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Social media interventions to prevent HIV: A review of interventions and methodological considerations

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Abstract

Persistent new HIV infections and risky behaviors underscore the need for enhanced HIV prevention. Social media interventions may promote safe sexual behaviors, increase HIV testing uptake, and promote safe injection behaviors. This review discusses how social media interventions tap into the wisdom of crowds through crowdsourcing, build peer-mentored communities, and deliver interventions through social networks. Social media HIV prevention interventions are constrained by ethical issues, low social media usage among some key populations, and implementation issues. Comprehensive measurement of social media interventions to prevent HIV is necessary, but requires further development of metrics.

Keywords

social media; HIV; prevention; behavioral intervention; key population; youth; MSM

Introduction

Social media may powerfully shape the HIV risk environment. Social media is “web sites and applications which enable users to create and share content or to participate in social networking.” [1] As social media becomes more widespread [2], it can be designed to provide psychosocial support, build community engagement, and increase awareness of HIV testing and services [3–6]. We review recent research using social media behavioral interventions to prevent HIV. These interventions promote safe sex, HIV testing and safe

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injection use. We then highlight key considerations for designing and implementing social media interventions. Given that other reviews show how social media may increase risk behaviors [7, 8], we focus instead on using social media for HIV risk reduction.

Social media interventions to promote safe sex behaviors

Social media may help improve interventions focused on reducing sexual risk behaviors. Condom promotion is key within the World Health Organization's comprehensive HIV prevention programming [9] and condom distribution is a key structural level factor for HIV prevention according to the US Centers for Disease Control (CDC) [10]. Social media interventions may be particularly effective in condom promotion because close social contacts actively demonstrate desire for behavioral change within a social group, thereby shifting social norms and actively reinforcing positive new interactions and behavioral patterns. Several interventions are noteworthy. One cluster randomized control trial (RCT) delivered sexual health messages to youth using friendship networks on Facebook [11, 12]. This study used a modified respondent-driven sampling to recruit participants, with seed individuals first located via online, newspaper advertisements, and face-to-face meetings. A seed and three waves of friends formed a friendship network. Each friendship network was then randomly assigned into either a Facebook page focusing on sexual health topics developed in collaboration with experts and youth facilitators or a control page presenting current events specifically avoiding sexual heath content. At the two-month follow-up, participants demonstrated increased condom use and proportion of safe sex acts [11, 12].

Another two US projects reported promising feasibility studies to inform social media interventions. The first targeted young black men who have sex with men (MSM) and transgender women using the Institute of Medicine's Integrated Model of Behavior theory to implement a mobile phone-optimized, online intervention [13]. The goal of the HealthMpowerment.org (HMP) intervention was to build community and facilitate supportive relationships among participants. A one-month pilot study successfully retained all fifteen participants, improving social support, and reducing social isolation and depressive symptoms [13]. An RCT to evaluate efficacy is currently underway. The second study assesses SiHLEWeb, a web-based, culturally-tailored HIV/STI prevention program based on the Sistas, Informing, Healing, Living, and Empowering program. [14] This program targeted underserved, young, atrisk African American women [15]. SiHLEWeb participants were recruited from community partners and attended four 1-hour sessions simulating live group participation via interactive videos on sexual health content combined with real-time follow-up with video peers and health educators [15]. At the three-month follow-up, participants demonstrated increased knowledge of HIV/STI risks, risk reduction behaviors, and increased condom use self-efficacy [15].

In the UK, HIV Prevention England (HPE) collaborated with the Terence Higgins Trust to implement a two-year campaign to promote condom use and HIV testing through postal kits promoted via Facebook, Twitter, Grindr, Gaydar, and other social media [16]. HPE used Facebook to recruit individuals to evaluate the effectiveness of health messages and the design of campaign materials to improve comprehensibility among key populations [17].

In Australia, a two-part social media intervention was used to promote sexual health and condom use. The first part used Facebook advertisements and tagging youth on Facebook to expand the program reach [5]. The second part involved producing episodic videos based on social media feedback. These resulting YouTube videos delivered sexual health messages for MSM based on the lives of four fictional gay characters dealing with sexual health issues. Video feedback provided through diaries and social media tailored subsequent videos [18]. The project entered its fifth season, attaining 3000 fans and receiving 30,000 video views after three seasons. There were no additional public health outcomes measured [18].

Several government programs have also used social media to promote safe sex behaviors and HIV prevention. In 2013, the US CDC highlighted social media research and outreach programs in “Adolescents, Technology and Reducing Risk for HIV, STDs and Pregnancy” [3]. This compendium highlighted a behavioral intervention consisting of 23-minute videos depicting sexual health scenarios, including negotiating condom use [19]. The intervention was first conducted in STD clinic waiting rooms, with video viewing as the treatment compared to standard waiting room procedures [19]. During a 14-month follow-up, new STD infections were reduced by 10 percent across three clinics. This efficacy led researchers to adapt an online format for implementation on YouTube [19]. Furthermore, the US CDC itself has developed a social media toolkit to promote online sexual health campaigns using Facebook, Twitter, and YouTube [3].

Social media interventions to promote HIV testing

Expanding HIV test uptake is essential for the success of programs to achieve HIV viral suppression [20]. Social media may improve testing efforts because it potentially enhances community engagement, bidirectional communication, and reduces costs through wider online distribution [8]. It can enhance testing by serving as a platform for community building and improving intervention development and delivery.

First, social media can be used to develop intervention materials or methods for HIV testing promotion through creative contributory contests (CCCs). CCCs engage many individuals to contribute creative knowledge towards a public good, in this case short videos promoting HIV testing [21]. An initial open call for videos is followed by judging, recognizing the contributions of participants, and sustaining engagement over time [21]. A recent study demonstrated that a CCC developed through social media was effective in promoting HIV testing among Chinese MSM, with substantial cost saving [22].

Second, social media can be used to establish virtual peer-mentored communities that promote HIV testing [23]. For example, in Project HOPE built a number of intervention groups on Facebook and trained peer leaders to promote HIV testing and HIV prevention [23]. Project HOPE has effectively increased HIV test uptake among high-risk populations in Peru [23] and the US [6]. Similarly, a Taiwanese study found that social-media communities led by internet popular opinion leaders can facilitate promotion of HIV testing among MSM [24].

Third, social media can serve as a platform for delivering newly-designed or extant evidence-based interventions through online networks [25, 26]. For example, one study

developed an internet-based social marketing campaign to promote HIV testing among MSM in England [27]. The study recruited participants into a longitudinal panel via community websites and a prior survey, but did not identify a correlation between intervention and testing uptake [27]. An Australian study used social media to promote a "pop-up" rapid HIV testing model (taking testing messages and services to target populations to increase the total number of HIV tests per hour, compared to clinic-based testing), concluding that the campaign increased testing uptake among those most at risk of HIV infection [28].

Social media based safe drug use intervention for HIV prevention

Social media can also be used to encourage safe drug use as an avenue for HIV prevention. For example, one study assessed the possibility of using a live-chat social media intervention to reduce drug use among young MSM in the US [4]. At 3-month follow-up, participants had fewer days of drug and alcohol use in the past month and less frequent condomless anal sex [4].

Challenges of adopting social media in HIV intervention

There are still many challenges in implementing and scaling up social media interventions. The primary challenge pertains to ethical issues, including ensuring participant autonomy, privacy, and obtaining informed consent [29]. Another challenge arises when target populations are considered high-risk for HIV because of engagement in illicit behaviors. For such groups, the limited capacity for social media to support open discussion may result in limited breadth and depth of social media interaction. This could reduce the potential for social media behavioral interventions, particularly in contexts where risk behaviors are condemned [29]. Such difficulties, combined with limited offerings of available electronic intervention materials, restrict the scope of activities that can be conducted for HIV prevention in social media settings [12, 23]. A further obstacle is the problem of low "dosage" offered by individual social media components, increasing the need for combination strategies to effectively reach target populations [5]. Research on how to better protect target populations [29] and improved methods to account for social media intervention exposure in the absence of face-to-face contact [15] are necessary to move forward this field [30].

Measurement and evaluation of social media interventions

Although social media platforms offer many implementation options, the development of effective measurements requires further consideration. Many participants in social media interventions have not been recruited through venues where biomedical measurements can be obtained. Often participants are geographically and demographically diverse, increasing the difficultly in linking individuals to specific local facilities, constraining direct measurements (see Table 1). Most studies relied on self-reported data collected via web surveys [11, 13, 24] and telephone [4], asking questions about testing results [24], high-risk behaviors such as unprotected sex [4, 11, 24], number of casual sex partners [11], drug use [4, 24], heavy drinking [4], and other psychosocial outcomes [4, 13]. Only two studies used objective measurement outcomes, assessing post-intervention testing rates [23, 27].

In evaluating these intervention, social desirability is usually a cause for concern [31]. In social media interventions, it is likely that the mode of data collection reduced the magnitude of social desirability bias. Self-administered mode (e.g. web-based survey) offers advantages over interviewer-administered modes (e.g., telephone survey) because participants are less likely to disclose socially undesirable behaviors or attitudes in the presence of human interviewers [32]. A recent study that introduced an alternative mode of SMS texting found that participants disclosed sensitive information more honestly [33].

Lastly, a key advantage of social media interventions is the richness of metadata recorded in real time. The embedded social media APIs (Application Programming Interface) facilitates access to information queried by participants in their interactions during treatment. Facebook-based studies enables researchers to gather data on HIV knowledge dissemination [5, 11, 18], participant demographics, and usage data (e.g. number of unique page views, average time spent on a given page, number of photos viewed, wall posts, comments and "likes"). This metadata allows measurement of the level of reach and engagement [5, 11, 13, 18, 28], differentiating survey data [5, 11, 13, 24, 27] and other qualitative approaches [5, 18] to facilitate evaluation of intervention feasibility, acceptability, and strengths.

Conclusion

Behavioral health research for HIV prevention can be improved though social media interventions. Social media is efficacious in engaging key populations and tracing how communities learn and share HIV prevention information during intervention treatment. Metadata functionalities open up new and timely techniques for enhanced implementation and monitoring of how interventions spread and work through online communities, offering pertinent insights for improving future HIV prevention efforts.

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Highlights

- Social media interventions to prevent HIV have been implemented and evaluated in a range of settings
- HIV prevention social media interventions focused on safe sex, safe injection, and increased HIV testing
- Key delivery modes include innovation contests, peer mentors, and online networks
- Privacy issues, biomarker collection, low use by key populations are constraints

Table 1

Measurements of reach, engagement, and outcomes for social media-based HIV prevention interventions

	Measurements of reach and level of engagement	Outcome of social media interventions
Metadata of social media platforms	Facebook page metadata metrics [5, 11, 18] (use Facebook pages for delivering information about HIV prevention): • Fan demographics (gender, age group, country) • Usage data (number of unique page views, active users, loyal users, photo views, wall posts, comments and "likes", and average time spent on the Facebook page) YouTube video metadata metrics [5, 18] (use YouTube video for delivering information about HIV prevention): • Viewer demographics (only for log-in users) • Usage data (cumulative number of video views, traffic sources which described where users accessed the YouTube channel from) Customized online community website for HIV intervention [13]: • Usage data through Google Analytics: Number of visits, time spent on sites, number of page views Number of mentions of #HelpEndHIV and #HIVTestingWeek on social media [28]	NA
Survey data collection	• Demographic characteristics [4, 13, 24, 27] • Awareness of the intervention programs [24, 27], where did participants found out about the project [5], when participants joined [5] • Whether participants told someone else about the project [5], times spent on communication with prospective sexual partners online [23], discussed HIV-related posts or related issues with others [11, 24]	• Self-reported testing results: whether had HIV test in the past 6 months and the HIV result [24], whether being diagnosed with STIs in the previous 3 months [24] • Self-reported condom use: condom use at last sex [11] or during anal sex [4, 24], proportion of sex acts protected by condom in the past 60 days [11], intention to use condoms at the next sexual encounter [11], condom use self-efficacy [13], attitudes toward condom use [13] • Self-reported sexual partners: whether had sex/sex partners in the previous 3 months [24], number of sexual partners [24], number of male partners with unprotected anal sex [11], whether the most recent sex partners was considered a “main” or primary partner or a casual partner [11] • Self-reported substance use: recreational drugs consumption in the previous 3 months [24], number of drug days [4] and heavy drinking days [4], self-reported psychosocial outcomes, including drug taking knowledge, sexual knowledge, motivation to change drug use and condomless anal sex, and self-efficacy skills (confidence in their ability to resist the urge of using drugs, or avoid condomless anal sex) [4], safe sex norms [13]
Other methods	• Qualitative 6-week diary scrapbook activity about how they interacted with the intervention program [18]	• The rate of HIV testing [23, 27]

	Measurements of reach and level of engagement	**Outcome of social media interventions**
	• Qualitative focus groups of engagement and interaction [18] • Qualitative project team meeting minutes and transcripts [5]	