Comparing Men who have Sex with Men and Transgender Women who Use Grindr, Other Similar Social and Sexual Networking Apps, or no Social and Sexual Networking Apps: Implications for Recruitment and Health Promotion

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Abstract

Objective: Researchers and public health professionals have increased their attention to GPS-based social and sexual networking applications (apps) tailored to gay, bisexual, and other men who have sex with men (MSM) and transgender women. These populations continue to be disproportionately affected by HIV in the United States; therefore, these apps, in particular Grindr, have become an important sampling venue for the recruitment of HIV-related research participants. As such, it is essential to identify differences among app users to avoid potential sampling bias. This paper seeks to identify differences in MSM and transgender women who use Grindr and those who use other similar apps.

Methods: A community-based participatory research (CBPR) approach was used to recruit participants online who then completed a 25-item anonymous survey. Five domains were assessed: sociodemographics, HIV testing, sexual risk, substance abuse, and use of GPS-based social and sexual networking apps.

Results: 457 participants completed surveys. There were significant differences in the sociodemographic characteristics by app use, including age, race/ethnicity, sexual orientation, and outness. After adjusting for the sociodemographic characteristics associated with app use, there were significant differences in HIV risk and substance use between the groups.

Conclusion: This paper is the first to report on findings that compare MSM and transgender women who report using Grindr to MSM and transgender women who report using other similar apps. GPS-based social and sexual networking apps may offer a valuable recruitment tool for future HIV research seeking to recruit populations at increased risk for HIV or those living with HIV for therapeutic trials. Because of the differences identified across users of different apps, these findings suggest that if researchers recruited participants from just one app, they could end up with a sample quite different than if they had recruited MSM and transgender women from other apps.

Introduction

Recently, researchers and public health professionals have increased their attention to GPS-based applications ("apps") and other social media platforms that are tailored to gay, bisexual, and other men who have sex with men (MSM) and transgender women, groups that continue to be most disproportionately affected by HIV in the United States (US) [1-3]. Some social media platforms, such as GPS-based mobile apps, incorporate global positioning system technology to facilitate in-person networking. MSM and transgender women reported using apps for a variety of reasons, including friendship and social support [4]. Significant proportions of MSM also report using these apps for sexual networking and recent estimates suggest that one-to two-thirds of MSM use these apps to meet sexual partners [5-7]. Several studies found app users to be more likely to report more sexual partners and condomless anal intercourse and to be at increased risk for sexually transmitted infections (STIs), including HIV [6,8-11]. Sexual health promotion, such as to increase awareness of syphilis and syphilis testing [12], distribute HIV self-test kits [13], and increase linkage to HIV testing and treatment services at a local health department [14], have successfully occurred on these apps. Most of these efforts have occurred on one app in particular, specifically, Grindr, which

was the first GPS-based social and sexual networking app of its kind. Additionally, most of our understanding of MSM who use GPS-based social and sexual networking apps has been based on samples recruited from Grindr [4,7,11,15-19], despite since its launch in 2009, many similar apps have been developed and some of these apps have also been tailored for various sub-communities and interests [20].

When the Internet emerged as an important way for people to connect, researchers also recruited samples via the Internet. At that time, questions were raised about the potential differences that may exist between Internet site users. Researchers have identified significant

differences in participant characteristics depending on how and from which online venues they were recruited [20,21]. Akin to the Internet, GPS-based social and sexual networking apps have become popular social media platforms, thus sampling venues, of this part of the 21st century. As such, there is an increasing need to understand apps as sampling venues and currently, there has not been systematic exploration of differences among various app users. Considering the potential differences between MSM and transgender women who use Grindr and those who instead use similar apps, we sought to examine if recruiting MSM and transgender women exclusively from Grindr unintentionally contributes to sampling bias. This analysis sought to address this gap by comparing the sociodemographic characteristics, HIV testing, sexual risk, and substance use of MSM and transgender women who do and do not use Grindr and other similar apps.

Methodology

Community-based participatory research

A community-based participatory research (CBPR) partnership, including community members, organization representatives, and academic researchers, conducted this study. The partners have worked together for over 15 years to design studies to explore and promote sexual and reproductive health and reduce HIV risk among a variety of health disparity populations [22]. In a recent study that we conducted together to test the acceptability and feasibility of providing HIV and STI testing referrals via four GPS-based social and sexual networking apps, the health educator observed sociodemographics differences in the profiles of the users across the apps [23].

Study design

Using a previously validated recruitment strategy [24-27], we recruited participants from four metropolitan areas across North Carolina (i.e., Asheville, Charlotte, Greensboro, and Greenville) to complete a 25-item anonymous internet survey. Participants were recruited through four social media platforms designed to facilitate social and sexual networking among MSM and transgender women: Craigslist, Adam4Adam, Black Gay Chat, and Gay.com. Craigslist offers different websites for different cities and their surrounding areas where users can post classified advertisements (such as for jobs, items for sale, and housing) and a personals sections. We posted an invitation to participate in the survey in the "casual encounters m4m [men for men]" and "men seeking men" personals subcategories. Interested users then responded by emailing the person who posted the ad or personals. Adam4Adam, Black Gay Chat, and Gay.com allow users to create profiles including their pictures and a description of themselves. Within these platforms, users can set filters to find other users within a certain geographic region. Users can then select and read profiles of other users and if interested can initiate a chat to engage in a one-on-one conversation. We used standardized language across all four websites that stated we were recruiting participants to complete a short survey and requested an interested user email us (in the case of Craigslist) or initiate a chat (in the case of Adam4Adam, Black Gay Chat, and Gay. com) if they were interested to learn more about the study. We did not target or approach users to complete our survey.

Participants were compensated $10, which they could obtain through PayPal, donate to a nonprofit of their choice, or forego. Wake Forest School of Medicine Institutional Review Board approved all study procedures (IRB00014308).

Measures

Five different domains were assessed through the survey: sociodemographics, HIV testing, sexual risk, substance use, and use of GPS-based social and sexual networking apps. All items had been previously validated and used in research conducted by the CBPR partnership [28-31].

Sociodemographics: Participants reported their age, race/ethnicity, county of residence, gender, sexual orientation, and level of "outness." The sociodemographic measures and response options reflect language used on these sites. In the analyses, the race/ethnicity options (American Indian/Alaska Native, Asian, Black/African American, Hispanic/Latino, Native Hawaiian or other Pacific Islander, White, and Other) were dichotomized as either White or Non-White. Participants described their sexual orientation as bisexual, gay or homosexual, heterosexual or straight, or other. Participants designated their outness by selecting one option that best reflected how "out" they were about their sexual behavior and/or orientation. Options were: "not at all," "not out at work," "to some people," "to all but family," or "totally." No participants chose "not out at work;" therefore, we made the response options of this measure range on a 4-point scale from 1 representing "not at all" to 4 representing "totally." This item reflected how users of these social and sexual networking sites are asked to self-identity.

HIV testing: Participants reported whether they had ever been tested for HIV in their lifetime and in the past 12 months. Participants reported the result of the test with the response options: "negative", "positive", "indeterminate", and "did not receive results." Participants also reported the location of their last HIV test. Location was classified as a traditional venue (e.g., doctor's office) or non-traditional venue (e.g., bar/club and church). HIV testing self-efficacy was measured on a 4-point scale and participants reported how sure they were that they could get tested for HIV, from 1 "not at all sure" to 4 "very sure."

Sexual risk: We used four questions to measure sexual activity and condom use with men and women. Participants reported whether they had oral, vaginal, and/or anal sex with a woman in the past 12 months (yes or no) and whether they had oral and/or anal sex with a man in the past 12 months (yes or no). Condom use during vaginal or anal sex with women in the past 12 months and condom use during anal sex with men during the past 12 months was measured on a 5-point scale, "never," "rarely," "sometimes," "usually," and "always." The selection of "never," "rarely," "sometimes," and "usually," was classified as inconsistent condom use.

Substance use: Alcohol use was measured by asking participants, "In a typical week, how many days do you get drunk?" [30]. Participants also reported which of the following substances they had used in the past 12 months: tobacco (cigarette or cigar), marijuana, cocaine, crack, "poppers" or rush (alkyl nitrites), crystal meth, ecstasy, GHB, and medication used for sexual enhancement (i.e., Viagra®, Levitra®, or Cialis®). Additionally, participants had the option of listing any other drugs they had used in the past 12 months. Recreational prescription drug use was assessed by asking participants if they had ever used prescription drugs without a prescription or for reasons other than the prescribed use.

App use: Participants indicated all of the apps they had used in the past 30 days from a list of 11 GPS-based social and sexual networking apps (i.e., A4A/Radar, BoyAhoy, GayConnect, Grindr, Growlr, GuySpy, Hornet, iDate, Jack'd, Mister, Scruff). If "Other" was selected they were asked to specify the app.

Analysis plan

First, we identified three groups of MSM and transgender women based on their reported app use in the past 30 days. If a participant did not report using a GPS-based social and sexual networking app designed for MSM and transgender women in the past 30 days, the participant was classified as a "non-app user." Participants who reported using Grindr (regardless of other use of other apps) in the past 30 days were classified as a "Grindr user." Participants who did not report using Grindr in the past 30 days, but reported using at least one other GPS-based social and sexual networking apps designed for MSM were classified as a "non-Grindr app user."

We performed descriptive analyses to examine overall prevalence and group prevalence of app use. We compared the sociodemographic characteristics, HIV testing experiences, sexual risk, and substance use of participants by app use (non-app user, Grindr user, and non-Grindr app user) with chi-square tests and Fisher's exact tests for categorical variables and analysis of variance (ANOVA) for continuous variables. Variables that were significantly different in the bivariable analysis ($p<0.10$) were entered into a multivariable logistic regression model to determine the associations between app use and HIV risk and substance use [32]. All analyses were performed in SPSS 22 (Armonk, NY).

Results

Description of participants

Table 1 presents the sociodemographic characteristics of the sample and differences by app use. On average, participants (n=457) were 41.1 years old (SD = 12.7, range=18-74). The majority of the sample was White (82.3%) and identified as male (98.7%). Over half the sample identified as bisexual (40.7%), or heterosexual/other (13.6%).

Table 1 also presents the HIV risk and substance use behavior for the total sample and by app use. Over three-quarters (78.3%) of participants had ever been tested for HIV and 45.1% had been tested in the past 12 months. About two-thirds (60.4%) of participants reported their last HIV test occurred at a non-traditional testing location. Slightly less than half (46.8%) of participants reported having sex with a woman in the past 12 months. No participants reported using marijuana, crack, crystal meth, or GHB in the past 12 months. Over one-third (38.7%) reported tobacco (cigarette or cigar) use and 16.4% reported using poppers in the past 12 months. About one-fifth (19.0%) of participants reported using medication for sexual enhancement and 9.6% reported using prescription medication recreationally.

	Sample (n=457)	Non-app user (n=230)	Grindr user (n=89)	Non-Grindr app user (n=138)	p
	n (%) or mean (SD), as appropriate				
Age	41.1 ± 12.7 (18-74)	42.5 ± 13.0 (18-74)	39.9 ± 13.4 (18-62)	39.4 ± 11.6 (18-65)	<0.05
Gender					0.34
Male	451 (98.7)	225 (97.8)	89 (100.0)	137 (99.8)	
Transgender	6 (1.3)	5 (2.2)	0 (0.0)	1 (0.7)	
Race/ethnicity					0.07
White	376 (82.3)	195 (84.8)	76 (85.4)	105 (76.1)	
Non White	81 (17.7)	35 (15.2)	13 (14.6)	33 (23.9)	
Sexual orientation					<0.001
Gay/homosexual	209 (45.7)	80 (34.8)	58 (65.2)	71 (51.4)	
Bisexual	186 (40.7)	108 (47.0)	25 (28.1)	53 (38.4)	
Heterosexual/other	62 (13.6)	42 (18.3)	6 (6.7)	14 (10.1)	
Outness	2.4 ± 1.2 (1-4)	2.1 ± 1.2 (1-4)	2.8 ± 1.2 (1-4)	2.7 ± 1.2 (1-4)	<0.001
Tested for HIV[1]	358 (78.3)	177 (77.0)	71 (79.8)	110 (79.7)	0.78
Tested for HIV[2]	206 (45.1)	97 (55.4)	44 (49.4)	65 (59.1)	0.61
Positive HIV status	42 (9.2)	4 (1.7)	19 (21.3)	19 (13.8)	<0.001
Location of last HIV test					0.004
Traditional	181 (39.6)	82 (35.7)	49 (55.1)	50 (36.2)	
Non-traditional	276 (60.4)	148 (64.3)	40 (44.9)	88 (63.8)	
HIV testing self-efficacy					<0.001
Less than very sure	85 (18.6)	67 (29.1)	7 (7.9)	11 (8.0)	
Very sure	372 (81.4)	163 (70.9)	82 (92.1)	127 (92.0)	
Sex with a female partner[2]	214 (46.8)	134 (58.3)	25 (28.1)	55 (39.9)	<0.001
Inconsistent condom use[2]	328 (71.8)	177 (77.0)	54 (60.7)	97 (70.3)	0.01
Days drunk in a typical week	0.4 ± 1.1 (0-6)	0.5 ± 1.2 (0-6)	0.3 ± 0.6 (0-4)	0.4 ± 0.9 (0-4)	0.13
Tobacco (cigarette or cigar) use[2]	177 (38.7)	90 (39.1)	48 (53.9)	39 (28.3)	0.001
Marijuana use[2]	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	--
Cocaine use[2]	12 (2.6)	9 (3.9)	2 (2.2)	1 (0.7)	0.21
Crack use[2]	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	--
Poppers/Rush use[2]	75 (16.4)	13 (5.7)	26 (29.2)	36 (26.1)	<0.001
Crystal Meth use[2]	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	--
Ecstasy use[2]	11 (2.4)	6 (2.6)	0 (0.0)	5 (3.6)	0.22
GHB use[2]	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	--
Erectile dysfunction medication[2]	87 (19.0)	43 (18.7)	18 (20.2)	26 (18.8)	0.96
Other illicit substances[2]	3 (0.7)	1 (0.4)	2 (2.2)	0 (0.0)	0.13
Recreational prescription drug use[1]	44 (9.6)	21 (9.4)	19 (21.3)	4 (2.9)	<0.001

[1] lifetime. [2] within the past 12 months.

Table 1: Sample characteristics and differences by app use (bivariable analysis).

Description of app use

Half (50.3%, n=230) of the participants were non-app users; 19.5% (n=89) were Grindr users; 30.2% (n=138) were non-Grindr app users. Among all the app users (both Grindr users and non-Grindr app users), the most frequently reported apps were A4A/Radar, Grindr, Jack'd, and Scruff; 80.1% of all app users reported using at least one of these apps. The least frequently reported apps were BoyAhoy and Hornet. Hornet was reported by only two individuals, both of whom used other apps as well. BoyAhoy was reported by 5 individuals as the only app they used. No participants reported using Mister.

Among the Grindr-users, 77.5% used Grindr only. Of the other apps used by Grindr users, A4A/Radar was the most frequently reported (n=17); all of the other apps were only reported by 1 or 2 other participants.

Among the non-Grindr app users, 79.0% reported using only 1 app in the past 30 days. Non-Grindr app users most frequently reported using A4A/Radar (n=46), followed by Scruff (n=36), and Jack'd (n=25). BoyAhoy and Hornet were the least frequently reported apps (n=5 and n=2, respectively).

Comparison of HIV risk and substance use by app use

From the bivariable analyses, there were significant differences in the sociodemographic characteristics by app use, including age, race/ethnicity, sexual orientation, and outness (Table 1). On average, non-app users were 2.6 years older than Grindr users and 3.1 years older than non-Grindr app users. Fewer non-Grindr app users were White compared to non-app users and Grindr users (76.1% versus 84.9% and 85.4%, respectively). Nearly twice as many Grindr users identified as gay/homosexual compared to non-app users. Grindr users reported the highest outness score and non-app users had the lowest outness score.

After adjusting for the sociodemographic characteristics significantly associated with app use, there were significant differences in HIV risk and substance use between the groups, as presented in Table 2. Non-app users compared to Grindr users were less likely to report a positive HIV status as well as popper and recreational prescription drug use, though they were more likely to report inconsistent condom use and lower HIV testing self-efficacy. Non-Grindr app users compared to Grindr users were less likely to report tobacco (cigarette or cigar) and recreational prescription drug use, and more likely to report inconsistent condom use.

Discussion

We found significant differences in sociodemographic characteristics when we compared a sample of MSM and transgender women who reported using Grindr, not using Grindr but using similar apps, or not using any GPS-based social and sexual networking apps. MSM and transgender women who reported not using any GPS-based social and sexual networking apps were more likely to be older and identify as bisexual or heterosexual compared to those who reported using apps. There were additional differences in HIV-related characteristics and behaviors after controlling for sociodemographic characteristics, including HIV status, HIV testing self-efficacy, and substance use.

This paper is the first of its kind to report on findings that compare MSM and transgender women who report using Grindr to MSM and transgender women who report not using Grindr but using other similar apps. As such, we are unable to compare our findings to other published papers. As important differences were identified between these two groups, further research could seek to replicate these results and continue to examine how MSM and transgender women who use Grindr and MSM and transgender women who do not use Grindr but use similar apps are different or similar from one another. Furthermore, our sample included very few transgender women; however, their use of GPS-based apps may be increasing and research should better explore their patterns of use. The differences in sociodemographic characteristics that were identified by comparing MSM and transgender women who did not report using apps to MSM and transgender women who reported using apps are similar to other findings [8,33].

These findings have important recruitment implications. GPS-based social and sexual networking apps may offer a valuable recruitment tool for future HIV research seeking to recruit populations at increased risk for HIV or those living with HIV for therapeutic trials. Additionally, it appears that if we were interested in recruiting MSM and transgender women with certain sociodemographic characteristics, such as MSM and transgender women of color, older MSM and transgender women, or less out MSM and transgender women, we should consider using other apps in addition to Grindr or non-app venues. Because of the differences identified across users of different apps, these findings suggest that if researchers recruited participants from just Grindr, they could end up with a sample quite different than if they had recruited MSM and transgender women from other apps.

In terms of intervention implications, researchers and practitioners could apply these findings to reach different target groups and implement interventions that encourage increasing HIV testing and condom use or decreasing substance use. For example, MSM and transgender women who do not report using GPS-based social and sexual networking apps were more likely to report low HIV testing self-efficacy, which is an important predictor of actual HIV testing, a critical aspect of HIV prevention. It may be necessary to connect with these populations through other venues in order to provide support

	Non-app user compared to Grindr user[1]	p	Non-Grindr app user compared to Grindr user[1]	p
	AOR (95% CI)		AOR (95% CI)	
Positive HIV status	0.05 (0.01, 0.16)	<0.001	0.45 (0.20, 1.01)	0.053
Last HIV testing at a traditional venue (compared to non-traditional)	0.78 (0.38, 1.62)	0.51	0.79 (0.38, 1.64)	0.53
Less than very sure HIV testing self-efficacy (compared to very sure)	4.56 (1.85, 11.24)	0.001	1.04 (0.36, 3.02)	0.94
Sex with a female partner[2]	1.75 (0.81, 3.79)	0.15	1.80 (0.80, 4.05)	0.16
Inconsistent condom use[2]	2.42 (1.35, 4.36)	0.003	2.49 (1.34, 4.62)	0.004
Tobacco (cigarette or cigar) use[2]	0.83 (0.47, 1.47)	0.51	0.34 (0.18, 0.64)	0.001
Popper use[2]	0.14 (0.07, 0.32)	<0.001	1.15 (0.59, 2.22)	0.69
Recreational prescription drug use[3]	0.36 (0.17, 0.77)	0.009	0.11 (0.03, 0.34)	< 0.001

[1]Grindr user is the referent group. AOR and 95% CI adjusted for age, geographic region, race/ethnicity, sexual orientation, and outness. [2]within the past 12 months. [3]lifetime.

Table 2: Comparison of HIV risk and substance use by app use: Multivariable logistic regression analysis (n=457).

to increase HIV testing self-efficacy. Research has consistently shown that MSM and transgender women have higher rates of smoking than their heterosexual counterparts [34,35]. Developing and evaluating the efficacy of HIV and substance use interventions delivered via apps could be an important next step to reduce health disparities, as researchers have already begun to demonstrate the acceptability and feasibility of promoting sexual health and HIV prevention on GPS-based social and sexual networking apps.

Strengths

This is the first paper to systematically describe and compare the sociodemographic characteristics, HIV risk, and substance use among MSM and transgender women who report using a variety of GPS-based social and sexual networking apps. Additionally, this research was conducted in North Carolina, which is a fairly rural state with a unique social context, and contributes to increasing our knowledge and understanding of MSM and transgender women outside of large, urban areas, such as Los Angeles, New York City, and Atlanta where most of the app-based research has been conducted [4-7,9,11,13,15,17]. Furthermore, given the rising and disproportionate HIV rates in the South and that the 14th and 22nd highest rates of HIV occurred in two metropolitan statistical areas in North Carolina, [1,36] conducting research to explore HIV risk in this area is greatly needed and should be a high priority in order to address the epidemiological changes in HIV in the United States.

Limitations

There are several limitations of this analysis that impact the interpretation of results. The results of this analysis are based on cross-sectional data, and no causal relationships can be assumed. The substance use measures lack specificity; participants were asked to report their substance use in the past 12 months and we did not measure frequency and intensity of use or routes of administration. Future research should seek to better understand these important features. It would have been insightful to recruit men and transgender women from social and sexual networking apps, and then conduct analyses to compare the various samples; however, by recruiting from these platforms, we were able to make comparisons between app users and non-app users.

Conclusion

These findings suggest that researchers need to carefully consider differences in samples that may exist based on the social media platform from where participants are recruited. We need to expand our understanding of apps as a new venue for recruitment, and there are important implications in the differences of the individuals we reach when recruiting from these new apps. Given the changing context and technologies, researchers and interventionists must understand and utilize venues that span beyond physical space to include new and virtual spaces that are popular amongst MSM and transgender women to socialize and meet, and at the same time continue to reach and meet the needs of all MSM and transgender women, including incorporating non-app-based strategies.

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Contributors

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