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Online HIV Information Seeking and Pre-Exposure Prophylaxis Awareness among People Who Use Drugs

Yerina S. Ranjit,

Department of Communication, University of Missouri

Roman Shrestha,

Department of Internal Medicine, Section of Infectious Diseases, AIDS Program, Yale University

Michael Copenhaver,

University of Connecticut

Frederick L. Altice

Department of Internal Medicine, Section of Infectious Diseases, Yale University School of Medicine and Division of Epidemiology of Microbial Diseases, Yale University School of Public Health

Abstract

People who use drugs (PWUD) remain at high risk for acquiring human immunodeficiency virus (HIV), both from injection and from sexual risk-taking. In 2016, 9% of 39,782 new HIV diagnoses occurred among people who inject drugs in the United States. Reaching PWUD with accurate information about and motivation for initiating pre-exposure prophylaxis (PrEP) remains challenging and remains the first crucial step in the knowledge-attitude-behavior change continuum. This study seeks to contribute to closing this information gap by examining the HIV information-seeking behaviors among PWUD who are not on PrEP, so as to identify potential strategies to increase adoption of HIV prevention such as PrEP as part of overall health and related to risk-taking behaviors. A cross-sectional survey was conducted in 2016 among HIV-negative PWUD (n = 400), 57.3% of whom reported injecting at least once in a week, chronically maintained on methadone treatment (MMT) at a large addiction treatment program. The study

Corresponding Author: Yerina S. Ranjit, 207 Switzler Hall, Columbia, MO Phone: 573-882-0881, ranjity@missouri.edu.
Credit Author Statement

Yerina S. Ranjit: Conceptualization, Formal Analysis, Writing – Original Draft, Writing – reviewing and editing, Visualization.

Roman Shrestha: Methodology, Investigation, Data Curation, Writing – Review & Editing, Project administration

Michael Copenhaver: Conceptualization, Methodology, Investigation, Resources, Supervision, Funding acquisition.

Frederick L. Altice: Writing – Review & Editing, Visualization, Supervision,

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Ethical Approval All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Informed Consent Informed consent was obtained from all individual participants included in the study.

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found that the number of hours spent online by people who use drugs was comparable to the general population. Awareness about PrEP and the seeking of HIV-related information was low in this population. Looking for sex partners online, perception of risk, having multiple partners were associated with seeking HIV information. Although using injection drugs was related to high perception of risk of acquiring HIV, it was not associated with seeking HIV information online. It is imperative to further understand the online HIV information seeking behavior of this population and provide targeted information in order to increase awareness and knowledge about HIV-related risk and methods of prevention, including information about PrEP.

Keywords

Online HIV information seeking behavior; people who use drugs; PrEP; HIV prevention; mobile health (mHealth)

1.1 Introduction

The opioid crisis in the United States, now affecting 2.2 million people, has profound consequences on health, including transmission of human immunodeficiency virus (HIV) as a result of the use of injectable opioids (e.g., heroin, fentanyl). People who use drugs (PWUD), particularly those who inject, remain at substantial risk for acquiring HIV (UNAIDS, 2012), both from injection behaviors and from sexual risk-taking. The current opioid crisis has ushered in new HIV outbreaks, reversing a decade-long trajectory of reductions in HIV incidence among people who inject drugs (CDC, 2018). Evidence-based strategies to reduce HIV transmission among drug users with opioid use disorder (OUD) include treatment with opioid agonist therapies (OAT) like methadone or buprenorphine and access to syringe services programs (SSPs). These strategies, however, do not fully eliminate injection-related risk and have no influence on sexual risk (Altice, Kamarulzaman, Soriano, Schechter, & Friedland, 2010; Tetrault et al., 2013). Pre-exposure prophylaxis (PrEP) with tenofovir-containing medications has emerged as an additional strategy to prevent HIV among people who inject drugs (Choopanya et al., 2013). Despite the evidence of its efficacy, PrEP scale-up among PWUD has been minimal. Two studies of drug users in Baltimore (Sherman et al., 2019) and New Haven (Shrestha, Karki, & Copenhaver, 2017) showed similar low awareness and remarkably low uptake, but high levels of interest in using PrEP. In one mixed-method study of people on OAT and PrEP, participants expressed satisfaction about the medication's role in preventing HIV, yet also expressed concerns about the lack of knowledge and information about PrEP (Shrestha & Copenhaver, 2018). Reaching PWUD with accurate information about PrEP remains a challenging first step in the classic knowledge-attitude-behavior change continuum (Bettinghaus, 1986). Globally, looking for health information on internet-connected mobile devices has been rated as one of the top online activities (Silver, Huang, & Taylor, 2019), and in general, people begin their quest for health information using a search engine (Eysenbach & Kohler, 2002). Little is known, however, about how those who use drugs use the internet to seek health information.

We, therefore, sought to examine information-seeking behaviors of individuals who use drugs, who were not using PrEP at the time, to identify potential strategies to increase adoption of PrEP as part of overall health and risk-reducing behaviors.

1.2 Health Information Seeking Behavior

Health information seeking behavior, defined as a process of gathering information about health, is associated with activities that promote healthier lifestyles as well as with coping strategies or psychosocial adjustments to illnesses (Lambert & Loiselle, 2007). Digital media, now in the hands of most Americans, have reduced the number of people who are not able to easily access health information, with one in three Americans using online platforms to seek health-related information (Fox, 2008; Jacobs, Amuta, & Jeon, 2017). Pew Research Center's research on internet use shows that people who have access to internet on their mobile phones, as opposed to mobile without internet connection, are more likely to seek health information—83% of wireless internet users reported seeking health information and 17% of mobile phone users reported specific use of their phones to look for health information (Fox, 2011). Additionally, individuals who have higher levels of education, have disabilities, or have faced major illness themselves or in a close relative tend to seek health information more than others (Fox, 2011).

Although information seeking and knowledge alone does not amount to behavior change or adoption of a preventative behavior, acquiring information is a precursor to motivation for adopting preventative behaviors (Lambert & Loiselle, 2007). Evidence suggests that individuals who seek wellness-related information are generally healthier than those who seek illness-related information on the (Weaver et al., 2010). Evidence also show that people are willing to change their health behaviors based on information they find on internet sources (Hu & Shyam Sundar, 2010; Rideout, 2001; Webb, Joseph, Yardley, & Michie, 2010). Studies of people with HIV have shown an association between actively using the internet to search for health information and health behaviors such as seeking treatment, adherence to treatment, and retention in care (Kalichman et al., 2005; Nugroho et al., 2018). Health information seeking behavior is also considered a coping mechanism among those with chronic medical conditions, including HIV. Little is known, however, about the general health information seeking behavior of PWUD, including those who engage in injection drug use.

1.3 Internet Use Among People Who Use Drugs

As information technology advances, mobile phone-based internet use has increased accessibility to information, including health information. Many health programs have adopted this tool for health outcomes such as improving health services, motivating participation in physical activities, or improving maternal and child health (Direito, Carraça, Rawstorn, Whittaker, & Maddison, 2016; Free et al., 2013; Nurmatov et al., 2014). Mobile health (mHealth) tools have also been used in HIV prevention and treatment for purposes such as providing information, linkage to care, and improving treatment adherence (Catalani, Philbrick, Fraser, Mechael, & Israelski, 2013). Although the adoption of the internet and mobile phones was reported to be low among drug users a decade ago, newer

data show that PWUD now have greater access to mobile phones and use them for calling, texting, and accessing the internet (Catalani et al., 2013; Masson, Chen, Levine, Shopshire, & Sorensen, 2019; Redpath et al., 2006; Shrestha, Huedo-Medina, Altice, Krishnan, & Copenhaver, 2017). Additionally, there is evidence to suggest that drug users, especially those who score highly on technology acceptance, are willing to receive health messages on their mobile phones (Masson et al., 2019; Shrestha & Copenhaver, 2018). Internet use, however, has also been associated with negative health outcomes and related risk behaviors like greater access to and use of drugs (Redpath et al., 2006; Wax, 2002). Although research indicates that internet use is increasing in this population, there is still a dearth of information about which activities PWUD participate in online and whether they seek HIV-related information. Understanding this communication behavior is crucial for public health programs and scholars of health communication to develop effective and targeted mobile health programs.

Health information seeking behavior has been linked to increased awareness and knowledge about a specific disease, such as cancer, further suggesting that knowledge can contribute to the intention to adopt a behavior (Sheeran & Taylor, 1999). Individuals who seek health information are open to using different avenues to receive health information (Cho, Park, & Lee, 2014; Dutta-Bergman, 2004). Based on these previous findings, we assume that drug users who seek HIV information online are more open to receiving information through a mobile health application or text messaging than those who do not seek health information online. In other words, PWUD who frequently use the internet on mobile phones to seek health information are likely to be open to adopting mHealth tools to improve their general health. In an attempt to understand the online activity of PWUD, and its association with online HIV information seeking behavior, we propose the following research questions: 1) What is the pattern of internet use among PWUD?; 2) What influences the online HIV-related information seeking behavior among PWUD?; and 3) Among drug users, which factors influence the acceptability of mHealth tools to improve health? Our hypothesis is the higher frequency of searches for HIV information is related to higher awareness about PrEP.

2.1 Methods

A cross-sectional survey was conducted in 2016 among 400 HIV-negative PWUD enrolled in methadone maintenance treatment (MMT) at Connecticut's largest addiction treatment program. The details of the recruitment (flyers, peers, referral from counselors) and study procedures have been previously reported (Shrestha, Karki, et al., 2017). Eligibility criteria included being 18 years or older, self-reported HIV negative status, reported drug- or sex-related risk behaviors in the past six months, met DSM-V criteria for opioid use disorder, and maintained on methadone. After consent was obtained, structured surveys were conducted using audio computer-assisted self-interview (ACASI). Participants were reimbursed for their participation, and the study was approved by the institutional review board at Yale University.

2.2 Measures

Measures included demographic and social information such as age, sex, race/ethnicity, sexual orientation, marital status, housing situation, and level of education, sexual and injection risk behaviors (Ward, Darke, & Hall, 1990).

2.2.1 Online HIV-Related Information Seeking Behavior (OHISB)

Online HIV-related information seeking behavior was measured on a 5-point Likert scale (1 = *Never* and 5 = *All the time*) using the following three items: *Do you search the web for HIV-related information?*, *Do you search the web for HIV experiences or treatment?*, and *Do you search the web for HIV-related news articles?* The Cronbach's alpha for this scale in this study was $\alpha=0.88$.

2.2.2 Acceptability of mHealth

Acceptability of mHealth was measured using a 5-point Likert scale (1 = *Not interested at all* and 5 = *Extremely*) using five items: *How interested would you be in using mHealth to remind you to take your medication?*, *How interested would you be in using mHealth devices in assessing your health behaviors?*, *How interested would you be in using mHealth devices in assessing drug use behaviors?*, *How interested would you be in using mHealth devices in assessing sexual behaviors?*, and *How interested would you be in using mHealth devices to receive information about HIV?* The Cronbach's alpha for this scale in this study was $\alpha=0.83$.

General questions regarding other online activities were measured on a 5-point Likert scale using the following items: *Do you search the web for general information?*, *Do you search the web for health-related information?*; and *Do you search online for sexual partners?*

Use of the internet was measured using one item that asked participants the approximate number of hours they used the internet in a week. PrEP awareness was measured using one item: *Before participating in this study, had you ever heard about PrEP?* HIV risk perception was measured on a one-item 4-point scale (1 = *No risk at all* to 4 = *A lot of risk*) with the question *What do you think your current risk of getting HIV is?* Intention to use PrEP was measured on a 5-point Likert scale (1 = *Strongly disagree* and 5 = *Strongly agree*) using one item: *I would be interested in taking PrEP to reduce my current risk of HIV infection.*

2.3 Analysis

We had three research questions: 1) What is the pattern of internet use among PWUD?; 2) What influences the online HIV-related information seeking behavior among PWUD?; and 3) Among drug users, what factors influence acceptability of mHealth tools to improve health? To answer the first, we conducted descriptive analyses, a univariate ANOVA to examine the differences in internet use among participants of different ethnic groups by age, and Pearson correlations. To answer the second and third research questions, we conducted linear regression analyses whereby we regressed online HIV-related information seeking behavior and acceptability of mHealth as dependent variables on various demographic variables, risk-related variables, HIV risk perception, and other online activities, such as

number of hours a week spent online, seeking health-related information, and looking for sexual partners, as independent variables. We used an independent samples *t*-test to test the hypothesis.

3.1 Results

The primary demographics of the study sample ($N=400$) are as follows: 58.5% male with the average age of 41.0 years ($SD=11.1$), 63% White, and 17% Black (see Table 1). On average, participants used the internet for 19.89 hours ($SD=20.70$) per week. Most (82%) participants had never heard about PrEP, and nearly all (98.3%) had never used it.

Results of univariate ANOVA showed a significant difference in internet use among Whites ($M= 22.1$, $SD= 21.1$), African Americans ($M= 15.5$ hours, $SD= 20.1$) and Hispanic or Latinx ($M= 17.5$ hours, $SD= 20.1$); $F(1, 131) = 2.5$, $p < .06$. Further analysis using independent *t*-tests showed that Whites were likely to spend more time on the internet relative to African American ($t(261) = 2.1$, $p < .05$), and Latinx ($t(249) = 1.4$, $p < .05$) participants, while there was no significant difference between African American and Latinx participants' internet use. Adjusting for age, however, we found no significant difference in internet use among young (21–35 years of age) Whites ($M= 22.1$ hours, $SD= 21.2$), African Americans ($M= 26.7$ hours, $SD= 22.8$) and Latinx ($M= 26.7$ hours, $SD= 22.8$) participants.

Additionally, only 78.3% ($n = 313$) of the participants reported having access to the internet at the time of the study, while the rest were without internet. Majority of them (57.8%, $n = 231$) reported using the internet on smartphones, while 20.5% ($n=82$) reported using it on devices such as tablets, laptop or a desktop. Questions regarding the location of internet use, such as home, library or work were not included.

Participants reported using the internet more for searching for general information ($M=3.73$, $SD=1.1$) than searching for health-specific information ($M= 2.94$, $SD= 1.1$). Looking for HIV-related information ($M=1.93$, $SD=0.9$), looking for HIV-related experiences and treatment ($M=1.68$, $SD=0.9$), and looking for HIV-related news articles ($M=1.75$, $SD=1.1$) were generally lower than searching for general and general-health information. Internet use was significantly related to searching for 1) general information ($r= 0.33$, $p < .00$); 2) health-related information ($r= 0.16$, $p < .00$); and 3) sexual partners ($r= 0.13$, $p < .00$). Looking for sexual partners online was also positively and significantly related to looking for health information online ($r= 0.13$, $p < .05$) as well as online HIV information seeking behavior ($r = 0.33$, $p < .00$) (See Table 2). Additionally, we found that the higher the number of sexual partners, the more likely the participants were to search the internet for HIV-related information ($r= 0.16$, $p < .05$). Furthermore, the number of sex partners and the frequency of sharing used needles were positively associated with HIV risk perception ($r= 0.40$, $p < .00$) and ($r= 0.29$, $p < .00$).

Linear regression analyses showed that searching for sex partners online ($\beta = 0.33$, $p < .00$), searching for health-related information ($\beta = 0.28$, $p < .00$), age ($\beta = 0.11$, $p < .05$), and education ($\beta = -0.12$, $p < .05$) were predictors of online HIV information seeking behavior.

The model was significant and accounted for 27% of the variance in the dependent variable ($F = 10.5$, $df = 9$, 261 , $p < 0.00$, $R^2 = 0.27$) (See Table 3). Regression analysis also showed that online HIV information seeking behavior significantly predicted acceptability of mHealth intervention ($\beta = 0.19$, $p < .01$). Being female ($\beta = 0.22$, $p < .00$), searching for sex partners online ($\beta = 0.20$, $p < .01$), and number of sex partners in the previous month ($\beta = -0.22$, $p < .01$) were significant predictors of interest in using mHealth interventions.

An independent samples *t*-test showed that the mean score of online HIV information seeking behavior was significantly higher among individuals who reported having knowledge about PrEP ($M = 2.1$, $SD = 1.0$, $n = 58$) relative to participants who were unaware of PrEP ($M = 1.7$, $SD = 0.7$, $n = 255$); $t(331) = -2.3$, $p < .05$. These results support our hypothesis that in this population, those who seek HIV-related information online frequently have higher awareness about PrEP than those who seek such information less frequently.

3.2 Discussion

This study is among the few that examine HIV information seeking behavior using the internet among PWUD and who are not using PrEP. This study found that the average amount of time PWUD spend on the internet is comparable to the national average of about 20 hours a week (Lebo, 2017). Also aligning with the national trend of accessing the internet on smart phone among U.S. adults, most of the participants in this study reported using the internet on smart phones rather than on devices such as laptops or tablets (Perrin & Kumar, 2019). Systematic reviews and meta-analyses suggest that OAT and SSPs substantially reduce HIV risk by 54% (MacArthur et al., 2012) and 34% (Aspinall et al., 2014), respectively, but these risk reduction strategies still leave considerable margin for prevention. The World Health Organization and the U.S. Centers for Disease Control and Prevention recommend PrEP for anyone at substantial risk of HIV, including people who inject drugs. Notwithstanding marked increases in internet use generally (Cole, Suman, Schramm, & Zhou, 2017; Redpath et al., 2006), but especially among people with HIV in the last decade, knowledge and use of PrEP remain alarmingly low in this sample despite the sizable proportion reporting substantial injection and sexual risk.

An important finding of this study is that looking for sex partners online and having multiple sex partners were associated with seeking HIV information, yet engaging in drug-related risk was not. We posit two reasons for this finding: 1) PWUD perceive themselves to be at risk of acquiring HIV because of their sexual behavior, but not because of their drug use, even though almost 60% of them reported injecting in the past month; and 2) while looking for sexual partners online, PWUD may have inadvertently been exposed to HIV information on dating apps or websites, which then led them to actively seek more information. A study of key stakeholders (i.e., men who have sex with men (MSM), site developers, and HIV specialists) involved in dating and sexual “hook-up” sites for MSM all agreed that information on these sites can effectively reach the target population (Wohlfeiler et al., 2013), though to our knowledge, such sites have not targeted drug users. Although HIV/STI prevention messages are typically incorporated into and acceptable for MSM dating sites, they are seldom available on heterosexual dating sites. Though this study lacks granular data

to uncover the pathways to online HIV information seeking behavior, it does suggest that PWUD remain concerned about sex-related risk and proactively access HIV information if they consider themselves to be at risk in that regard. Another challenge is that PWUD with substance use disorder with greater cognitive impairment are less likely to use the internet, and this could impact their information seeking behavior as well (Tofighi et al., 2016).

Despite the revealed direct association between sexual partner seeking and sex with multiple partners, we still do not fully understand the online activity of this population. That is, what are PWUD doing when they are using the internet? Answering this question may guide the provision of targeted HIV prevention and access to information about related services. Better understanding the online behavior of PWUD, the sites they frequently visit, and their use of those sites is central for provision of more effective and targeted HIV-prevention strategies.

Another important finding is that those who had sought HIV information online were more likely to be aware of PrEP relative to those who had not engaged in the behavior. This finding may, in part, be related to the content of online sources of information about HIV, including general discussions about PrEP as an evidence-based prevention strategy. The proportion aware of PrEP (18%) and those ever prescribed it (2%) are extremely low, suggesting that the targeting may have focused more on other at-risk groups, relative to drug users. Additionally, those who actively use online platforms to seek sexual partners are more likely to seek HIV information and are also interested in receiving health information on mobile devices. Given the extraordinarily low uptake of PrEP by PWUD, strategies that promote internet use by this population generally, and specifically HIV-related information seeking, may increase access to PrEP information. Such a leap from PrEP knowledge to PrEP interest, however, may require targeted messaging that promotes PrEP for people (including heterosexual adults) who inject drugs. In general, this suggests that when technology is integrated into people's lives, which is commonly what happens with mobile device use, they are more likely to be receptive to using it for obtaining health-related information. Together, these findings suggest that prevention strategies might focus on promoting technology use along with skills to navigate the internet.

Of concern here is the finding of a digital divide, with Whites displaying much greater use of the internet both generally and to obtain health-related information compared to African Americans and Latinx population. Although it is encouraging that this divide disappears in the younger population, older users still face this gap, which is reflective of the national digital divide, where Whites have greater access to information technology than do African Americans and Latinx (Pew, 2019). Reasons such as cost, frustration, complexity of using the internet, social isolation, and chronic physical and mental conditions have been associated with lower use of internet among older adults (Carpenter & Buday, 2007; Choi & DiNitto, 2013; Gatto & Tak, 2008). Hence, programs that address these challenges need to be developed to reach the older adults within these ethnic and racial groups of PWUD.

Furthermore, African Americans remain disproportionately affected by HIV, and this gap in internet access and use restricts access to meaningful information and potentially contributes to and perpetuates the disparity experienced by people of color with regard to prevention, treatment, and care (Rebeiro et al., 2018). The prevailing lack of trust by people of color

toward healthcare providers continues to contribute to general and HIV-related health disparities (Saha, Jacobs, Moore, & Beach, 2010), including initiation in and adherence to antiretroviral therapy (Altice, Mostashari, & Friedland, 2001; Mostashari, Riley, Selwyn, & Altice, 1998), but the anonymity of the internet has the potential to overcome these issues, in part, through targeted messages on sites visited by PWUD of color.

Although this study does not provide details of the internet use behavior of PWUDs, it provides information about general internet use among PWUD, their online health information seeking behavior and their preference of device to access internet. This information paired with established evidence for efficacious use of internet, including evidence-based content, telemedicine, web-based interventions supporting substance use disorder and HIV care, and supportive social network, public health initiatives need to incorporate programs that improve access to and use of the internet possibly via smart phones for individuals at highest risk of health disparities (Benavides-Vaello, Strode, & Sheeran, 2013; Copeland & Martin, 2004; Marsch, Carroll, & Kiluk, 2014; Rash, Stitzer, & Weinstock, 2017).

Our study has some limitations. First, this is self-selected population in a Methadone Maintenance Program and their self-reported behavior. Second, measures were not standardized and were less rigorous. Third, the data is dated as it was collected in 2016, and hence attitude, mobile and internet use behavior may have changed as more information about PrEP has been publicized in the last few years.

3.3 Conclusion

Though future studies will need to disentangle why and how PWUD use the internet, especially for health information seeking, this study offers an initial examination of how much PWUD surf the internet and some insights into what they use it for. The study does, however, provide useful information that documents marked internet use by this population, and it also reveals that their use of the internet for health information seeking, especially related to HIV, is higher if they intend to engage in or are engaging in behavior with higher sex-related, but not injection-related, risk. HIV-related information seeking was associated with knowledge about PrEP, but the information about PrEP gained from the internet was not likely targeted to a PWUD audience, since very few of the study participants had been aware of and prescribed PrEP. There is a dire need for strategies that facilitate access to information technology and targeted prevention programs so as to improve knowledge about HIV prevention and uptake of PrEP among PWUD, but such programs will need to move beyond information provision alone by linking the information to motivation and behavioral skills to promote behavioral change.

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Highlights

- Awareness about PrEP and the seeking of HIV-related information was low among people who use drugs
- Looking for sex partners and perception of risk of acquiring HIV were associated with seeking HIV information online.
- Although using injection drugs was related to high perception of risk of acquiring HIV, it was not associated with seeking HIV information online.
- Better understanding the online behavior of people who use drugs and their use of those sites is central for provision of more effective and targeted HIV-prevention strategies.

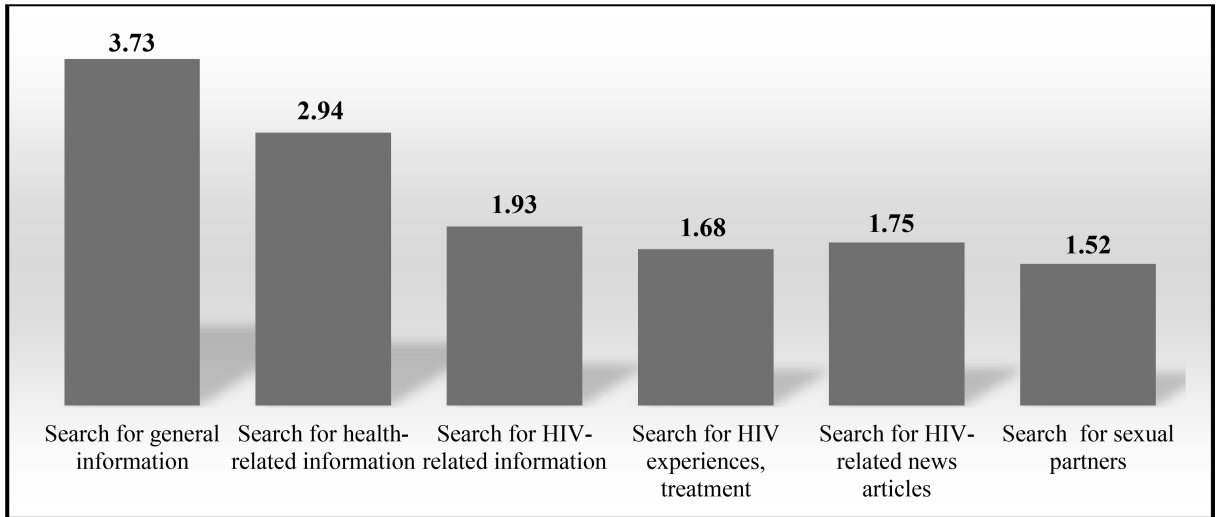


Figure 1. Mean scores of Online Information Seeking Behavior (OISB) among HIV negative injection drug users

Table 1.

Characteristics of sample of people who use drugs (PWUD) on methadone maintenance therapy (N=400)

		Total N (%)	
1.	Mean Age (SD)		40.99 (11.08)
2.	Gender	Male	234 (48.5)
		Female	166 (41.4)
3.	Sexual Orientation	Heterosexual	345 (86.3)
		Homosexual	9 (2.3)
		Bisexual	39 (9.8)
		Other	7 (1.8)
4.	Ethnicity/race	White	253 (63.3)
		Black	70 (17.5)
		Hispanic/Latino/a	61 (15.3)
		Other	16 (4.0)
5.	Education	High school and below	107 (26.8)
		Above high school	293 (73.3)
6.	Homeless at any time in the past 12 months	No	198 (49.5)
		Yes	202 (50.5)
7.	Currently homeless	No	77 (19.3)
		Yes	125 (31.3)
8.	In a relationship	Yes	83 (20.8)
		No	317 (79.3.3)
9.	Current access to the internet	No	87 (21.8)
		Yes	313 (78.3)
10.	Primary device for internet access (n = 313)	Smart phones	231 (73.8)
		Tablet	22 (7.0)
		Laptop	28 (8.9)
		Other	32 (10.2)
11.	Ever been tested for HIV	Yes	390 (97.5)
		No	10 (2.5)
12.	Ever heard of PrEP before this study	Yes	72 (18.0)
		No	328 (82.0)
13.	Ever used PrEP	Yes	7 (1.8)
		No	393 (83.0)
14.	Frequency of injecting drugs in the last month	Has not done it	170 (42.7)
		Once a week	90 (22.5)

		Total N (%)	
		More than once a week	44 (11.1)
		Once a day	44 (11.1)
		2–3 times a day	29 (7.3)
		More than 3 times a day	21 (5.3)
		Not any time	80 (20.0)
		One time	5 (13.8)
		Two times	42 (10.5)
		3–5 times	30 (7.0)
		6–10 times	15 (6.5)
		More than 10 times	8 (3.5)
		Didn't re-use	40 (10.0)
		Every time	81 (20.3)
		Often	34 (8.5)
		Sometimes	38 (9.5)
		Rarely	16 (4.0)
		Never	20 (5.0)
		One	197 (49.3)
		Two	66 (20.1)
		3–5 people	50 (15.2)
		6–10 people	12 (3.7)
		More than 10 people	3 (0.9)
		No regular partner	20 (5.0)
		Every time	26 (6.5)
		Often	9 (2.3)
		Sometimes	32 (8.0)
		Rarely	47 (11.8)
		Never	193 (8.3)
		No regular partner	64 (19.5)
		Every time	49 (14.9)
		Often	21 (6.4)
		Sometimes	41 (12.5)
		Rarely	4 (16.5)
		Never	99 (30.2)
		No paid sex	182 (55.7)
		Every time	30 (9.2)
		Often	5 (1.5)
		Sometimes	18 (5.5)
		Rarely	15 (4.6)
		Never	77 (23.5)

Table 2.

Correlation matrix among variables of interest

	1	2	3	4	5	6	7	8	Mean (SD)
1 Number of hours spent online per week	1.00								19.8 (20.7)
2 Number of sex partners in the last month	-0.01	1.00							1.6 (0.9)
3 Using shared needles in the past month	-0.02	0.39**	1.00						1.4 (1.4)
4 Perceived HIV risk	-0.08	0.40**	0.29**	1.00					2.1 (1.02)
5 Search online for general information	0.33**	-0.04	0.09	-0.02	1.00				3.7 (1.1)
6 Searching online for health-related information	.163**	0.03	0.07	0.05	0.54**	1.00			2.9 (1.1)
7 Search online for sexual partners	0.13*	0.26**	0.11	0.28**	0.10	0.13*	1.00		1.5 (0.9)
8 Online HIV information seeking behavior	0.08	0.16**	0.07	.116*	0.17**	0.35**	0.33**	1	1.8 (0.9)

** Correlation is significant at the 0.01 level (2-tailed).

* Correlation is significant at the 0.05 level (2-tailed).

Table 3. Regression of variables predicting acceptability of mHealth and HIV information seeking behavior

Model	Acceptability of mHealth Intervention					HIV Information-Seeking Behavior				
	B	SE	β	t	Sig.	B	SE	β	t	Sig.
1	(Constant)	1.98	0.39	5.11	<0.01	0.30	0.29		1.03	0.30
1	Age	0.00	0.01	0.03	0.44	0.01	0.00	0.11	2.01	0.05
2	Female sex	0.19	0.06	0.22	3.16	0.07	0.05	0.09	1.51	0.13
3	Income	-0.06	0.08	-0.06	-0.83	-0.02	0.06	-0.02	-0.35	0.73
4	Education	-0.01	0.04	-0.02	-0.26	-0.06	0.03	-0.12	-2.11	0.04
5	Number of hours per week spent online	0.00	0.00	-0.01	-0.22	0.00	0.00	0.05	0.79	0.43
6	Search online for sexual partners	0.18	0.07	0.20	2.66	0.30	0.05	0.33	5.58	<0.01
7	Number of sex partners in the last month	-0.21	0.07	-0.22	-3.18	0.06	0.05	0.07	1.25	0.21
8	Search online for general information	0.15	0.07	0.18	2.25	0.05	0.05	0.06	0.86	0.39
9	Search online for health-related information	0.04	0.06	0.05	0.68	0.20	0.05	0.28	4.15	<0.01
10	HIV information seeking behavior	0.19	0.08	0.19	2.57					