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Pre-exposure prophylaxis awareness, use, and intention to use in a regional sample of Latin American geosocial networking application users in 2018-2019

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Abstract

Pre-exposure prophylaxis (PrEP) access is increasing in Latin America. We explored PrEP use among Spanish-speaking, *Hornet* geosocial networking application users from Latin American countries with limited PrEP data via an online survey completed between December 2018 and February 2019. A total of 718 *Hornet* users from 10 countries were included, of whom 72.1% reported PrEP awareness. Few (5.6%) were currently taking PrEP, though 32.1% intended to take PrEP in the subsequent six months. PrEP awareness was lower in 18–25-year-olds compared to 26+ (62.4% vs. 75.6%, aOR 0.67, [95% CI 0.46–0.97]), and higher among those living in larger versus smaller cities (74.4% vs. 58.8%, aOR 1.96, [95% CI 1.25–3.07]) or countries with at least partial versus no PrEP policy adoption (79.1% vs. 60.8%, aOR 2.20, [95% CI 1.56–3.12]). Intention to use PrEP was higher among PrEP-eligible respondents (51.8% vs. 29.6%, aOR 2.26,

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Conflicts of Interest: A.G. was the senior health innovation strategist at Hornet Gay Social Network at the time of data collection. The remaining authors (K.J.B., E.R.S, J.L., A.R., S.L.G., V.G.R., J.E.L., J.C., and I.W.H.) have no conflicts of interest to report.

[95% CI 1.26–4.07]) and those recently tested for a sexually transmitted infection (35.4% vs. 25.5%, aOR 1.58, [95% CI 1.01–2.48]). Efforts to expand PrEP use in Latin America should focus on national PrEP policy adoption, and research should explore barriers to awareness and use among young men who have sex with men.

Keywords

HIV; Prevention; Homosexual; South America; Men

Introduction

An estimated 41% of new HIV diagnoses in Latin America occur in men who have sex with men (MSM),[1] for whom pre-exposure prophylaxis (PrEP) has proven highly effective in preventing new HIV infection.[2] The 2017 Pan American Health Organization's (PAHO) HIV prevention report[3] included guidance on PrEP use, and the Implementation PrEP (ImPrEP) Project has been working to increase PrEP uptake in the region.[4] Despite increasing awareness of and willingness to use PrEP among MSM in Latin America,[5] as of early 2021 Brazil and Chile remain the only countries, excluding the Caribbean, where a national PrEP policy has been fully adopted.[6]

Brazil and Mexico account for more than half of the region's annual HIV diagnoses[1] and together have been the focus of much of the existing research exploring PrEP uptake in the region.[5, 7–9] There remains, however, a lack of literature describing PrEP uptake among MSM in other countries in Latin America. To fill this gap and inform efforts to scale-up PrEP access and use, this study explores awareness of, current use of, and intention to use PrEP among a regional sample of geosocial networking (GSN) application (app) users in Latin America.

Methods

Study Design

We conducted a web-based, cross-sectional survey using SurveyMonkey.[10] Respondents were a convenience sample of adult (≥18 years old) *Hornet Gay Social Network* (*Hornet*) GSN app users. *Hornet*, which is similar to other GSN apps like *Grindr,* is popular amongst Latin American gay, bisexual, and other MSM ≥18 years old and has been used as a recruitment tool for other similar surveys from the region.[5, 11, 12] The majority of *Hornet's* 25+ million global users are under 30 years old, and previous research in Brazil, Mexico, and Peru found that nearly 50% of MSM recruited through GSN apps reported daily app use for sexual encounters.[5]

Recruitment occurred between December 2018 and February 2019; three direct recruitment messages were sent to *Hornet* inboxes of Spanish-speaking app users from Latin America. No compensation was provided for participation. The 19-question survey was in Spanish (Supplemental File) and was adapted from a survey previously used in Europe, Central Asia, and Taiwan.[13, 14] After survey completion, respondents were provided with country-specific sexual health information. One response per internet protocol (IP) address was permitted.

For analysis, respondents from Spanish-speaking Latin American countries, excluding the Caribbean, with at least 10 HIV-negative respondents were included. As a result, only 10 Latin American countries are represented in this regional sample. We analyzed results from Mexico separately, as the large sample size of Mexican respondents permitted country-specific data analysis and interpretation.[15]

Variables

Demographics and Sexual Health—Participants were asked in which country and city they lived. Countries were dichotomized into those with partial or full PrEP policy adoption and those without any policy adoption. PrEP policy adoption was defined as one (partial) or both (full) of the following: national regulatory approval for at least one PrEP medication and/or national policy that makes PrEP available for populations at high risk of HIV-infection.[6] A city population size variable matched participants' cities with United Nations 2015 population data estimates.[16] Participants were also asked about their HIV status (positive, negative, or unknown), post-exposure prophylaxis (PEP) use and sexually transmitted infection (STI) testing and diagnoses in the last 12 months, and drug use during sex (chemsex) in the previous three months. Those reporting PEP use and/or an STI diagnosis in the previous 12 months were categorized as PrEP-eligible.[3]

PrEP Awareness, Use, and Intention to Use—PrEP awareness was assessed by asking, "Have you heard about PrEP?" Those responding "yes" were asked where they had heard about PrEP. Current PrEP use was assessed by asking, "Are you currently taking PrEP?" Lastly, intention to use PrEP was assessed through agreement with the following statement: "It is very likely that I will use PrEP in the next 6 months." Likert responses of "totally agree" and "agree" were combined into "Agree," and responses of "I don't know," "disagree," and "strongly disagree" were combined into "Do Not Agree."

Statistical Analysis

We analyzed three dichotomized outcome variables; awareness of PrEP, current use of PrEP, and intention to use PrEP. The "exposures" analyzed were age, country PrEP policy, city population size, PrEP eligibility, and recent STI testing. Associations with outcomes were analyzed using univariable (OR) and multivariable (aOR) odds ratio in logistic regression with 95% confidence intervals (CI). Individual regression models were created for each exposure. For each full model, age, country PrEP policy, and city population size were included as confounders, with additional confounding variables selected based on previous research.[5, 6, 17, 18] The confounders selected for each regression model are listed as footnotes below the table. Analysis was performed using Stata/IC 16.1.

Ethics

The University of California, Los Angeles (UCLA) Institutional Review Board approved this study. Participants provided consent via the first survey question. Same sex sexual behavior remains highly stigmatized in many of the countries in which the data were collected; as such, we did not collect any personal identifying information from participants other than IP address.

Results

A total of 4,461 *Hornet* GSN app users opened the survey and completed the consent question. After exclusions, 718 respondents from Latin America with self-reported HIV-negative serostatus were included in this analysis.

Table 1 presents the demographic, sexual health, and PrEP uptake data. Most respondents were from countries with at least partial PrEP policy adoption (Chile, Argentina, Peru, and Costa Rica; n=445, 62.0%), and lived in cities with a population of at least 500,000 (n=594, 82.7%). In the previous 12 months, 473 (65.9%) respondents had been tested for an STI, and 91 (12.7%) were eligible for PrEP. Regarding PrEP uptake, 518 (72.1%) reported having heard of PrEP, with the most common information source being the internet (n=274, 52.9%). Few (n=29, 5.6%) were currently taking PrEP, and 157 (32.1%) intended to take PrEP in the next six months. PrEP use (25.3% vs. 2.3%) and intention to use (51.8% vs. 29.6%) were both higher among those who were PrEP-eligible compared to those who were not.

Table 2 presents univariable and multivariable regressions estimating the associations with awareness of, current use of, and intention to use PrEP. Respondents aged 18–25 were less likely to have heard about PrEP compared to those aged 26+ (aOR 0.67 [95% CI 0.46–0.97]), while those living in a country with at least partial PrEP policy adoption (aOR 2.20 [95% CI 1.56–3.12]) or in a city with a population of at least 500,000 (aOR 1.96 [95% CI 1.25–3.07]) were more likely to have heard about PrEP. PrEP-eligible respondents had increased odds of both current use of (aOR 13.84 [95% CI 5.65–33.91]) and intention to use PrEP in the next six months (aOR 2.26 [95% CI 1.26–4.07]). Recent STI testing was associated with greater intention to use PrEP (aOR 1.58 [95% CI 1.01–2.48]).

Discussion

Our study augments the limited literature describing PrEP uptake in Latin American countries other than Brazil and Mexico. PrEP awareness among this sample of GSN app users was 72.1%, but it was significantly higher among respondents from countries with partial or full PrEP policy adoption (79.1%). This frequency is similar to awareness among respondents from Mexico (81.3%) in 2018–2019,[15] a country with partial PrEP policy adoption, but higher than the pooled awareness of respondents from Brazil, Mexico, and Peru (64.9%) in 2018[5] or Brazil (61.3%) in 2014–2015.[7] These differences likely reflect timing of data collection,[12] geographic variation,[5, 12] and varied national guidelines on PrEP.[6] However, PrEP awareness in the region has certainly increased from 10.4% in 2012.[19]

PrEP awareness was significantly lower in respondents between 18 and 25 years old, similar to results from Mexico,[15] Brazil,[5, 7] and the United States.[20] While several studies have sought to address PrEP utilization among young MSM (YMSM), including YMSM within the ImPrEP countries,[21, 22] more data are needed from the countries represented in this study. In addition to age, living in a city with a population of at least 500,000 conferred significantly higher odds of having heard about PrEP, which was similarly demonstrated in respondents from Mexican cities with a population of at least 1.5 million.[15] This is

likely due to greater engagement with gay communities and lower levels of homophobia and PrEP-associated stigma,[23] suggesting that efforts to increase PrEP uptake across Latin America should consider additional ways to disseminate information to less populated areas.

Current PrEP use remains low; among PrEP-aware respondents, 5.6% were currently taking it, which is lower than 19.8% in Brazil in 2020,[24] but comparable to 3.5% in Mexico[15] in 2018–2019, 2.3% in Brazil in 2018,[5] and 2.0% in Peru in 2018.[5] While the small number of respondents currently taking PrEP limited our ability to study associations, PrEP eligibility was significantly associated with current PrEP use in this sample, which is encouraging. Considering STI diagnosis and PEP use were the variables used to categorize PrEP eligibility, this association may indicate increased perceived risk among this population subset or increased interaction with healthcare providers who may provide PrEP information and prescriptions. The small number of those reporting current PrEP use were not PrEP eligible per our categorization may be due to our lack data on condomless anal intercourse or HIV-positive sexual partners, which are additional eligibility criteria for PrEP,[3] or to individuals acquiring PrEP via private providers or the internet.

In contrast to other studies of PrEP uptake in the region, which surveyed willingness to take PrEP,[5, 7, 9] we asked about intention to use PrEP in the subsequent six months. Previous research has explored the differences between hypothetical willingness and behavioral intention, with intention capturing respondents closer to acquiring and taking PrEP.[25] Among those aware of and not currently taking PrEP, 32.1% agreed or strongly agreed that they would likely take PrEP in the coming six months, similar to data from Mexico (34.2%)[15] but notably lower than the willingness to use PrEP reported in pooled data from Brazil, Mexico, and Peru (64.2%).[5] We found that intention to use PrEP was significantly associated with PrEP eligibility and recent STI testing. Like our conclusions about PrEP use, this may be due to an increased exposure to PrEP information in sexual healthcare settings or increased perceived risk of acquiring HIV. However, intention to use PrEP did not guarantee that respondents had access to it, since at the time of data collection PrEP access was mostly limited to research studies, private providers, and/or the internet.[26]

There are several limitations to this research. Although *Hornet* is marketed toward gay men, it is estimated that up to five percent of users are transgender, though our survey did not include gender identity nor sexual orientation questions. As a regional convenience sample with small sample sizes from multiple countries, these data are also not necessarily representative of MSM communities across Latin America. Additionally, recruiting from a GSN app may have introduced bias by selecting respondents of higher socioeconomic status with access to a device compatible with GSN apps. GSN app users also tend to have higher utilization of prevention services such as STI and HIV testing,[27] and thus may not be representative of the larger MSM population. However, given the limited research on PrEP use from the countries represented in this sample, we believe that these data provide important information for a region working toward increased PrEP uptake. While versions of this survey have been used previously,[13, 14] it has not been formally validated. Our survey did not address sexual practices, and consequently did not have information on condomless anal intercourse or sexual partners' HIV status, which are additional eligibility criteria for PrEP.[3] This analysis excludes PLWH; however, our survey did not include a question on

the timing of the most recent HIV test, and some respondents who indicated they were HIV-negative may have acquired HIV since their most recent test.

Conclusion

Efforts to increase PrEP use in Latin America are underway, but previous research has focused on only a few countries in the region. While PrEP awareness among GSN app users is high, particularly in countries with at least partial PrEP policy adoption, current use remains low. While nearly one-third of respondents intended to take PrEP in the subsequent six months, access in Latin America remains limited. Efforts to scale up PrEP utilization in the region should build upon existing systems for PrEP distribution, while working toward PrEP policy adoption in countries where it is lacking. Future research should also explore barriers and facilitators to PrEP use among YMSM and those living in less populated areas.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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Table 1:

Demographic, sexual health, and PrEP uptake data from a regional sample of Latin American GSN app users in 2018–2019

Variable	Total, n (%) n=718
Age, years	
18–25	189 (26.3)
26–30	146 (20.3)
31–40	213 (29.7)
41+	170 (23.7)
Country	
Chile [a]	234 (32.6)
Colombia	190 (26.5)
Argentina [a]	127 (17.7)
Peru [a]	60 (8.4)
Ecuador	24 (3.3)
Costa Rica [a]	24 (3.3)
Venezuela	21 (2.9)
Uruguay	17 (2.4)
Guatemala	11 (1.5)
Paraguay	10 (1.4)
City Population Size[b]	
≥ 500,000	594 (82.7)
< 500,000	102 (14.2)
HIV Status[c]	
Negative	614 (85.5)
Status Unknown	104 (14.5)
Chemsex[d,e]	27 (3.8)
STI testing[f,g]	473 (65.9)
STI diagnosis[f,g]	
Yes [h]	62 (8.6)
Not sure	26 (3.6)
No	630 (87.7)
PEP use[f,h]	33 (4.6)
PrEP eligible[h]	91 (12.7)
PrEP awareness	518 (72.1)

Variable	Total, n (%) n=718
PrEP information source[i]	
Internet	274 (52.9)
GSN/Dating applications	94 (18.2)
Friends	60 (11.6)
Doctor	36 (7.0)
Other	54 (10.4)
PrEP use[i]	29 (5.6)
Intention to use PrEP[j]	
Agree	157 (32.1)
Do not agree	332 (67.9)

[a]Countries with partial or full adoption of PrEP policy; includes regulatory approval of PrEP medications and PrEP availability for eligible populations under national policy [6]

[b]Based on United Nations population data estimates for 2015;[12] data unavailable for N=22 (3.1%) of reported cities

[c]Respondents living with HIV (n=123) were removed from analysis; there were no questions pertaining to timing of recent HIV testing

[d]Previous three months

[e]Survey question specified the following drugs: Mephedrone, GHB/GBL, Ketamine, Methamphetamine. GHB and GBL stand for gamma hydroxybutyrate and gamma butyrolactone, respectively

[f]Previous twelve months

[g]Respondents were asked about sexually transmitted infections in general; no specific infection was listed

[h]Those reporting PEP use and/or STI diagnosis in the previous 12 months were categorized as PrEP-eligible

[i]Includes only those who had heard or PrEP, n=518

[j]Includes only those who had heard of PrEP and were not currently taking PrEP, n=489

Abbreviations: PrEP (pre-exposure prophylaxis), GSN (geosocial networking), HIV (human immunodeficiency virus), STI (sexually transmitted infection), PEP (post-exposure prophylaxis)

Table 2:

Univariable and multivariable regressions predicting awareness of, current use of, or intention to use PrEP among a regional sample of Latin American GSN app users in 2018–2019

Variable	Awareness of PrEP n=718				Current Use of PrEP n=518 [a]				Intention to Use PrEP n=489 [a]			
	Yes n (%)	No n (%)	OR [95% CI]	aOR [95% CI]	Yes n (%)	No n (%)	OR [95% CI]	aOR [95% CI]	Agree n (%)	Do Not Agree n (%)	OR [95% CI]	aOR [95% CI]
Age[d]												
18–25	118 (62.4)	71 (37.6)	**0.54 [0.38–0.76]**	**0.67 [0.46–0.97]**	5 (4.2)	113 (95.8)	0.69 [0.26–1.86]	0.70 [0.23–2.07]	36 (31.9)	77 (68.1)	0.99 [0.63–1.55]	1.05 [0.66–1.69]
26+	400 (75.6)	129 (24.4)	Ref.	Ref.	24 (6.0)	376 (94.0)	Ref.	Ref.	121 (32.2)	255 (67.8)	Ref.	Ref.
Country PrEP policy[e]												
Partial/full adoption	352 (79.1)	93 (20.9)	**2.44 [1.75–3.41]**	**2.20 [1.56–3.12]**	20 (5.7)	332 (94.3)	1.05 [0.47–2.36]	0.71 [0.28–1.78]	114 (34.3)	218 (65.7)	1.39 [0.91–2.10]	1.33 [0.86–2.06]
No policy	166 (60.8)	107 (39.2)	Ref.	Ref.	9 (5.4)	157 (94.6)	Ref.	Ref.	43 (27.4)	114 (72.6)	Ref.	Ref.
City population size[f]												
≥ 500,000	442 (74.4)	152 (25.6)	**2.04 [1.32–3.15]**	**1.96 [1.25–3.07]**	23 (5.2)	419 (94.8)	0.60 [0.22–1.65]	0.42 [0.13–1.33]	130 (31.0)	289 (69.0)	0.73 [0.41–1.30]	0.66 [0.36–1.20]
< 500,000	60 (58.8)	42 (41.2)	Ref.	Ref.	5 (8.3)	55 (91.7)	Ref.	Ref.	21 (38.2)	34 (61.8)	Ref.	Ref.
PrEP eligible[b,g]												
Yes	75 (82.4)	16 (17.6)	**1.95 [1.10–3.43]**	1.44 [0.80–2.60]	19 (25.3)	56 (74.7)	**14.69 [6.50–33.18]**	**13.84 [5.65–33.91]**	29 (51.8)	27 (48.2)	**2.56 [1.46–4.50]**	**2.26 [1.26–4.07]**
No	443 (70.7)	184 (29.3)	Ref.	Ref.	10 (2.3)	433 (97.7)	Ref.	Ref.	128 (29.6)	305 (70.4)	Ref.	Ref.
Recent STI testing[c,h]												
Yes	354 (74.8)	119 (25.2)	**1.47 [1.05–2.06]**	1.24 [0.86–1.80]	26 (7.3)	328 (92.7)	**4.25 [1.27–14.26]**	1.66 [0.44–6.20]	116 (35.4)	212 (64.6)	**1.60 [1.05–2.44]**	**1.58 [1.01–2.48]**
No	164 (66.9)	81 (33.1)	Ref.	Ref.	3 (1.8)	161 (98.2)	Ref.	Ref.	41 (25.5)	120 (74.5)	Ref.	Ref.

ORs and aORs had a p value of < 0.05

[a]Current use of PrEP includes only those who had heard or PrEP; intention to use PrEP includes only those who had heard of PrEP and were not currently taking PrEP

[b] Those reporting PEP use and/or STI diagnosis in the previous 12 months were categorized as PrEP-eligible

[c] Previous 12 months

[d] Multivariable models for age included the following confounders: country PrEP policy, city population size, and PrEP eligibility

[e] Multivariable models for country PrEP policy included the following confounders: age, city population size, recent STI testing, chemsex, and doctor as source of PrEP information

[f] Multivariable models for city population size included the following confounders: age, country PrEP policy, recent STI testing, PrEP eligibility, chemsex, and doctor as source of PrEP information

[g] Multivariable models for PrEP eligible included the following confounders: age, city population size, country PrEP policy, recent STI testing, chemsex, and doctor as source of PrEP information

[h] Multivariable models for recent STI testing included the following confounders: age, city population size, country PrEP policy, HIV status, PrEP eligibility, chemsex, and doctor as source of PrEP information

Abbreviations: PrEP (pre-exposure prophylaxis), GSN (geosocial networking), OR (odds ratio), aOR (adjusted odds ratio), CI (confidence interval), STI (sexually transmitted infection), Ref. (reference variable)