported prevalence rates can be influenced by social, religious and cultural discrimination toward same-sex behaviours that may prevent men from fully disclosing their sexual partnering.

What is the HIV Prevalence among Male Sex Workers?

Male prostitutes are at increased risk of acquiring HIV. In a Spanish study of male sex workers visiting HIV testing clinics, 12.2% tested HIV-positive (n=418) (12). In a study of male sex workers in London, HIV prevalence was 9% (59/636) (13). HIV prevalence was significantly associated with injection drug use, entering the sex trade at a young age, and unprotected sex with a casual partner. Men recruited earlier in the study (1994 to 1996) were more likely than those recruited later (2000 to 2003) to be UK born and to self-define as gay. Later recruits included more men from South or Central America, Eastern Europe and a higher proportion reported regular female partners.

What Behavioural Factors Impact HIV Transmission Risk?

No single behaviour best describes the sexual practices of MSM. Gay and bisexual men engage in relationships with different levels of commitment and risky behaviours such as multiple sex partners, inconsistent condom use, and drug and alcohol addictions (14–18).

Unprotected Anal Intercourse

Unprotected insertive anal intercourse (UIAI) between an HIV-positive and an HIV-negative man remains the greatest risk for HIV transmission. In a U.S. study of 16 states, the percentage of HIV-positive MSM who reported engaging in UIAI during their most recent sexual encounter was 6%, both for steady and casual sex partners (5).

Unprotected anal intercourse (UAI) is a blanket term for anal sex, and does not specify whether the sex reported in a study is insertive or receptive. Data from the Seropositive Urban Men's Intervention Trial shows that 21% of HIV-positive gay and bisexual men whose steady partners were HIV-negative, or whose HIV status was unknown, reported engaging in UAI in the past three months, while 47% of those did so with non-primary partners who were HIV-negative, or whose status was unknown (19). One study of MSM in primary relationships indicated that UAI is more frequent with primary partners (n=78) than with casual partners, regardless of HIV-status (20), while in other studies MSM in primary relationships had more UAI with casual partners in the past three months (21).

Van Kesteren, Hospers and Kok (22) reviewed 15 studies of HIV-positive MSM who engaged in UAI (range 13% to 51%) with HIV-negative or partners of unknown serostatus, and found they were more likely to engage in UAI with an HIV-concordant (same HIV status) partner than with a serodiscordant partner (different HIV status). A study conducted in five ambulatory HIV clinics in Canada showed that 13% of HIV-positive MSM engaged in UAI with HIV-negative, or HIV-status unknown partners in the past six months (23).

Strategies that MSM use to avoid UAI include not engaging in anal sex, not engaging in sex with online partners, always using condoms with casual partners, always using condoms for anal sex, and mutual disclosure and extensive discussion, including voicing a desire to stay HIV-negative (24). While some men successfully avoid unprotected sex, others intend to avoid it but are not always successful. Only a minority of men purposefully choose never to use or rarely to use condoms, reporting that engaging in unprotected sex heightens passion and lowers inhibitions leading to behaviour where HIV risk is not a consideration (24).

Internet

The Internet is a popular tool for MSM to meet partners (24); however, the relation to HIV risk is not consistent. Studies have found that Internet-using MSM are more likely to report UAI and to be at risk for an STI or HIV (15,25–28). In 1999, a syphilis outbreak among men in San Francisco was traced to users of a gay chat room (27). In contrast, other studies, including an Internet study, identified only a small number of men genuinely seeking partners of discordant serostatus: 1% of HIV-positive men and 21% of HIV-negative men (29,30).

Strategic Positioning

Choosing a sexual position that reduces risk of transmitting HIV is called strategic positioning (8,23,30). Mathematical modelling has shown that choosing receptive oral sex instead of receptive anal sex reduced risk 50-fold, while choosing insertive oral sex instead of insertive anal sex offered a 13-fold reduction (31). In comparison, condom use during receptive anal intercourse provided a 20-fold risk reduction.

Serosorting

Serosorting refers to consciously choosing a seroconcordant partner (8). Based on a 6,989 MSM cohort, HIV-negative men who used condoms and refrained from UAI had an HIV incidence much lower (0.9 to 1.9%) than those who used a serosorting strategy (2.6%), but serosorters had fewer infections than those who did not serosort at all (4.1%) (32). Thus, among MSM, selecting a partner with unknown serostatus would increase the relative risk of HIV acquisition by 43-fold compared to serosorting and choosing a partner who tested negative. Selecting an HIV-positive partner increases risk by 430-fold (31).

Although serosorting may reduce the risk of HIV transmission, it is an imperfect strategy. It is estimated that 15% to 30% of new HIV infections in MSM are occurring in men who report having UAI exclusively with men believed to be HIV-negative (33). According to a recent statistical model, the benefits of serosorting decrease as the proportion of recently infected individuals in a population of potential sex partners increases (34). A strategy of risk reduction by HIV serosorting can be severely limited by lack of verbal disclosure and imperfect knowledge of one's own and one's partners' serostatus (35).

Barebacking

Barebacking is a term that originated in gay slang for unprotected anal sex. One study by Grov and colleagues indicated (15) that 13% of MSM (n=1084) self-identified as "barebackers". Compared to men who did not bareback, men who did bareback were 7.7 times more likely to be HIV-positive and experienced significantly more STIs (other than HIV) in their lifetime. Men who engaged in barebacking in this study were also more likely to miss medication, report drug use (non-injection and injection), exhibit higher levels of sexual compulsivity, and lower levels of personal responsibility for safer sex.

Substance Use

MSM who use injection drugs have the highest risk for HIV/AIDS. Use of alcohol and club drugs, particularly methamphetamine and poppers, and attending bathhouses, sex clubs, and circuit parties are associated with risky sex (36–39). A survey of MSM who attend circuit parties found that serodiscordant unprotected anal sex was more likely to occur among men who used amphetamines (speed), Viagra and amyl nitrites (poppers). Other studies have shown, however, that gay men are able to combine drug taking with safe sex (37).

What Non-behavioural Factors Impact HIV Transmission Risk?

Rectal tissue is much more vulnerable to tearing during intercourse and the large surface area of the rectum/colon provides more opportunity for viral penetration. Unprotected receptive anal intercourse increases an individual's biological risk most significantly, while insertive anal intercourse poses intermediate risk, and oral sex has only minimal risk (40–42). Rectal microbicides can prevent or significantly reduce the risk of HIV transmission in primate models following rectal exposure but no microbicide has proven to be effective among MSM (41,43,44).

Other factors such as the presence of sexually transmitted infections and high viral load may also increase the risk of HIV transmission and acquisition (44,45). Although male circumcision has gained media attention recently, it has not been proven to reduce HIV transmission among gay and bisexual men (46).

Treatment Optimism

Some studies have found that belief about the effectiveness of antiretroviral therapies (ART) may lead to increased risk behaviour and transmission rates, called treatment optimism (47–50). A meta-analysis showed that MSM who believed that receiving ART protects against transmitting HIV had engaged in higher rates of UAI (51). This association was seen in HIV-seropositive, HIV-seronegative, and never-tested men. In a U.S. prevalence study of 11 states, 15% of 1477 HIV-negative or untested MSM reported high-risk sexual behaviours, especially among African-American and Hispanic MSM (52). Other researchers argue that HIV optimism is a simplistic explanation for the rising rates of HIV transmission and that even the highest estimates of HIV optimism cannot explain the epidemiological effect (29,53). A few studies interviewing gay and bisexual men report that ART and HIV optimism rarely affects decision-making regarding safe and unsafe sex (29,54).

Disclosure of HIV Status

All Canadian provinces and 31 U.S. states have developed statutes for making non-disclosure of HIV-positive status to sex partners a criminal offence (55), changing perceptions of responsibility to legal obligation (56). Despite the legal obligation in many jurisdictions in North America, disclosure rates to sexual partners range between 48% to 93% in eight studies reviewed (57). Some casual sex partners of MSM choose to remain anonymous. A study of HIV-positive gay and bisexual men found that 49% reported having at least one anonymous partner during the previous four months, and 71% did not disclose their HIV status (58). Men who had disclosed to their anonymous partner(s) scored significantly higher on self-efficacy for disclosure, and outcome expectancies for disclosure, as compared to men who had not disclosed.

Factors involved in decisions regarding disclosure to either casual or primary sex partners are complex, influenced by a sense of responsibility to partners, acceptance of being HIV positive, and/or the perceived transmission risk (59). In Gorbach et al's (59) qualitative study, reasons cited for not disclosing included "HIV is nobody's business", being in denial, having a low viral load, fear of rejection, current drug use, thinking "it's just sex", being in a public place, sexual activity, partner asks or discloses first, feelings for partner, responsibility, and fear of arrest.

When these fears are overcome, strategies used to disclose include point-blank verbal disclosure, hinting, listing one's HIV status on an online profile, asking a partner about his HIV status first, and insisting on condom usage (57). Strategies to help African-American bisexual men disclose include building social support networks, condom self-efficacy, communication skills, a sense of collective responsibility and addressing HIV stigma in the African-American community (60). Further, the particular choice of HIV disclosure strategy can vary depending on venue such as bathhouses or parks. These venues have unspoken codes that increase the odds of indirect disclosure. The authors state, "Nonjudgmental responses to symbolic or verbal hints would be especially significant for men who seek "friends with benefits" or even potentially long-term monogamous relationships" (60). Non-verbal hints can include tattoos, temporary or permanent, such as red ribbons and positive (+) signs, which symbolize HIV and may entice potential sex partners to inquire about the tattoo's meaning, resulting in disclosure, or HIV-related materials displayed for a partner to see.

What HIV Prevention Interventions Exist for MSM?

Since HIV was first associated with gay men, there has been a wide range of interventions that have proven effective in reducing risk of HIV transmission. These include non-occupational post-exposure prophylaxis, harm reductions programs for substance users, anonymous and nominal HIV testing programs, behavioural and Internet-based interventions.

Non-Occupational Post-Exposure Prophylaxis (nPEP)

When there is a clear case of sexual exposure to HIV, policies exist in some U.S., Canadian, U.K., and European jurisdictions for administration of non-occupational post-exposure prophylaxis (nPEP) for MSM (61–63). nPEP is given as a 28-day course of antiretroviral therapy (ART). It is recommended that nPEP be administered up to 72 hours after potential exposure, but ideally within the first 6 to12 hours (63).

In the U.K., between 1997 and 1999, the number of requests for nPEP increased four-fold and the number of prescriptions increased seven-fold (61). This may reflect a combination of increasing public and physician awareness, risky sexual behaviour, and access to nPEP. Of the 242 people requesting nPEP in 1999, 50% were sexually exposed by an HIV-positive partner. In one study from San Francisco, MSM were given a 4-day supply of zidovudine and lamivudine, and instructed to begin nPEP immediately after exposure (64). nPEP was initiated 109 times by 68 participants (34%). Results concluded that nPEP was safe and did not appear to be associated with increases in reported high-risk behaviour. Ready access to nPEP did not significantly affect HIV transmission rates in this study. Currently, there are no nPEP randomized control trials due to ethical and logistical reasons. Therefore, there is no clear evidence for effectiveness of nPEP as data is available only from animal trials, perinatal trials, studies of health-care workers receiving prophylaxis after occupational exposures, and observational studies (65).

Substance Use Interventions

Substance use interventions such as needle exchange programs and safe injection sites have been shown to be effective in increasing detoxification rates and methadone uptake, and reducing needle sharing, overdose and infection among MSM who inject drugs (66,67). Harm reduction programs aimed at reducing non-injecting drug use were effective in two studies following gay and bisexual men and reductions in methamphetamine use decreased risky sexual practices from baseline to follow-up (68,69). Motivational interventions involving multiple sessions have addressed addictions including smoking, alcohol, and drug use (70,71). The "Check-up", a motivational enhancement therapy for substance-using MSM, has shown promise in telephone-delivered interventions that are able to reach high risk, rural, closeted, and ambivalent individuals (71). Results from the randomized control intervention indicate that compared to the delayed counselling control group, those enrolled in the Check-up reduced unprotected anal intercourse (UAI) and increased their motivation to change risky sexual practices.

HIV Testing Interventions

Approximately 33% to 77% of HIV-positive MSM, particularly younger (79%) and African-American (67% to 91%) MSM are unaware of their HIV-positive status (11,42,72). In a few

studies, one third of MSM had avoided testing because of fears of testing positive. One randomized trial by Spielberg and colleagues (73) used alternative methods to traditional testing in two bathhouses. The testing offered were: (a) a traditional test with standard counselling, (b) a rapid test with standard counselling, or (c) an oral fluid test with standard counselling. The most important finding was that more men received results on days when the rapid test was offered, as compared to the traditional test. The most accepted form of testing was oral fluid testing. For a full discussion of routine and rapid testing, please refer to the National Collaboration Centre for Infectious Diseases' evidence reviews on these separate topics.

If a gay man tests positive, evidence-based strategies that address stressors related to disclosure with families and partners can be implemented. Examples of current stress-reducing interventions include post-test counselling (56), support groups (74), and motivational interviewing (75).

Behavioural Interventions

Implementation of evidence–based individual-level, small group, and community level prevention interventions designed to increase condom use, self-efficacy skills, and HIV knowledge, can play an important role in reducing STIs and HIV risk (8,36,76,77). These interventions targeting MSM are also cost-effective (8). A meta-analysis of HIV intervention research among MSM in the U.S. suggested that prevention interventions resulted in a significant (27%) reduction in the number of UAI acts, and reduced UAI by 17% (36). Another meta-review conducted globally showed a reduction in the number of sex partners, UAI (23%), and an increase in condom use by 61% (8). Successful interventions incorporated role playing, skills-building sessions (on the topics of negotiation, self-efficacy, or communication of safer sex of 3 to 6 hour duration), motivational enhancement (one hour or more), utilized several delivery methods, and were conducted over multiple sessions (8,36,70,77,78). Research suggests that messages with an eroticized aspect of safer sex attract more attention and may motivate and elicit more safer-sex practices (79). Group-level or individual-level interventions with these components were shown to be effective (77). However, Johnson and colleagues' meta-analysis (36) suggests that MSM who rarely or never use condoms may be better served by individual–level interventions than by small-group interventions that introduce them to potential new partners who are themselves at particularly high risk.

Community-level interventions that use popular opinion leaders (POL) to influence young and middle-aged gay men (18 or older) in a social network are effective (8,77). POL primary contacts in turn influence other people, thereby diffusing social influence from the POL to the larger community. This model significantly increased the odds of condom use with anal intercourse by 35% to 59% (8). A more recent POL study by Somerville and colleagues (80) attained 2,376 educational contacts using 37 Latino (18 to 25 years) POL. The intervention showed a significant increase in condom use and HIV knowledge. The model was culturally appropriate and took into consideration the barriers typically faced by young Latino migrant MSM. Adapting and tailoring interventions for subgroups of MSM may be an effective strategy (8).

Challenges with implementing the POL model include strict implementation of POL components, recruitment and retention of POL, difficulties POL may have in talking about some areas of sexual health with their peers, and long follow-up periods (78). Further, there is risk in extrapolating studies of sub-populations in different countries to the Canadian context, as communities have their own unique cultural idiosyncrasies.

When researchers examined whether experts or peers with similar ethnicity, gender, age, and behavioural choices, induced greater behavioural change at an individual level, they found that MSM changed more when an expert delivered the intervention, or was female, and less when a male or a peer did so (81). Durantini and colleagues (81) speculate that male participants establish a more competitive relationship with, and hence mistrust, interventionists that are similar to them. These findings are in conflict with another meta-analysis that shows that group- and community-level interventions that use MSM as peers (or POL) are effective (8,77). The differences between these meta-analyses may be the degree of change; however, more research is needed.

Internet Interventions

A few Internet HIV prevention interventions based on cognitive behavioural therapy appear to be effective in reducing risk (82–84). Ninety rural MSM were randomly assigned to either an intervention involving two skills-building conversations between an HIV-negative man and a PHA, or a non-intervention control group (82). Participants discussed HIV testing, living with HIV, treatment issues, routes of infection, how to maintain an HIV-negative status, and correct condom application. HIV knowledge, self-efficacy and safer sex attitudes significantly increased after participating in the intervention.

Research Gaps

Substance use interventions for MSM are needed that reduce club drug use and other substances, as these are associated with risky behaviour. Sexual harm reduction practices, such as serosorting and strategic positioning, are being used by some MSM, and in mathematical modelling, these practices significantly reduce the transmission risk of HIV if HIV status is correctly identified. However, more study in this area is needed, as many PHAs are unaware of their status and their partner's status. More studies situated within Canada and with specific sub-populations are also needed, especially well-designed POL studies.

Researchers should be more specific with regard to sexual practices when designing research instruments. For example, questions should specify whether a man had insertive or receptive anal or oral intercourse, and whether it was protected or unprotected.

What can we conclude

If there is any message that can be gleaned from the discussion, it is that there is no one behaviour that can be deemed as typical of MSM, just as there is no typical gay man (29). Further, the methods of perceived risk reduction such as serosorting, insertive unprotected anal sex, and receptive unprotected anal sex with an HIV-positive partner who reports an undetectable viral load, or who is circumcised, are no substitute for consistent condom use.

To decrease HIV transmission, providers should encourage MSM to receive an HIV test at least annually or in follow up to risky sex, and prevention programs should improve means of reaching MSM unaware of their HIV status. MSM with symptoms possibly due to acute HIV infection should be offered RNA testing to diagnose recent acquisition of HIV (11). Barriers to testing should be addressed, particularly those related to fear, to the perception of being at low risk for infection, to apprehension of having name reported, and to anxiety over waiting for results. Further, there should be increased availability of testing in clinical and non-clinical settings. Alternative methods to HIV traditional testing, such as rapid testing, should be introduced at outreach venues such as bathhouses to increase the number of men who receive their test results. If men test HIV-positive, public health workers should make them aware of the robust variety of disclosure strategies available and tailor the strategy to their comfort level, as well as matching it to their current environmental and relational circumstances.

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