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HIV prevalence, sexual behaviors, and engagement in HIV medical care among an online sample of sexually active MSM in Venezuela

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Abstract

In Venezuela, members of a social and sexual partner-networking site for MSM completed an online survey regarding sexual behaviors and HIV medical care. Among the 3,175 respondents, self-reported HIV prevalence was 7.8%. Of participants living with HIV, 73.2% reported taking antiretroviral medication and, 56.6% reported complete adherence within the past month. Participants living with HIV were more likely to be older (aOR=1.04 per one-year increase in age, 95% CI: 1.02, 1.06) and diagnosed with an STI in the previous year (aOR=32.35, 10.2). These data provide further understanding of the HIV epidemic among MSM in Venezuela, and potential targets for HIV prevention interventions.

Keywords

Venezuela; men who have sex with men; HIV; STI; Latin America

INTRODUCTION

In Latin America, men who have sex with men (MSM) have an estimated 30 times greater odds of HIV compared to the general population (1-5). Moreover, the disproportionate vulnerability for HIV infection among MSM is reported to be higher in Latin America and the Caribbean than in any other region of the world (4). Country-specific data is necessary to

inform HIV related research, policy and programmatic work, yet an in-depth understanding of the epidemiology of HIV among key populations is limited for some Latin American countries.

With an estimated generalized HIV prevalence of 0.6% among adults aged 15-49, the República Bolivariana de Venezuela (Venezuela) has one of the highest HIV prevalences in the Andean Region and third highest in Latin America (1,3,6). As such, characterizing epidemiologic profiles of HIV and understanding factors related to engagement in HIV medical care among those most impacted by the epidemic is important for curbing continued HIV spread. Key populations in Venezuela are believed to be MSM and female sex workers (FSW) (3,6-8). Compared to other countries in Latin America where evidence suggests heightened vulnerability to HIV among transgender women and sex workers in addition to MSM, there is a dearth of research to support these claims in Venezuela (9). The scarcity of evidence regarding HIV risk factors for key populations may be due in part to the social, political, and economic climate in Venezuelan over the past few decades (10,11). Specifically, the change in political ideology and growth in economic and social instability may have posed unique barriers to describing behavioral and other health related characteristics associated with HIV vulnerability in Venezuela (12).

To address this gap, members of one of the largest online social and sexual partner seeking websites for MSM were invited to participate in an online survey regarding sexual behaviors and engagement in HIV medical care in Venezuela. Due to an increase in popularity of online and mobile applications for social and sexual partner seeking among MSM, there are over six million active MSM users globally (13), these sites provide an opportunity to recruit members of a group potentially at high risk for HIV with relative ease where conventional methods may not be feasible. Seeking to contribute to the limited available data regarding MSM in Venezuela, here we describe the HIV testing behaviors, prevalence, and engagement in medical care among sexually active MSM in Venezuela.

METHODS

Participants and Procedures

Between October and November 2012, an anonymous online survey was administered to members of a social and sexual networking site for MSM in Spanish- and Portuguese-speaking countries and territories in Latin America and the Caribbean, and in Spain and Portugal. The present analysis was restricted to individuals who reported currently living in Venezuela, who reported both a male sex assigned at birth and current male gender identity (i.e., cisgender men). To protect anonymity of participants the website name cannot be disclosed and IP addresses were not recorded in the database. Nonetheless, to minimize the likelihood that the same individual would complete the survey more than once, the survey software (Qualtrics) was programmed to only allow one response per IP address. Although it is possible that a participant could have completed the survey more than once from a different IP address, the length of the survey and lack of incentive for participation make this unlikely. An email recruitment message was sent to all users at the time of the study that had indicated their residence was in Latin America. The recruitment email provided a description of the study and included a link to the study website. Individuals who visited the

study website were able to read a more detailed description of the study procedures and, if interested, proceed to the study consent form. Those who decided to participate were directly sent from the consent form to the study questionnaire, which took approximately 30 minutes to complete. All participants were 18 years of age. Detailed methods have been described elsewhere (14). In Venezuela specifically, a total of 20,342 emails were opened, 4,935 individuals clicked the provided link to the survey, and 3,175 completed the survey. Ethical approval was obtained from the Institutional Review Board at [removed for review].

Measures

Demographics included age, urbanicity (coded as currently living in an urban versus rural area), and education (coded as at least some university-education or above versus less than university education). Given that the original survey included a wide range of countries and economies, a relative measure of income/class was chosen to assess socioeconomic status (coded as no income, low income/low class, middle income/middle class, high income/upper class). Sexual orientation was obtained by asking participants to select terms that best described their sexual orientation and responses were coded as homosexual/gay identity versus any other sexual orientation. Sexual role was measured by asking participants to describe their sexual role during intercourse and participants were able select multiple roles, if applicable. For this analysis, if participants endorsed top (i.e., insertive sexual role) and not bottom (i.e., receptive sexual role) and not versatile (i.e., endorsing both insertive and reception sexual roles), they were coded as primarily “top”, similar coding was conducted for bottom, and versatile sexual roles.

History of HIV/STI Testing and Diagnosis was measured by asking participants to self-report if they had ever been tested for HIV and if they had ever been told by a healthcare professional that they had HIV, if they had ever been tested for STIs and if they had been told by an healthcare provider that they had syphilis, gonorrhea, chlamydia, HPV/genital warts, or genital herpes, or if they had ever been told by a healthcare professional that they had Hepatitis A, Hepatitis B, or Hepatitis C. Individuals who reported that they did not know or preferred not to respond to questions related to HIV and STI were excluded from the analysis.

Sexual Behavior was measured by asking participants if they had been sexually active in the previous 3 months, how many male partners they had in the past 3 months, and how often they used condoms with these partners in the same time period. Participants who reported any condomless anal intercourse in the previous 3 months were coded as having engaged in condomless anal intercourse.

HIV Medical Care data was collected among participants who reported being diagnosed with HIV. Participants were asked if they were currently engaged in medical care for their HIV, if they were currently prescribed antiretroviral therapy (ART), and adherence for those prescribed ART. Using a scale from 0% to 100%, participants were asked to rate their own level of adherence in the previous month.

Outcomes—The primary outcomes of interest were 1) having ever been HIV tested, 2) self-reporting having been diagnosed with an HIV infection, and 3) current engagement in

HIV-related medical care among those with self-reported HIV infection. Participants were asked if they had ever had an HIV test. Participants who responded “yes” were then asked if a healthcare professional had ever diagnosed them with HIV infection; those who responded “yes” were coded as living with HIV. Those who responded “no” were coded as not living with HIV. Individuals who reported no history of HIV testing, or who refused to answer questions regarding HIV serostatus were not included in analyses of HIV serostatus. Finally, participants who self reported living with HIV were asked if they were currently being seen by a doctor for HIV treatment. Those who responded “yes” were coded as currently engaged in HIV-related medical care.

Data Analysis

Proportions for categorical variables and means and standard deviations for continuous variables were calculated overall and by HIV serostatus of respondent. Separate bivariate logistic regression models were used to assess the associations between each outcome (i.e., 1) having ever been tested for HIV; 2) having been diagnosed with HIV; and 3) engagement in HIV medical care among those reporting HIV-infection) with demographic and sexual behavior variables, including age, urbanicity, sexual orientation (coded as gay/homosexual or other sexual orientation), education, income, STI diagnosis in the past year, sexual role (top/insertive, bottom/receptive, or versatile), and condomless anal intercourse in the previous 3 months.

Then, three separate multivariable logistic regression models were constructed using backwards selection with a *P*-value of 0.2 as the cutoff to assess factors associated with: 1) having ever been tested for HIV; 2) having been diagnosed with HIV; and 3) engagement in HIV medical care among those reporting HIV-infection. The backward selection procedure begins with all candidate variables in the model, and removes them one by one until all final variables have a *P*-value of 0.2 or less. Models assessing factors related to HIV serostatus and engagement in HIV medical care were restricted to individuals with a history of HIV testing. Because the focus is on strength of associations, analyses were not adjusted for multiple comparisons (15). A complete case analysis was conducted for all analyses. All analyses were conducted in Stata 12.0 (StataCorp, College Station, TX).

RESULTS

Table 1 list the sample characteristics of the 3,098 respondents including demographics, sexual behaviors and HIV and STI testing history. Participants who self-reported living with HIV were significantly older, mean of 33.3 years (SD 9.0) compared to 31.2 (SD 9.3) for HIV uninfected ($p=0.003$) men. Those who self-reported living with HIV were more likely to report having ever been diagnosed with any STI (27.9%) compared to 10.6% among participants not living with HIV ($p<0.001$). Among participants who self-reported living with HIV a significantly higher prevalence of the following STIs was also reported: Syphilis (7.4% versus 3.1%; $p=0.005$), HPV (15.8% versus 4.2%; $p<0.001$), HSV (6.3% versus 2.2%; $p=0.002$) and Hepatitis B (5.9% versus 1.2%; $p<0.001$). Prevalence of any serodiscordant condomless anal sex was significantly higher among participants self-

reporting an HIV status as compared to those who did not (26.8% versus 11.3%, respectively; $p<0.001$).

Of those who self-reported living with HIV ($N=186$), 96.2% answered questions related to their HIV medical care. Of these, 135 (75.4%) reported being engaged in HIV medical care, 131 (73.2%) were currently taking antiretroviral medication (ART), and 73 (56.6%) of those who were on ART reported 100% adherence to their antiretroviral regimen in the past month. Forty-four (42.3%) participants engaged in HIV medical care reported condomless anal intercourse in the previous 3 months compared to 15 (48.4%) participants who did not report engagement in HIV medical care ($p=0.68$). Participants who self-reported currently taking ART reported less frequent condomless anal intercourse as compared to participants who reported not being currently on ART (42.0% versus 48.6%, respectively ($p=0.56$). Similarly, condomless anal intercourse is less frequently reported among participants who self-reported 100% ART adherence in the past month ($N=19$, 35.9%) compared to those who self-reported less than 100% ART adherence in the past month ($N=22$, 47.8%; $p=0.23$).

Table 2 lists results of bivariate and multivariable models assessing factors associated with self-reported HIV testing history, living with HIV, and engagement in HIV medical care. In a final multivariable model, factors associated with increased odds of reporting having had an HIV test (*Model 1*) included older age (aOR=1.08, 95% CI: 1.06, 1.10), homosexual or gay sexual orientation (aOR=2.10, 95% CI: 1.59, 2.79), middle income compared to no income (aOR=1.80, 95% CI: 1.11, 2.90), and an STI diagnosis in the past year (aOR=2.37, 95% CI: 1.37, 4.14).

Factors associated with increased odds of self-reporting living with HIV (*Model 2*) included older age (aOR=1.04 per one-year increase in age, 95% CI: 1.02, 1.06), homosexual or gay sexual orientation (aOR 4.88, 95% CI 2.35, 10.2), STI diagnosis in the previous year (aOR=3.26, 95% CI 2.11, 5.04), bottom/receptive sexual role (versus top/insertive) (aOR=2.85, 95% CI: 1.38, 5.88), and versatile sexual role (versus top/insertive) (aOR=2.18, 95% CI: 1.32, 4.20).

Finally, we assessed factors associated with increased odds of self-reported engagement in HIV medical care (*Model 3*). These factors included older age (aOR=1.18 per one-year increase in age, 95% CI: 1.09, 1.27) and an STI diagnosis in the previous year (aOR=4.91, 95% CI: 1.37, 17.6).

DISCUSSION

To our knowledge, this is the first study to assess self-reported HIV prevalence, sexual behaviors and engagement in HIV medical care among MSM in Venezuela (9). These preliminary data provide an important contribution to the limited available literature in Venezuela and support the continued need for HIV and STI epidemiologic research among MSM in this context. Moreover, with over 3,000 respondents, our study also provides support for the use of online surveying as a low-cost and novel method to access often stigmatized members of a population at high-risk for HIV acquisition. This sampling technique may be particularly salient in a country with political and/or economic constraints,

such as Venezuela, which have previously presented barriers for studies seeking to assess sexual health among MSM.

Our results are generally consistent with a well-established epidemiologic profile of HIV and associated factors among MSM in Latin America (1,3,4,6,9). For example, sexual role was associated with increased odds of self-reported HIV infection but not with increased odds of HIV testing. These findings support previous work in Latin America highlighting the relevance of sexual role in HIV transmission networks (1,2,5,6). Notably, education and income were only significantly associated with increased odds of HIV testing practices and not HIV infection itself. This may be because our study included men with Internet access, potentially representing a higher socioeconomic status group. However, these findings also suggest that factors associated with HIV testing and HIV prevalence may be qualitatively different. Although there may be similarities between HIV testing and vulnerability to HIV, among our sample, they are characterized as distinct phenomena with different associated factors. The heterogeneity within this sample of MSM also support previous literature in Latin America bringing attention to the fact that the population included in the 'MSM' category is a very diverse group (16,17). Jointly, these results highlight that there is a need to address a range of factors that contribute to testing and engagement in HIV medical care to ameliorate vulnerability to HIV.

In contrast to studies reporting HIV prevalence around 15% among MSM in Central and South America (1), our study reports a 7.8% HIV prevalence among Venezuelan MSM. The lower self-reported HIV prevalence in our sample may point to the success of the Venezuelan National HIV/AIDS Program, operational for the past five years, in providing antiretroviral therapy free of charge (7,18,19). Though scarce information exists on engagement in HIV medical care among MSM, the available literature indicates that among the general population currently living with HIV more than 50% are prescribed treatment (18,20). Similarly, over three-fourths of MSM in our sample who reported living with HIV were engaged in HIV-related medical care, further suggesting the strength of existing comprehensive HIV services. However, since this study presents only preliminary data of a specific subsample of MSM, reserved enthusiasm should be employed when pointing to these results as evidence of the successes of current efforts of HIV treatment and care in Venezuela.

MSM who self-reported living with HIV disclosed three times as many recent STI diagnoses as compared to HIV uninfected MSM. However, it is likely that individuals who are engaged in care are screened more frequently for STIs, and therefore participants engaged in care were more likely to report an STI diagnosis. Nonetheless, a higher proportion (~50%) of the participants who reported living with HIV also described inconsistent condom use in past three months compared to those who are not living with HIV. These results parallel similar associations between STIs and HIV co-infection documented in South America (21-24), suggesting that HIV transmission among MSM in this region is associated with STI co-transmission (25). Accordingly, in this context, particular attention should be paid to secondary prevention efforts to also incorporate STI screening and treatment to mitigate increased HIV transmission and acquisition risk associated with co-occurring STIs.

For participants who were prescribed ART but non-adherent in the past month, slightly less than half were engaging in condomless intercourse. Condomless anal intercourse among individuals who are living with HIV but are not fully adherent to their ART regimen may be of public health concern due to decreased likelihood of viral suppression (26). As a result, secondary prevention interventions must incorporate adherence counseling and support to reduce HIV transmission.

The results of this study must be interpreted in the context of several limitations. Our sample is comprised of MSM recruited from an online social and sexual networking website for MSM and as such, results may not be generalizable to other Venezuelan MSM. As such, there may have been characteristics of non-respondents that would make them different than respondents and would limit generalizability. All collected data was self-reported by participants and may be subject to bias, including social desirability bias. HIV serostatus and history of STIs was determined based on self-report, and participants were not tested for HIV or STIs. Participants may be affected by social desirability bias and thus potentially underreport HIV and STI diagnoses, and some of the results may be reflective of access to HIV and STI screening services. As expected given that this was an online, self-administered survey, there was attrition that resulted in missing data for some variables. However, this attrition rate did not differ greatly from previous online surveys (27). Additionally because these analyses were restricted to individuals who reported natal sex as male and self-identified with a male gender identity (i.e., cisgender men), this paper provides a limited epidemiologic profile of key populations in Venezuela. This approach was chosen because of the small number of transgender and/or gender nonconforming individuals that participated in our study. Though this analysis was restricted to MSM, it is nonetheless important to highlight that transgender women may also be members of a population at heightened vulnerability to HIV in South America (9,28,29). Constituting a different population compared to cisgender MSM, future work is needed to assess factors most salient for improving HIV prevention and access to medical care among transgender women in Venezuela.

Despite these limitations, given the current lack of data on sexual behaviors and HIV prevalence among Venezuelan MSM, our analysis provides a much needed preliminary assessment of the aspects of the HIV continuum of care among MSM in Venezuela and highlights that care is not a continuous, uninterrupted flow from testing to treatment. Rather, barriers and motivations at each step of the process are likely to be distinct, calling for interventions at each step to address the HIV epidemic in Venezuela. Highlighting the heterogeneity of MSM in our sample, future epidemiological research in this area would benefit from varied recruitment strategies to better inform our understanding of the HIV epidemic in Venezuela and implications for prevention interventions to address varied needs among Venezuelan MSM. The results of this study further highlight the need to understand the mechanisms by which Venezuelan MSM engage in behaviors that place them at risk for HIV, and how socioeconomic and demographic factors affect their vulnerability.

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Table 1

Descriptive characteristics of full sample of MSM who use the Internet to find partners in Venezuela and by self-reported serostatus

Characteristic	HIV + (N=188)	HIV – (N=2,663)	Total (N=2,851)
Age (years, mean (SD))	33.4 (9.0)	30.3 (9.3)	30.5 (9.3)
Urban-dwelling	181 (96.3%)	2,519 (94.6%)	2,700 (94.7%)
Sexual orientation ²			
Homosexual/gay	175 (93.1%)	1,853 (70.0%)	2,028 (71.5%)
Bisexual	13 (6.9%)	675 (25.5%)	688 (24.3%)
Heterosexual	0	21 (0.8%)	21 (0.7%)
Unsure	0	77 (2.9%)	77 (2.7%)
Other	0	21 (0.8%)	21 (0.7%)
University education or above	156 (83.4%)	2,128 (80.4%)	2,284 (80.6%)
Income			
No income	7 (3.9%)	162 (6.3%)	169 (6.2%)
Low income	15 (8.2%)	261 (10.2%)	276 (10.1%)
Middle income	151 (83.0%)	2,005 (78.5%)	2,156 (78.8%)
High income	9 (5.0%)	126 (4.9%)	135 (4.9%)
Any sexually transmitted infection diagnosis, past 12 months ²	51 (27.6%)	256 (9.8%)	307 (10.9%)
Sexual role			
Top	15 (8.7%)	487 (18.8%)	502 (18.1%)
Bottom	46 (26.6%)	458 (17.6%)	504 (18.2%)
Versatile	112 (64.7%)	1,651 (63.6%)	1,763 (63.7%)
Any unprotected anal sex in the past 3 months	59 (43.4%)	1,041 (52.9%)	1,100 (52.3%)

¹Participants were instructed to “check all that apply”, percentages will not add up to 100%;

²Including syphilis, gonorrhea, chlamydia, human papilloma virus, and/or herpes simplex virus

TABLE 2
Factors associated with self-reported HIV testing, living with HIV, and engagement in HIV medical care among Venezuelan MSM

	HIV Testing		Participants self-reporting living with HIV		Engaged in HIV Medical Care	
	Bivariate OR (95% CI)	Multivariable ¹ aOR (95% CI)	Bivariate OR (95% CI)	Multivariable ¹ aOR (95% CI)	Bivariate OR (95% CI)	Multivariable ¹ aOR (95% CI)
Age (per year)	1.10 (1.08 to 1.11)	1.08 (1.06 to 1.10)	1.02 (1.01 to 1.04)	1.04 (1.02 to 1.06)	1.17 (1.10 to 1.24)	1.18 (1.09 to 1.27)
Urban (vs. rural)	1.90 (1.30 to 2.79)	**	1.27 (0.58 to 2.78)	**	1.26 (0.24 to 6.72)	**
Homosexual/gay identity (vs. any other sexual orientation)	1.80 (1.45 to 2.23)	2.10 (1.59 to 2.79)	5.21 (2.94 to 9.23)	4.88 (2.35 to 10.2)	3.45 (1.05 to 11.3)	**
Education (university or above vs. secondary or below)	2.49 (1.98 to 3.13)	1.32 (0.94 to 1.84)	1.00 (0.67 to 1.49)	**	2.05 (0.89 to 4.74)	**
<i>Income</i>						
No income	Ref	Ref	Ref	Ref	Ref	**
Low income	2.31 (1.50 to 3.55)	1.72 (0.96 to 3.11)	1.06 (0.42 to 2.67)	**	1.50 (0.20 to 11.54)	
Middle income	4.01 (2.86 to 5.62)	1.80 (1.11 to 2.90)	1.24 (0.57 to 2.72)		1.62 (0.28 to 9.22)	
High income	4.30 (2.34 to 7.91)	1.99 (0.88 to 4.54)	1.17 (0.42 to 3.25)		4.0 (0.27 to 58.56)	
Diagnosed with an STI in the last year ²	2.58 (1.62 to 4.12)	2.38 (1.37 to 4.14)	3.25 (2.29 to 4.62)	3.26 (2.11 to 5.04)	2.32 (0.96 to 5.64)	4.91 (1.37 to 17.6)
<i>Sexual role</i>						
Top	Ref	**	Ref	Ref	Ref	**
Bottom	0.72 (0.51 to 1.01)		3.80 (2.05 to 7.02)	2.85 (1.38 to 5.88)	0.80 (0.19 to 3.34)	
Versatile	1.01 (0.76 to 1.34)		2.38 (1.35 to 4.20)	2.18 (1.13 to 4.20)	0.84 (0.22 to 3.23)	
Any condomless anal intercourse in past 3 months	0.67 (0.52 to 0.87)	0.76 (0.57 to 1.00)	0.72 (0.51 to 1.03)	0.78 (0.53 to 1.13)	0.78 (0.35 to 1.72)	**

Abbreviations: OR, odds ratio; aOR adjusted odds ratio; CI, confidence interval; STI, sexually transmitted infection;

** Indicates not included in final multivariable model

Final multivariable logistic regression model selected via backwards elimination with a P -value cutoff of 0.2

²Including syphilis, gonorrhea, chlamydia, human papilloma virus, and/or herpes simplex virus