

# Social Media and Mobile-App Use for Sexual Encounters Among Men Who Have Sex With Men in Puerto Rico

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**Objective:** To describe the use and frequency of use of mobile apps (internet- and/or smartphone-based geospatial networking apps) among men who have sex with men (MSM) and how these platforms are used to engage with sexual partners in PR.

**Methods:** A local module including questions regarding mobile apps and sexual engagement and derived from the 2017 Puerto Rico National HIV Behavioral Surveillance System, fifth MSM cycle, was used for this analysis. A subsample of 127 eligible participants was recruited through venue-based sampling and assented to participate. Univariate analysis was used to evaluate sociodemographic and behavioral characteristics, HIV testing, and the ways in which mobile apps are used to find sexual partners.

**Results:** The participants' median age was 35 years, with a standard deviation of  $\pm 11.37$  years. Most of our sample (97%) had had anal sex with at least 1 partner in the last 12 months, and 76% of them had had condomless anal sex. Over three fourths (81%) reported using apps for sexual encounters, while 45% stated that the most frequently used app was Grindr. Of the participants who had used apps for sexual encounters, 57% had met 5 or more sexual partners through apps in their lifetime.

**Conclusion:** This study shows that there is a need for further research to understand the habits of this population in PR regarding the use of apps to find sexual partners and, also, as a possible way to develop strategies for prevention and health promotion in this group. [*PR Health Sci J* 2021;40:136-141]

*Key words:* HIV/AIDS, MSM, Internet, Smartphone-based Geospatial Networking Apps, Puerto Rico

Men who have sex with men (MSM) is the population most affected by HIV in the United States (US). In 2017, 38,739 people in the US were diagnosed with HIV; 66% of the diagnoses were in MSM (1). Surveillance data have shown that the annual rate of HIV infections among MSM has stabilized in recent years. Nevertheless, when incidence rates are explored by race/ethnicity, HIV continues to affect MSM who are relatively younger and from racial/ethnic minorities to a greater degree than it does MSM of other populations. Black/African American gay and bisexual men accounted for 37% of the new diagnoses among all gay and bisexual men in the US and dependent areas in 2018. Hispanics/Latinos made up 26% of the new HIV diagnoses in the US and dependent areas (2–4). Within the US, Puerto Rico (PR) had the 12th highest rate of new HIV diagnoses in 2017 (5). As of 2019, there have been 49,476 confirmed cases of HIV infection in PR (6). Recent data suggest that there has been an increase in the risk of HIV in young men 13 to 24 years old (7); since 2014,

MSM have had the highest percentage of new cases of HIV in PR, surpassing people who inject drugs (PWID), population that had the greatest number of HIV diagnoses at and from the time that the epidemic began (8).

The mechanisms that MSM use to gather and to find sex partners have changed, as have the socialization practices in place at those gatherings. Before the widespread availability of the internet in the 1990s, the primary way of socialization

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for MSM was going to gay bars and clubs, community centers, and public sex venues (this latter including adult bookstores, bathhouses, parks, and public bathrooms) (9,10). With the rapid development of technology, what started as chat rooms on desktops with limited visual capabilities has transformed into websites and applications that are now mobile (available through a phone) and that allow the instant sharing of visual and geosocial information (9,11). With factors such as the disclosure of sexual orientation, security, and accessibility, plus the technological advancement of the internet and its round-the-clock availability, gay and bisexual men have rapidly made the internet a space for sexual purposes, including finding sex partners, dating, engaging in cybersex, and viewing pornography (9,12).

According to Grov and colleagues (9), the internet can be viewed as a “modern bathhouse.” Researchers have attempted to understand how meeting sexual partners on the internet is related to behaviors that expose MSM to HIV. In the 1990s, a study by Bull and McFarlane revealed that using the internet to meet sex partners was a known risk factor for HIV and sexually transmitted infection (STI) transmission (13). However, current research suggests that the relationship between the internet and sexual behavior that exposes someone to HIV is complex. Some studies suggest that MSM who use mobile apps also report practicing more behaviors that expose individuals to HIV, though not all studies have found that association (12,14). In addition, one study found that some MSM use mobile apps to explore their sexual identities, manage their first sexual encounters, and negotiate (15). To the contrary, some suggest that the quick manner in which sexual encounters through mobile apps occur might minimize the discussion of each partner’s history, including HIV status, leading to false perceptions of what an HIV-positive person might look like (16).

Research dedicated to the understanding of HIV-related topics as they pertain to MSM in PR is limited. Nevertheless, epidemiological and behavioral profiles of MSM have been well documented (8,17,18). A previous study has reported a decrease in HIV unawareness in MSM (“unawareness” meaning, in this case, that study members were HIV positive but did not know their diagnosis or had not confirmed it via HIV testing) (8). Related to mobile-app use and MSM in PR, research shows that the app used most is Grindr, a geolocation smartphone application used by MSM to find sexual partners (19). Despite these past efforts, there is a need to continue assessing these ever-changing dynamics among the MSM population of PR, particularly with regard to the use of mobile apps and how such use relates to the behaviors that expose people to HIV. Using the 2017 Puerto Rico National HIV Behavioral Surveillance System (PR-NHBS), a population-based surveillance system, we aimed to describe the use and frequency of use of mobile apps and how these platforms are used by MSM in PR to engage with sexual partners.

## Materials and Methods

### Data source

The NHBS aims to document behavioral practices that expose people to HIV. Three different cycles covering 3 subgroups are conducted annually; the subgroups are MSM, PWID, and heterosexuals at increased risk of HIV infection. The NHBS procedures and methods are described elsewhere (12,14,20). Briefly, the NHBS completes consecutive cross-sectional surveys in every cycle, with the aim of assessing the prevalence of HIV infection, awareness, and behaviors that expose people to HIV; describing HIV testing habits and the utilization of healthcare services; and evaluating the use of preventive measures. The data used in this analysis correspond to the fifth cycle of the PR-NHBS (PR-NHBS-MSMS, implemented in January 2017). The Institutional Review Board of the University of Puerto Rico, Medical Sciences Campus, reviewed and approved the study. The sample was obtained using venue-based sampling. To gather the study sample, our team (1) undertook a formative assessment to identify and assess MSM venues (e.g., bars, cafes and restaurants, dance clubs, fitness clubs and gymnasiums), (2) sampled venues and identified the frequency of visits at each venue to create a monthly recruitment calendar, and (3) conducted recruitment events in which any man attending the event would be eligible if he met the criteria outlined in the eligibility interview.

All the participants who agreed to participate were offered an anonymous HIV test. Participants could refuse the HIV test and still participate in the survey. Participants who agreed to participate in the testing component of the NHBS survey were also provided with information about HIV testing and the results of their own tests. The HIV test results were returned to the corresponding participants by a trained counselor at the end of the testing process. If the participants who had been tested agreed, their specimens were collected for long-term storage to conduct additional testing. If a rapid test was used, the results were returned shortly after the time of testing.

The participating areas were those that are included within the San Juan metropolitan statistical area (SJ-MSA). This MSA is composed of 41 municipalities, and the estimated sample size for the NHBS-MSMS was 500 participants. To be included in the final sample, the eligibility criteria were that the potential participant (1) had not already participated in the current cycle of the NHBS, (2) lived in participating SJ-MSA, (3) was 18 years or older, (4) had ever had oral and/or anal sex with another man, (5) was born male and self-identified as male, (6) was able to complete the face-to-face interview in English or Spanish (duration of the survey: 1 hour), and finally, (7) had had oral and/or anal sex with another man in the past 12 months. A total of 325 face-to-face interviews were conducted. Of those 325 interviews, 129 participants agreed to complete the local module. We focused our analysis only on the participants who (1) answered both the NHBS core questionnaire and the local module questions, (2) answered the sex-via-apps question

(Y/N), and (3) had had sex in the last 12 months prior to their participation in the survey. After we applied the criteria above, our sample consisted of 78 participants. Univariate analysis evaluated descriptive measurements for sociodemographic characteristics, behaviors that expose people to HIV, and the use of mobile apps to have a sexual encounter.

### Measures

The variables were assessed using measures from the NHBS core questionnaire and a local module developed by the research team (and from which questions for the questionnaire were derived). The local module consisted of a small questionnaire that explored different topics of interest to the Puerto Rican MSM population. The topic ideas were gathered in the formative assessment phase of the NHBS survey, in which phase the researchers interviewed key informants. If a given individual agreed to participate, he answered the questions on the local module at the end of the core questionnaire.

#### Sociodemographic and behavioral variables.

Age, educational level, employment, presence of insurance and type of insurance if present, and HIV testing were used to describe the participating population of the SJ-MSA that answered the local survey. Sexual behavioral practices such as disclosed sexual orientation, age of sexual debut, number of sexual partners, anal sex, and condomless anal sex were also studied. Behavioral practices, including alcohol use, binge drinking (5 or more drinks in approximately 2 hours) in the last

**Table 1.** Sociodemographic Characteristics of Sexually Active MSM: PR-NHBS, MSM cycle, 2017 (n=78)

Variable	N (%)
<b>Age</b>	
18–28	27 (34.62)
29–39	26 (33.33)
>40	25 (32.05)
<b>Education</b>	
High school or less	11 (14.10)
Some college or more	67 (85.90)
<b>Employed</b>	
No	55 (70.51)
Yes	23 (29.49)
<b>Currently insured</b>	
No	14 (17.95)
Yes	64 (82.05)

30 days before taking the survey, and the use of injectable (e.g., heroin) and non-injectable drugs were also analyzed.

**Mobile apps for sexual encounters.** The local module for the NHBS-MSMS provided more in-depth questions about the use of mobile apps for sexual encounters. Questions explored the most frequently used mobile apps, and the influence of app utilization on visiting other venues. We also asked whether the study participant had used a mobile app to arrange a sexual encounter (Y/N). Of those who answered this question in the affirmative, we determined the number of sexual partners met through mobile apps (lifetime and 3 months), the participant’s awareness (at the time) of the HIV serostatus of the sexual partner(s) he had met using a mobile app(s), whether or not the participant sought out HIV testing after having a sexual encounter with any one or all—if applicable—the partners he had met via a mobile app or apps, and whether or not the participant had been under the influence of alcohol or drugs (or both) while using mobile apps to look for sex.

#### Data analysis

The NHBS core questionnaire database was merged with the local module database using IBM SPSS 22. Univariate analysis evaluated descriptive measurements for sociodemographic characteristics, behaviors that expose people to HIV, and the use of mobile apps to have a sexual encounter.

## Results

#### Sociodemographic characteristics

The participants’ median age was 35 years, with a standard deviation of ±11.37 years. Most of the sample reported having some college or more (86%), were not employed (71%), and were currently insured (82%) (Table 1).

Most of the participants reported being “out” (94%), meaning they had disclosed their sexual orientation to friends and family. More than half of the study participants had had their sexual debut before 17 years of age. Most of our sample had had anal sex with at least 1 partner in the 12 months prior to their taking the survey (97%, of which 76% had had condomless anal sex). The majority also reported having consumed alcohol in the 30 days prior to their taking the survey (91%). More than one fourth of the participants reported using non-injectable drugs (40%), such as marijuana, methamphetamine, cocaine, or crack; a small proportion (2.6%) reported using injectable drugs (Table 2).

#### Apps for sexual encounters

Our sample reported that the most frequently used app was Grindr (45%), followed by Facebook (33%); 81% reported looking for sex via apps. Of the participants who had used apps for sexual encounters, 57% had met 5 or more sexual partners through apps in their lifetimes. The majority of the men in our sample did not know the HIV status of the last sexual partner they had met through apps (64%). When asked if they had had an HIV test after said encounter, 62% stated they did not (data

**Table 2.** Behavioral Characteristics and Practices of MSM: PR-NHBS, MSM cycle, 2017 (n = 78)

Variable	N (%)
Disclosed sexual orientation	
No	5 (6.41)
Yes	73 (93.59)
Age of MSM sexual debut	
<17	43 (55.13)
≥17	35 (44.87)
Anal sex with at least 1 partner	
No	2 (2.56)
Yes	76 (97.44)
Unprotected anal sex with at least 1 partner <sup>a</sup>	
No	18 (23.68)
Yes	58 (76.32)
Alcohol in the last 30 days	
No	7 (8.97)
Yes	71 (91.03)
Binge drinking <sup>b</sup> in the last 30 days <sup>c</sup>	
No	25 (35.21)
Yes	46 (64.79)
Uses injectable drugs	
No	76 (97.44)
Yes	2 (2.56)
Uses non-injectable drugs	
No	47 (60.26)
Yes	31 (39.74)

<sup>a</sup>Total number of participants who answer this question; n = 76; <sup>b</sup>Defined as 5 or more drinks in approx. 2 hours; <sup>c</sup>Some participants skipped due to NA or refused to answer

not shown). Thirty-one percent indicated that they had been under the influence of alcohol and/or drugs while using apps for sexual encounters (Table 3).

### Discussion

This study aimed to describe the use and frequency of use of mobile apps in a sample of MSM in PR and how these platforms are used to help MSM in engage with sexual partners. Our results showed that most of the participants used apps to find sexual partners. As stated before, there has been a shift in the mechanisms of socialization in this population (9,21). The reasons for this shift might include the accessibility of the internet and the ease of its use, as well as the anonymity that it provides. Prior studies have suggested that it is precisely this promise of anonymity that makes mobile apps ideal for communicating the (sexual) needs and desires of their users. Such apps also permit conversations that would be

**Table 3.** Utilization of mobile apps among MSM: PR-NHBS, MSM cycle, 2017

Variable	N (%)
Most frequently used mobile app (n = 78)	
Grindr	35 (44.87)
Facebook	26 (33.33)
Twitter	9 (11.54)
Other <sup>a</sup>	8 (10.26)
Apps' influence on visits to MSM-exclusive places (n = 78)	
Visits have increased	7 (8.97)
Visits have decreased	10 (12.82)
Visits have not changed	61 (78.21)
Sex via mobile apps (n = 78)	
No	15 (19.23)
Yes	63 (80.77)
Number of sexual partners met through apps (lifetime) (n = 63)	
One to 4 sexual partners	27 (42.86)
5 or more sexual partners	36 (57.14)
Number of sexual partners met through apps (last 3 months) <sup>b</sup>	
None	21 (35.59)
One to 4 sexual partners	26 (44.07)
5 or more sexual partners	12 (20.34)
Knew sexual partner's HIV status (last sex via apps) <sup>b</sup>	
No	38 (64.41)
Yes	21 (35.59)
Under the influence of alcohol and/or drugs while using apps to look for sex <sup>b</sup>	
No	42 (68.85)
Yes	19 (31.15)

<sup>a</sup>Scruff, Jack'd, u4Bear, VGL; <sup>b</sup>Only among those who responded "yes" to sex-via-apps question (n = 63). Missing value.

uncomfortable and awkward in face-to-face interactions, such as those pertaining to condom use, HIV serostatus disclosure, and serosorting (9,22–25). Similar to what has been found in other studies (21,26), our study determined, in post hoc analysis, that younger MSM tended to have higher levels of mobile-app use and more frequent sex via apps than did their older counterparts.

Grindr was the most used app for MSM in our sample (19,27). This finding concurs with Rodríguez and colleagues in their assessment of social-app use among college students (18–24 years old) from the western region of PR (19). Currently, Grindr has 6 million monthly active users and 3 million daily active users (28). Overall, the facilitated connection between users based on proximity and attraction (29) and the app's popularity in this group for sexual partnering may be the reasons for the previously mentioned finding (27). In their lifetimes, 57% of our sample had 5 or more sexual partners whom they had met through mobile apps. Another study, this one in California, showed a higher number of lifetime and recent sexual partners

in people who used apps (30). Research suggests that mobile apps in MSM may be used specifically to find casual sex partners or romantic partners (31). It has been documented that the number of sexual partners met via mobile apps can vary depending on the intentions of its user (32); the fact that mobile apps can serve as both catalysts and buffers for sexual encounters can also affect the number of sexual partners that a person might meet using this kind of app (9,16,22–25).

Our results showed that a high percentage of MSM who used apps engaged in sex with partners of unknown HIV status. The majority of the study sample had participated in condomless anal sex and were unaware of the HIV status of their sexual partner. In addition, despite the fact that the members of our sample reported having medical insurance, most of them did not get tested for HIV after any sexual encounter initiated through a mobile app. For MSM, the key risk factors contributing to new infections include high HIV prevalence, the lack of awareness of the HIV-positive status of the respective partner, the practice of condomless anal sex, and increased viral load among people with HIV (16,27,33). Taken together with the wealth of literature that highlights the burden of and risk factors for HIV (9, 11,16,17,18), our results serve as a foundation for describing the use (in PR) of apps for finding sex partners among MSM and reveal the behavioral practices of these men.

Because of the limited scope of our study, understanding how MSM in PR use apps to find sexual partners will require further research. The limitations of this study include its design and sample size. The NHBS is a cross-sectional study, and the impact of app use on sexual dynamics over time cannot be assessed. As mentioned before, some of the questions for this study were derived from a local module created by the research team and were implemented only among those who, after the completing the core survey, agreed to complete the extra set of questions. Therefore, the small sample size of this subgroup limited the opportunity to perform more elaborate analyses that would permit us to predict the likelihood of risk or protective practices in MSM who use apps. The sample size for the local survey in 2017 was also limited. Possible reasons may include the length of the NHBS core survey, itself, and the manner of sampling (the participants were in socializing contexts and might have become fatigued with the total length of the NHBS and local surveys). Other potential limitations include the potential underreporting of sensitive information regarding sexual practices and the social dynamics involved in using mobile apps. In addition, the sample size expected for the study was not reached due to Hurricane Maria. After the hurricane, in September 2017, the venue-based sampling method experienced challenges because many of the venues had been closed. The situation after the hurricane, specifically the lack of security, power, and water service and the fact that the interviewers had fewer hours available for the interview, affected the sampling process.

Findings from this study show that there was a high frequency of mobile-app usage and behaviors that exposed this sample population of MSM to HIV. They also show that there is a gap between these exposure-related behaviors (unawareness of

sexual partner's HIV status, participating in anal sex, participating in condomless anal sex) and possible protective behaviors (HIV testing). Further comprehensive research, using a quantitative and qualitative approach, is needed to understand the dynamics of this population in PR in terms of its use of mobile apps to find sexual partners. The trends described herein suggest that new opportunities for developing and implementing strategies related to HIV prevention (and prevention promotion) exist (34,35). In addition, it might be possible to use the platforms themselves to recruit MSM participants into population-based research studies.

## Resumen

**Objetivo:** El objetivo de este estudio fue describir el uso y la frecuencia de las aplicaciones móviles (internet y aplicaciones sociales con tecnologías de geolocalización) en hombres que tienen sexo con hombres (HSH) y cómo éstas plataformas se utilizan para interactuar con parejas sexuales en PR. **Métodos:** Se utilizó un módulo local el cual incluía preguntas sobre aplicaciones móviles e interacciones sexuales, derivado de los datos del quinto ciclo del Sistema Nacional de Vigilancia de Conductas Asociadas al VIH de Puerto Rico en el 2017 dirigido a HSH. Se reclutó una submuestra de 127 participantes elegibles por muestreo basado en sitios. Se utilizó un análisis univariado para evaluar características sociodemográficas, de comportamientos, pruebas de VIH y las prácticas en el uso de aplicaciones para tener un encuentro sexual. **Resultados:** La media de edad de los participantes fue de 35 años, con una desviación estándar de  $\pm 11.37$  años. La mayoría de la muestra (97%) reportaron tener sexo con al menos una pareja en los últimos 12 meses, y 76% de ellos reportaron sexo sin condón. Más de tres cuartas partes (81%) reportaron la utilización de aplicaciones para tener encuentros sexuales, siendo Grindr la aplicación más utilizada (45%). De los participantes que reportaron la utilización de aplicaciones móviles para encuentros sexuales, el 57% ha conocido cinco parejas sexuales o más en su vida. La mayoría de los participantes desconocía el estatus de VIH de su última pareja sexual conocida mediante aplicaciones móviles (64%).

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