



Mobile apps and sexual risk behaviours among men who have sex with men

Questions

- What is the impact of mobile applications and internet hook-up sites on risk behaviour associated with HIV/STI transmission and acquisition among men who have sex with men in high income countries?
- What strategies are used to reach out and prevent HIV/STI among men who have sex with men seeking sex online?

Key Take-Home Messages

- Since the 1990s, gay and bisexual men who have sex with men have been using information and communication technologies, specifically the internet and mobile smart-phone networking applications for a variety of sexual purposes (1).
- Men who prefer finding partners online, and by extension, men who use mobile apps to find partners, prefer the anonymity of the encounter, the ability to experiment with their sexuality, and the ease of interaction with partners (2).
- While some research suggests that seeking sex through mobile and internet platforms is associated with more high-risk behaviours than other ways of finding sexual partners, other research suggests on-line sex seeking may contribute to more protective behaviours.
- Given the number of men who use the internet and mobile apps to seek sexual partners, these platforms may be effective tools for education and HIV-STI prevention interventions (3).
- The internet and mobile apps can be used to recruit and engage men who have sex with men in HIV-related research; however, researchers should be aware of the different characteristics (e.g., age, ethnicity, education) of individuals recruited through mobile apps versus more traditional recruitment methods.

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The Issue and Why It's Important

Since the early 1990s, gay and bisexual men who have sex with men have been using information and communication technologies, specifically the internet and mobile smart-phone networking applications ('mobile apps') for a variety of sexual purposes (1), including seeking sexual health information, engaging in cybersex, finding sex partners, dating, and viewing pornography (1).

The commercial availability of the internet marked the beginning of a revolution in the ways men who have sex with men fostered community and met sexual partners (1). Prior to the internet, men who have sex with men primarily met sexual partners through gay bars and public sex venues such as bathhouses and cruising parks or bathrooms (1). Throughout the 2000s, technological advances, including the transition from dial-up to wireless, steadily contributed to the integration of the internet into the daily lives of men who have sex with men (1). The availability of smart-phone devices in the latter half of the 2000s led to an era of mobile computing, where third party apps were designed for a variety of purposes including gaming, productivity, e-commerce, media consumption and geospatial networking.

One example, Grindr, is a popular geospatial mobile application among men who have sex with men, that was launched in March 2009 and currently has approximately six million users in over 192 countries (1). Similar to traditional online dating websites, the app allows members to chat and share photos; however the app also allows users to send their exact location to potential sexual partners. Users can also send instant messages, allowing people to arrange sexual encounters even when they are not actively using the app (4). Following the success of Grindr, other mobile apps emerged on the market, providing men who have sex with men with products tailored to specific communities (1). Popular websites and apps for seeking sexual partners include Manhunt, Craigslist, Adam4Adam, Jack'd and Scruff (5).

Some research suggests that online sex seeking is associated with more high-risk behaviours than casual sex arranged in-person, such as more sexual partners who have ever diagnosed with an STI and a greater likelihood of unprotected anal intercourse (4). A recent study among participants who use Grindr and online dating websites found that more men used online dating websites to seek out sex (42%) compared to Grindr (30%) (6). Men who preferred finding partners online liked the anonymity of the encounter, the ability to experiment with their sexuality and the ease of interaction with partners (2). It is likely that men using geospatial mobile apps to seek sexual partners have similar preferences (2). Other reasons for using the internet and geospatial mobile apps include meeting friends, passing time and connecting with the gay community, which is especially relevant for young men who have sex with men under the age of 21 who are excluded from gay clubs and bars (6;7).

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This review summarizes the research on: the influence of these technologies on sexual; efforts to use these technological platforms to develop interventions; and the use of the internet and apps to recruit men who have sex with men to research projects (1).

What We Found

Characteristics of men who have sex with men who seek partners using mobile apps and internet hook-up sites

Some research suggests that men who seek male sexual partners through mobile and internet platforms are more likely to engage in high-risk behaviours than those who seek partners through other means; however, other research does not.

For example, three studies reported high-risk behaviours and high rates of STIs among men who sought male sex partners through mobile apps.

- In a U.S. study that recruited 375 men from Los Angeles using the Grindr mobile app (3), 39% reported having had unprotected receptive anal intercourse over the previous three months and most of those who had unprotected anal intercourse also reported lower perceptions of being at risk for HIV. Approximately 80% of the sample had been tested for HIV in the last year, while 4% had never been tested. The 5% who reported being HIV-positive also had higher numbers of anal sex partners in the last three months. These findings suggest that men connecting on Grindr are engaging in risk behaviour and that HIV-positive men may not be serosorting to protected potential uninfected partners (3).
- Another U.S. study (8) of HIV-negative men who attended a clinic compared rates of STIs of those who used mobile apps and those who met male sexual partners in-person or through online hook-up websites. Over a two year period, 7,184 self-identified HIV-negative clinic attendees tested for STIs and self-reported their drug use behaviours as well as the social networking methods they used to meet sexual partners. Thirty-four percent of participants met sex partners through in-person social networking, 30% used the internet only or in combination with other methods, and 36% used mobile apps online or in combination with other methods. Individuals who used geospatial mobile apps had a greater odds of testing positive for gonorrhoea and chlamydia compared to those who met partners using in-person methods only. No differences were found for testing positive for syphilis and HIV; however, the authors

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attributed this to the low numbers of infections during the observation period (8). Similar findings were reported in another study where mobile app users reported having significantly more sexual partners and had a higher prevalence of ever being diagnosed with an STI than men who found partners through other means (4).

Conversely, three U.S. studies exploring the sexual risk behaviours of men who seek male sexual partners through mobile apps and internet hook-up sites found that they may be using protective behaviours such as frequent testing and condom use to reduce their HIV risk.

- In 2014, Redina et al. (9) analyzed lifetime- and past-year testing behaviour of 1,351 men who have sex with men in New York City, recruited from Grindr. Participants reported high rates of testing: approximately 90% had been tested within their lifetimes and 71% had been tested within the last year. Men who reported recent unprotected anal intercourse were also more likely than men who had not engaged in unprotected anal intercourse to report having been tested in the last year. The authors hypothesized that this frequent testing could be attributed either to men recognizing their HIV risk and therefore getting tested more often or to men who recently received a negative test result feeling confident and therefore having unprotected anal intercourse (9).
- A U.S. study by Rice et al. (7) compared sexual behaviours of men who use Grindr to meet sexual partners versus men who met sexual partners through other means. Seventy-five percent of 195 young men reported having had sexual encounters with partners they met on Grindr. While 15% reported unprotected anal intercourse with their last Grindr partner, in general the men reported higher rates of condom use with partners they met on Grindr, compared to those they met elsewhere (7).
- In a 2014 Lehmillier et al. (4) study of 110 adult men, researchers found no differences between app users and non-users in terms of frequency of unprotected insertive or receptive anal intercourse. Findings suggest that, while app users may be more sexually active, they may not necessarily be engaging in riskier sexual behaviours than those who do not use apps (4).

Two studies explored differences between men who sought sex online and those who used geospatial mobile apps. One (5) study of 126 men in New York City found no differences between the two groups with respect to race, sexual sensation seeking, gay identity or internalized homophobia. However, men who used both the internet and mobile apps to seek male partners were younger and

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reported higher incomes than men who used the internet only (5). In another study of 379 men (2), 64% reported using geospatial mobile apps to find men in the past year and about 25% reported having sex with a man they met through mobile apps. These men were younger than men who had met sexual partners on the Internet. They were also less likely to be HIV-positive and had fewer than five sexual partners in the last year (2).

Canadian Context

Two Canadian studies explored sexual risk behaviours and characteristics of men who used mobile apps and hook-up websites to find male sexual partners.

- Between July 2013 and January 2014, SPOT – an ongoing Montreal-based testing intervention for men who have sex with men – tested 375 participants for HIV and STIs (10) – of whom, 30% reported using mobile apps to meet sexual partners. Those who used mobile apps were more likely to be under age 30, have been tested for HIV at least once in their lifetime and to have had a one-night stand. However, there was no difference between those who used mobile apps and those who did not in the proportion who reported unprotected anal intercourse with an HIV-positive or a partner of unknown HIV status, which suggests that mobile app use may not be associated with greater risk-taking (10).
- Cruising Counts (11), an Ontario community-based study, compared men who have sex with men who exclusively seek sex online and those who also seek sex via physical venues. Of 1,651 participants, 484 exclusively sought sex online, while 978 also sought sex in physical venues. The men in the two groups did not differ by age, ethnicity or education; however, men who exclusively sought sex online were less likely to seek information on HIV/STI testing and post-exposure prophylaxis treatment (11).

Potential to use internet and mobile app technologies for outreach to men who have sex with men

Given the number of men who use the internet and mobile apps to seek sexual partners, these platforms may be effective ways to deliver education and interventions (3). There is a significant body of literature evaluating internet and mobile-based applications to promote sexual health promotion, but few of these applications/interventions specifically target online sex seeking behaviours of men who have sex with men.

In one study, mobile app networks were used to enhance partner notification for men who have sex with men who were newly diagnosed with an STI (12). When a man diagnosed with an STI indicated he had met his sexual partners online, disease intervention specialists were able to find partners by accessing the man's inboxes and profiles. A total of 97 individuals were identified among 117 dyads. Of the 117 dyads, 21 originated either online or through a mobile app; of those, six partners were located using smartphones and two were notified of their exposure through a website. The study demonstrated the potential role of mobile and online networks in partner notification and case finding (12).

While mobile health apps have the potential to be used for education, research suggests that few people download apps developed for sexual health and HIV/STIs so they do not reach a large number of people at risk (1). Given the lack of popularity and reach of these apps, research overwhelmingly suggests that -- instead of developing and promoting a separate app focused on sexual health -- it would be more effective to work within existing highly publicized apps, such as Grindr, that already have a strong following and widely accepted user interface (9).

Sun et al. (13) evaluated the feasibility of providing sexual health information and HIV/STI testing referrals through existing geospatial mobile apps for men who have sex with men. Sixty-four percent of participants found the apps to be an acceptable source for sexual health information and approximately 25% of chats with a health educator resulted in users requesting a referral to a local HIV/STI testing site. The men who

found apps acceptable as a source of sexual health information were more likely to be non-white, did not know their HIV-status and had lower HIV testing self-efficacy. Those who used prescription drugs recreationally and drank during the week were less likely to find app-based education acceptable (13).

AIDS service organization and community-based organization staff providing outreach to men who have sex with men consider online outreach a vital tool for HIV prevention. They identified advantages such as anonymity and the ability to engage hard-to-reach men at a time and place most relevant for individuals; however, they also identified barriers such as confidentiality and privacy issues and lack of information on best practices on online outreach (14;15).

While existing mobile apps may be widely accepted among men who have sex with men, they likely will not reach all men. Researchers should be mindful of technology and eHealth literacy inequities within this population, as well as the constant changes in the popularity and emergence of social media platforms and the technological devices themselves (15).

Use of the mobile apps and the internet for engagement in research

The internet and mobile apps have been used effectively to recruit and engage men who have sex with men in HIV-related research. For example:

- To recruit eligible couples for a study to adapt the 'Connect 'n Unite' intervention for Spanish-speaking Latino gay couples in New York City, Martinez et al. (16) developed a social media recruitment protocol and trained research staff and stakeholders to conduct social media recruitment through channels such as Facebook and Craigslist. Messages were also publicized using smartphone applications such as Grindr, Scruff and Jack'd. Over one month, the study reached out to over 35,658 individuals and recruited 14 couples (N=28 individuals) for their intervention (16). While the number of participants recruited was small compared to the number of individuals contacted, social media may be a

successful avenue to engage men who have sex with men in research.

- Burrell et al. (17) explored the potential to use Grindr to recruit men who have sex with men for HIV prevention research. Of 32,480 men who viewed the study advertisement, 137 men made contact with the study. Men recruited through Grindr as opposed to other recruitment methods were more likely to be white, younger, better educated and have had more sex partners in the last 14 days (17).
- Another study (18) also reported that participants recruited using Grindr were younger than men recruited through other means; however, it found no difference in the number of sexual partners in the past six months.
- Three different HIV-related studies – an HIV testing program, a social epidemiologic study and an HIV vaccination trial – used geospatial mobile apps as well as other recruitment methods (19). Text-only advertisements for each study ran for a 24-hour period and were visible to every user who opened the app within that time period. The ads for the testing program and the social epidemiological study had the highest rates of completed study visits. Authors also found the mobile apps resulted in high enrollment rates among men of colour but a lower proportion of black men than the other recruitment methods (19).

While apps can be used to recruit study participants, researchers should be aware of the differences in participant characteristics depending on the recruitment method. It appears that men recruited through mobile apps are more likely to be white or men of colour (excluding black men), younger and better educated.

Factors That May Impact Local Applicability

Most studies included in this review were conducted in the United States. Regional differences between gay and men who have sex with men in both the American and Canadian contexts must be considered when interpreting the literature. An overwhelming majority of the studies included in this review were published in the last three years, indicating that this is a rapidly evolving area of research that warrants further and frequent updates.

What We Did

We searched Medline, PsycInfo, Embase and Social Work Abstracts using a combination of MeSH and text terms [(HIV OR sexually transmitted OR STI* OR STD* OR syphilis OR gonorrhea) AND (gay or men who have sex with men OR homosexual OR bisexual OR MSM OR queer) AND (mobile app* OR phone app* OR hook-up site* OR Grindr OR Jack*d OR Scruff OR GuySpy OR Bender OR Hornet OR Manhunt OR Growlr OR Adam4Adam OR Planet Romeo)]. All articles were restricted to English and no date restrictions were applied to the search. A grey literature search using Google was also conducted using a combination of the terms above.

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