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## HIGH SUBSTANCE USE AND HIV RISK BEHAVIOR AMONG YOUNG ARGENTINE MEN WHO HAVE SEX WITH MEN

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### Abstract

In the United States young men who have sex with men (YMSM) have higher rates of substance use, higher HIV incidence, and less frequent HIV testing than their heterosexual counterparts and older MSM. Less is known about comparable populations in Latin America. As part of an epidemiological study, MSM were recruited through Respondent Driven Sampling in the metropolitan area of Buenos Aires, Argentina and answered a computerized behavioral survey. From the total of 500 MSM enrolled, a sub-sample of 233 aged 18 to 25 was analyzed. The sample was concentrated among lower socioeconomic strata, and only 16% identified as gay. Nearly half reported male, female, and transvestite sexual partners. Reported substance use was widespread ranging from 61% for marijuana to 20% for *pasta base* (cocaine sulfate). Seventy percent of the sample had never been tested for HIV infection; 3% tested positive for HIV and 8% for syphilis during the study.

### RESUMEN

En los Estados Unidos, los hombres jóvenes que tienen sexo con hombres (JHSH) tienen tasas de uso de sustancias más altas de los HSH de mayor edad y de sus pares heterosexuales, además de una mayor incidencia del VIH y menor frecuencia de hacerse el examen del VIH. De las poblaciones comparables en América Latina, se conoce menos. Como parte de un estudio epidemiológico, 500 HSH fueron reclutados a través del método de Muestreo Dirigido por los Participantes (en inglés RDS) en el área metropolitana de Buenos Aires, Argentina y contestaron una encuesta conductual computarizada. Una submuestra de 233 hombres de 18 a 25 años de edad fue analizada. Se concentró en estratos socioeconómicos más bajos y sólo el 16% se identificaron como gay. Casi la mitad de la submuestra reportó haber tenido parejas sexuales masculinas, femeninas y travestís. El uso de sustancias fue común, desde 61% consumidores de marihuana

hasta 20% sulfato de cocaína (*pasta base*). El 70% de la muestra nunca se había hecho una prueba para el VIH: 3% resultaron positivos para VIH y 8% para sífilis en el transcurso del estudio.

## Keywords

MSM; YMSM; HIV; substance use; sexual risk; Argentina

## INTRODUCTION

Research in the U.S. has revealed high rates of alcohol and drug use among young men who have sex with men (YMSM) [1], and a disproportionate risk of substance use compared to their older MSM peers [2] and their heterosexual counterparts [3–6]. In a study of 814 YMSM aged 16–25 in six U.S. cities [7], respondents reported high rates of use of marijuana (58.6%), poppers (28.9%), cocaine (26.4%), amphetamines (18%), and hallucinogens (39.6%) as well as heavy drinking (13.8%). In another study of 3,492 YMSM in seven U.S. cities, 66% of the 15- to 22-year-olds reported illicit drug use in the six months prior to the interview, 29% used drugs once a week or more, and 28% reported polydrug use [8]. Among YMSM, risk factors for substance use include physical and/or sexual abuse [8], sexual identity [8–10], degree of “outness” [8], mental health [10–12], and discrimination [8,11], while loneliness has also been correlated with substance use among adult MSM [13–15].

High rates of alcohol and drug use raise concerns not only about substance abuse sequelae but also for its association to HIV risk behavior [16–24]. Data from the 2008 National HIV Behavioral Surveillance System (NHBS) conducted in 21 cities showed 10.5% HIV prevalence among MSM respondents ages 18 to 24 [17]. Similarly, in a multiyear analysis of infection rates in New York City, HIV incidence among MSM under 30 was 70% higher than among those 30 and older; for very young MSM (under 20), incidence was over twice that of the overall MSM sample (5.7 vs. 2.4 per 100 person-years) [25].

Low rates of HIV testing among this population are another concern. Although at least annual HIV testing is recommended for sexually active MSM, in the six-city U.S. study reported by MacKellar et al. [26], 41% of the 439 YMSM with unrecognized HIV infection had not tested within the past year. Self-reported testing in the past 12 months among YMSM in the NHBS ranged from 43 to 72% in the years 1994–2011, leveling off at approximately 60% in the last five years of reports [27]. Sumartojo et al. [28] found lowest testing rates among YMSM who reported high-risk sex with non-main partners. In the Explore study 680 of the 1,562 HIV-infected MSM (44%) were unaware of their infection; for younger MSM, approximately 75% were unaware of it [27].

The confluence of high rates of substance use, high HIV risk behavior, high prevalence and incidence, and low rates of HIV testing among YMSM in the U.S. have led to calls for programs and research directly focused on this population, as reversing these trends will be essential for meeting the 90-90-90 goals established by UNAIDS to help end the AIDS epidemic.

## YMSM in Low and Middle Income Countries

Although a substantial body of literature has emerged regarding substance use among YMSM in the U.S., reporting on this population from low- and middle-income countries (LMICs) is scant [29]. While age is often included as a co-variate in statistical analyses, no studies to date have provided a comprehensive assessment of the HIV-risk-related behaviors of YMSM in any Latin American country. As a result, there is little knowledge of HIV prevalence, risk factors, and testing patterns among YMSM in this region of the world.

Findings from the limited literature that exists in LMIC outside of Latin America reveal high rates of HIV and other STIs among YMSM; for example, Wei et al. [30] found that in four Chinese cities prevalence of HIV was 6.7%, syphilis 8.3% and concurrent HIV/syphilis 1.5%. A Russian study found that 17% of YMSM in St. Petersburg had an STI (syphilis 10%, Chlamydia 4.8%, gonorrhea 2.4%) and that over 64% of men had engaged in recent condomless anal intercourse, including 30% with casual partners [31]. Jacobson et al. [32] pooled results from surveys in nine Latin American cities (n=1410) for which researchers had used Respondent-Driven Sampling (RDS) for recruitment. They found overall HIV prevalence among YMSM to be 4.6% (95% CI: 3.2%-6.5%) in the pooled sample with variations from 2.7% in Buenos Aires, Argentina to 9.3% in San Pedro Sula, Honduras.

HIV testing rates among YMSM in LMICs is another underexplored area. In one of the few studies done to date, Johnston et al. [33] found wide disparities between the two major cities of Thailand in which 74.1% of YMSM had been tested with the past year in Bangkok while only 27.1% of those in Chang Mai had done so. In the pooled Latin American YMSM study, Jacobson et al. [32] reported that rates of ever testing for HIV varied widely from city to city from 28.7% to 59.2%; high proportions of YMSM reported never testing for HIV.

Given these multiple gaps in knowledge of YMSM outside of the developed world, we report on HIV risk behavior, HIV testing practices, and HIV/STI prevalence among YMSM in the Buenos Aires, Argentina, metropolitan area as well as the prevalence of use of alcohol and a variety of drugs, correlates of drug and alcohol use, and the association between substance use and HIV risk behavior.

Study results will be contextualized by a landscape in which prevalence rates among young men increased significantly between 2005-2011, stabilized until 2014 and appear to be slightly decreasing currently. No figures are available specifically for YMSM although MSM transmission accounted for over 60% of the new HIV infections among men aged 15-24 from 2013-2015 [34]. Argentina, similarly to most of Latin America, has not experienced the significant changes in HIV testing policy seen in other parts of the world over the past decade. For example, rapid HIV testing has been in use in the U.S. since 2003 [35] and in Africa since 2006 [36]. However, in Argentina, its use was piloted in selected HIV testing centers only in 2013 with full implementation still in progress [34]. Similarly, PrEP is not currently available in Argentina nor are there policy statements suggesting its availability in the foreseeable future.

## METHODS

For the parent study from which this sub-sample of 18-25 year-old MSM is drawn, a total of 500 MSM were recruited between November 2007 and July 2009 through RDS. A total of 16 seeds were recruited by a local nonprofit using its networks of MSM acquaintances and based on individuals' likelihood of referring three others to the study, diversity of backgrounds, self-reported HIV status, and sexual identity. These seeds underwent all study procedures and were provided with three coupons to pass to members of their networks. Of the 16 seeds, seven did not recruit any participants. Referrals from the other seeds ranged from one to 25, except for one seed that generated 447 referrals (89.3% of the sample) which reached 22 waves of referrals. Eligibility criteria for the parent study included identifying as a man, being 18 years of age or older, having had sex in the prior six months with another man or a male-to-female (MTF) transvestite (*transvestite* was the term used in Buenos Aires at the time of the inquiry to refer to pre-operative individuals), having had sex at least 10 times with a man or MTF transvestite in his lifetime, residing in the Buenos Aires metropolitan area, having a recruitment coupon received from a prior participant (except for seeds), and agreeing to provide a blood sample for HIV and STI testing. Participants received the equivalent of US\$20 for completing the study procedures and US\$5 for each person they referred who qualified for the study. Written consent was obtained from all participants prior to enrollment in the study. For a detailed discussion of the formative qualitative work that preceded data collection and details regarding the use of RDS in this study, such as how the network size of participants was assessed, recruitment yields by seed, and weighting process for the data, see [37]. The procedures were approved by the Institutional Review Board of the New York State Psychiatric Institute and the Independent Research Ethics Committee of the Faculty of Medicine, Universidad de Buenos Aires, Argentina.

### Instruments

Participants completed a Web-based survey lasting approximately 60-75 minutes. Those unable to use the computer received assistance from study staff who read the questions verbatim and entered the responses. The survey sections relevant to this manuscript are described below.

**Sexual Identity**—Participants indicated whether they considered themselves 1) gay/homosexual, 2) bisexual, 3) transvestite, 4) heterosexual, or 5) other.

**Sexual behavior**—Participants were asked in separate questions if they had had sexual intercourse with men, women or MTF transvestites in the prior year. They were subsequently asked about their sexual behavior in the prior two months with each partner type, including number of partners and occurrences of oral, vaginal or anal sex; insertive or receptive intercourse; condom use; and in cases of condomless intercourse assumed HIV status of partners.

**HIV testing history**—Participants were asked how many times they had been tested for HIV. Those with no prior HIV tests were asked the reasons for never testing and their

assumed HIV status. Those who had had a prior HIV test were asked the month and year of first HIV test and the most recent test.

**Substance Use**—Participants were presented with a list of different substances one by one, beginning with alcohol. Those who indicated ever using a particular substance were asked the frequency of use in the past two months using a Likert scale ranging from 0 (Never/None) to 6 (More than once a day). For alcohol use participants were also asked about their typical level of intoxication when drinking with possible answers of 0 (“Too little to feel any effect”), 1 (“Enough to feel it a little”), 2 (“Enough to feel it a lot”), 3 (“Enough to get drunk”), and 4 (“Enough to feel like you might pass out”). Heavy alcohol use was defined as drinking once per week or more and a level of intoxication of 2, 3, or 4. Heavy drug use was defined as using an illicit drug once per week or more.

**Mood**—Mood was assessed with the Mood Survey [38], which has two subscales: Mood Level (which assesses a respondent’s typical mood) and Mood Reactivity (which assesses the intensity and frequency with which a respondent reacts to a mood experience). Loneliness was assessed using the UCLA Loneliness Scale Version 3 [39]. This scale consists of 20-items rated from 1 (Never) to 4 (Always). Ratings are added across the 20-items, with higher scores indicating greater loneliness.

### Samples Collection and STIs Diagnoses

As detailed in Pando et al. [40], a sample of anticoagulated blood was collected to test for HIV, HBV, HCV and *T. pallidum* infection.

### Statistical Analyses

Data were weighted prior to analyses using SPSS. Weights were calculated as the inverse of the participant’s personal network size (PNS). This value was then multiplied by the sample size (N) divided by the sum of weights ( $\Sigma w$ ). The weighting formula is then:

$$(1/\text{PNS}) * (N/\Sigma w)$$

This formula is based on the RDS II estimator [41] and produces results that reflect the original sample size of 500. One limitation of these analyses may be the sample size. The original sample size of 500 was proposed based on power analyses specifying a design effect of 2.0. However, it has been suggested that in some simulations RDS may require a design effect of 10 or higher [42], so caution should be used in interpreting these findings as the true population values. In addition, weighting data based on a single network size value may not achieve unbiased estimates. As an RDS study, all results presented in the tables are based on weighted data. However, to identify findings that were affected by data weighting, all statistical comparisons were repeated using unweighted data, and any differences are reported in the results.

Logistic regression analyses were used to predict heavy alcohol and drug use. Simple logistic regressions, one for each independent variable, were conducted followed by multiple logistic regressions with all independent variables in the regression model simultaneously.

Descriptive data for sexual behaviors and the correlations between those sexual behaviors and substance use were calculated separately for gay- and non-gay-identified men. Because sexual behavior frequencies typically had a skewed distribution, log-transformed variables were used for the correlations.

## RESULTS

### Demographics

A total of 233 participants from the parent study were between 18 and 25 years of age and were included in this study. In general, these YMSM had limited education and were of lower than average socioeconomic status; only 30% had completed high school. Approximately 75% were unemployed or had only temporary work by self-report (Table 1), and 82% reported incomes below 1000 Argentine pesos (US\$286) per month, which was approximately the 25<sup>th</sup> percentile in income distribution in Argentina at the time of the study.

### Sexual Identity and Behavior

Sixteen percent of participants identified as gay, 36% as bisexual, 25% as heterosexual, and 23% as “other” (e.g., “macho,” “passive,” “*hombre*”). In terms of sexual behavior, 16% of participants reported having had only male sexual partners during the past two months, 20% reported having had both male and female partners, and nearly half (49%) reported having had male, female, and *travesti* sexual partners. Sexual identity categories did not fully overlap with sexual behavior (see Table 2): for example, among those who identified as bisexual approximately one third had sex with men and women and another third had sex with men, women, and *travestis*. Among men who identified as heterosexual or “other,” over two thirds reported engaging in sex with men, women, and *travesti* partners. Results also demonstrate high prevalence of unprotected anal and vaginal intercourse. Overall, 79% of participants reported condomless anal or vaginal intercourse during the past two months with 36% of all those occasions occurring without condoms.

### HIV and STIs

Among the 226 participants who responded to questions about HIV testing history, 70% (n=157) reported no prior HIV test, 14% (n=32) one prior test, 6% (n=14) two prior tests, and 10% (n=23) reported three or more prior HIV tests. Six participants (3%; 95% CI 0.7%-5%) tested HIV positive as part of this study, four of whom were not aware of their HIV infection. Furthermore, 19 (8%; 95% CI 4%-12%) were infected with syphilis and 14 (6%; 95% CI 3%-9%) with Hepatitis B; none were infected with Hepatitis C.

### Prevalence and Correlates of Substance Use

**Prevalence of Alcohol Use**—As per Figure 1, over 80% of participants consumed alcohol during their lifetime and during the past 2 months, and 18% reported daily drinking. Approximately 26% of the overall sample (31% of those who drank in the past 2 months) engaged in heavy drinking, defined as one or more occasions per week in which they typically drank to the point of “feeling it a lot,” “feeling drunk,” or “feeling like they were going to pass out.”



**Prevalence of Drug Use**—Seventy percent of the participants reported using drugs, and close to half reported poly-drug use over the previous two months (Figure 1). Marijuana and cocaine (at 61% and 35%, respectively) were the most frequently used drugs. *Pasta base* (cocaine sulfate) and tranquilizers were also used by a significant portion of respondents; approximately 20% of participants reported ever using them, and 20% and 13% reported using them over the past two months, respectively. While 14% of participants reported no substance use and 18% reported only using alcohol, almost two-thirds of participants reported poly-substance use in the past two months. Approximately 20% reported using alcohol, marijuana, cocaine, and other illicit drugs.

The rate of use for the most frequently used substances was high (not shown): almost 70% of marijuana users did so at least weekly as did almost half of those who reported using *pasta base*, tranquilizers, and cocaine. Over 40% of participants who reported using marijuana did so daily as did approximately 20% of those who used *pasta base* or tranquilizers. Heavy drug use, defined as once per week or greater frequency, was reported by 49% of participants overall and by 74% of those who used drugs during the prior two months.

**Correlates of heavy alcohol and drug use**—As per Table 3, in simple regression analyses odds of heavy drug use decreased with higher education levels (OR 0.71, 95% C.I. 0.53-0.95,  $p=.023$ ), mood level (OR 0.67, 95% C.I. 0.50-0.89,  $p=.006$ ) and gay identity (OR 0.26, 95% C.I. 0.11-0.58,  $p=.001$ ), while loneliness increased the odds (OR 2.33, 95% C.I. 1.20-4.50,  $p=.012$ ). Greater mood reactivity increased the odds of heavy alcohol use OR 1.56, 95% C.I. 1.10-2.22,  $p=.013$ ). In multivariate analyses mood reactivity continued to increase the odds of heavy alcohol use (AOR 1.82, 95% C.I. 1.18-2.79,  $p=.007$ ) while being employed (AOR 0.49, 95% C.I. 0.23-1.03,  $p=.058$ ) approached significance in decreasing those odds. Similarly, in the multivariate model, gay sexual identity was associated with lower frequency of drug use (AOR 0.28, 95% C.I. 0.11-0.71,  $p=.008$ ).

### Sexual Risk Behavior and Substance Use

After regression analyses showed greater likelihood to engage in heavy drug use among non-gay-identified men, participants were dichotomized based on their reported sexual orientation to compare them in terms of sexual risk behavior in relation to substance use. Table 4 presents correlations between frequency of alcohol and drug use and frequency of specific sexual risk behaviors among participants who reported engaging in sex with a particular type of partner (i.e., men, women, transvestites). Among gay-identified men, frequency of alcohol and drugs was related to an increase in the number of sexual partners ( $r = .43$ ,  $p < .01$  for alcohol;  $r = .38$ ,  $p < .05$  for drugs). Among non-gay identified men, greater alcohol use was inversely related to number of sexual partners and frequency of receptive CAI with men and transvestites ( $r = -.16$ ,  $p = < .05$ ). Also, higher frequency of drug use was related to more sex partners and more condomless sex with all partner types among non-gay identified men.

## DISCUSSION

This study was the first to use RDS as a recruitment method in Argentina at a time when RDS was being adopted by researchers throughout the region [43]. This method theoretically should result in a broader cross-section of members of the target population than typical venue-based or snowball recruitment [44,45], and the results in this case were consistent with expectations. The sample was heavily drawn from lower socioeconomic strata and included a majority of non-gay-identified men. The sample was therefore unusual and provided insights into an under-researched sector of MSM in this region of the world.

Of particular interest for this study was the finding that approximately two thirds of the group reported sex with both men and women (including half with trans women) even though only one third self-identified as bisexual, demonstrating that categories of sexual identity and behavior commonly understood in the scientific/academic community did not apply to this population. The finding has important implications for the development of interventions and programs aiming to reach MSM, which often rely on gay-identified community venues, publications, or organizations.

HIV testing among the Argentine YMSM in this study was far less frequent than in comparable samples from the U.S. and Europe. Only 16% of Argentine YMSM reported two or more lifetime tests whereas approximately 60% of YMSM in the U.S. report testing annually [27]. These low testing rates may have improved since the period of data-gathering given that Argentina introduced rapid, point-of-care testing in 2013 in a few testing sites in the major cities [34]. Sustained interventions to encourage first testing and to boost testing frequency among this population could reduce morbidity as well as future infections in Argentina as cases are diagnosed and treated earlier. To this end, interventions that bring HIV testing to resource-limited neighborhoods such as large-scale testing campaigns, home testing, or self-testing might be particularly useful, especially since these approaches have been effective at reaching individuals who have never been tested before [46]. Furthermore, recent findings that rapid HIV self-testing is highly acceptable among MSM in Argentina [47] highlight the potential use of self-testing to increase access and frequency to testing.

Substance use patterns among Argentine YMSM in this study also differed from those reported in U.S.-based studies of similar populations though overall use was heavy for both. While marijuana use was in the range of 60% in the Argentine sample, similar to that of U.S. reports [7,8,22], Argentine youth reported higher levels of cocaine use but less use of poppers and hallucinogens. *Pasta base*, a precursor substance in the elaboration of powder cocaine, is common in Argentina but unknown in North America. Polydrug use was high in both populations as well with two-thirds of Argentine respondents acknowledging multiple substance use in the past two months.

Argentine YMSM who were not gay-identified and those who had both men and women partners reported higher rates of substance use than those who were gay-identified or who only had male partners [6,24,48]. These findings may reflect alcohol and drug use as a way to mitigate internalized homophobia. Alternately, they may highlight an underlying factor of sensation seeking whereby those who seek the effects of alcohol and drugs may also seek



greater sexual sensation through different types of sexual partners. Both of these factors were found to be related to alcohol and drug use among Latino MSM in the U.S. [49]. The high rates of alcohol and drug use highlight the need to identify individuals with problem substance use and engage them in care. Screening-Brief Intervention-Referral to Treatment (SBIRT) programs, in which a substance use screening instrument is completed by all individuals receiving a service (i.e., all patients admitted to an Emergency Room or receiving primary care services at a hospital), have proven efficacy in identifying such individuals and reducing their substance use, even in instances where only the Brief Intervention component is used [50–53]. SBIRT interventions have also been used in STD clinics and shown efficacy in reducing rates of STD infections [54,55]. In Argentina, however, where psychoanalysis remains the cornerstone of mental health treatment [56], these study findings also highlight the need for briefer, evidence-based treatments for substance use that may be more accessible to the general population.

The implications of the combined effects of high rates of substance use, high levels of sexual risk behavior, and low HIV testing rates among these YMSM are troubling for their potential to foreshadow increased HIV incidence and prevalence. Promising new strategies to drive down incidence such as Treatment as Prevention (TasP) or pre- and post-exposure prophylaxis are unlikely to succeed if key populations remain largely disconnected from those who could provide such services. Without intense efforts to expand and routinize HIV testing that reaches these men successfully, many newly diagnosed persons will face delays in accessing the care that can preserve their health and interrupt the chain of new infections.

While important differences exist between the population reflected in these data and comparable YMSM populations in the developed world, the findings suggest an urgent need for prevention initiatives among Latin American YMSM that address the multifaceted nature of the risk involved supported by sustained public health commitments to provide ongoing diagnostic and clinical services.

There are a number of limitations to these findings. Although the HIV prevention landscape has not changed much in Argentina since this data was collected, a current assessment of substance use and HIV risk behavior among this population might yield different results. In addition, although RDS aims to reduce the biases present in other recruitment methodologies, we cannot be certain that this is a representative sample of YMSM in Buenos Aires. Furthermore, the data is based on self-report and subject to recall and social desirability biases. Lastly, our use of a global assessment of the relationship between substance use and sexual risk behavior may obscure associations that may be found using situational or event-level studies. Nonetheless, these findings can provide a baseline regarding substance use and HIV risk behavior among YMSM to which future data can be compared. Given the dearth of studies of YMSM in LMIC and specifically in Latin America, we believe these findings begin to address important gaps in knowledge.

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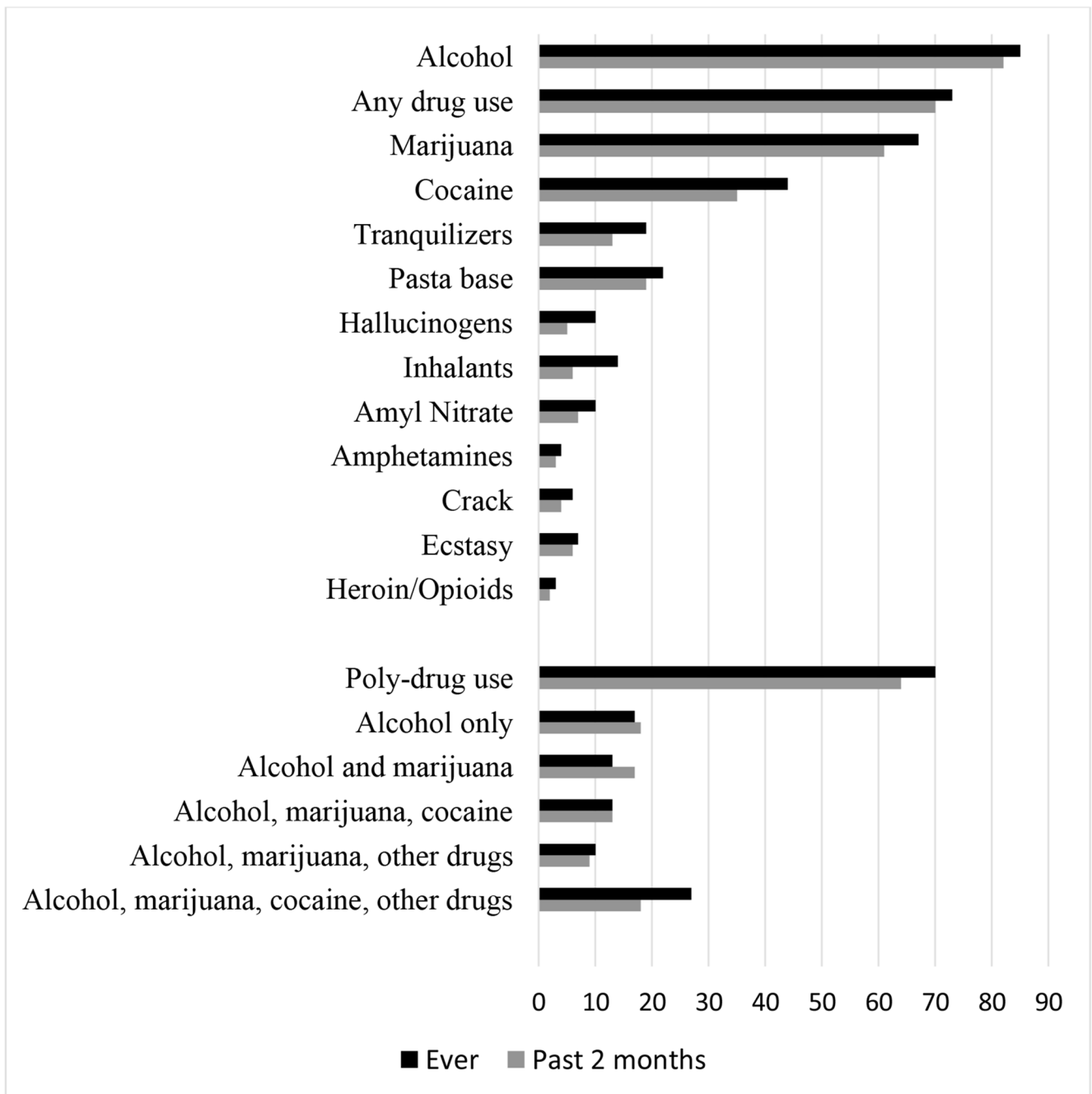
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**Figure 1.**

Prevalence (%) of substance use among Young G&MSM in Buenos Aires, Argentina, 2007-2009 (n=233)<sup>1</sup>

<sup>1</sup>Ns may not sum to 233 due to missing data. Percents are among those with non-missing data.

**Table 1.**

Sample description of YMSM in Buenos Aires, Argentina, 2007-2009 (N=233)

	N <sup>I</sup> (%)
<b>Educational level</b>	
Primary School or less	69 (30)
Incomplete HS	93 (40)
Complete HS	51 (22)
Some Tertiary studies	18 ( 8)
<b>Employment status</b>	
Temporary work	86 (37)
Unemployed	87 (37)
Employed by Employer	53 (23)
Self-employed	31 (13)
Student	54 (24)
<b>Monthly income (in US\$) <sup>I</sup></b>	
None	73 (42)
Less than \$286 (Arg\$1000)	70 (40)
\$286 - \$571 (Arg\$1000-1999)	29 (16)
\$572 - \$856 (Arg\$2000-2999)	2 (1)
> \$856 (Arg\$3000+)	1 (1)
<b>Sexual identity</b>	
Gay	37 (16)
Bisexual	83 (36)
Heterosexual	58 (25)
Other	54 (23)
<b>Sexual partners (past 2 months) <sup>2</sup></b>	
Men only	34 (16)
Women only	7 (3)
Trans only	3 (1)
Men and Women	42 (20)
Men and Trans	8 (4)
Women and Trans	12 (6)
Men, Women, and Trans	104 (49)

<sup>I</sup>Based on exchange rate at time of study<sup>2</sup>Ns may not sum to 233 due to missing data. Percents are among those with non-missing data.



**Table 2.**

Sexual behavior over the past two months by sexual identity among YMSM in Buenos Aires, Argentina, 2007-2009

	<b>Total (N=233)%</b>	<b>Gay (n=37)%</b>	<b>Bisexual (n=83)%</b>	<b>Hetero (n=58)%</b>	<b>Other (n=55)%</b>	<b>X<sup>2</sup></b>	<b>df</b>	<b>p</b>
Oral/anal sex w/man	88%	97%	87%	81%	93%	7.2	3	.067
Oral/anal/vaginal sex w/ woman	78%	6%	86%	95%	98%	130.7	3	<.001
Oral/anal sex w/transvestite	61%	14%	56%	84%	76%	52.8	3	<.001
Sex with man, woman, and transvestite	49%	6%	39%	70%	71%	47.8	3	<.001
Unprotected anal sex w/man	44%	81%	42%	33%	35%	25.1	3	<.001
Unprotected anal or vaginal sex w/woman	56%	6%	56%	80%	64%	50.7	3	<.001
Unprotected anal sex w/ transvestite	22%	5%	21%	35%	22%	11.0	3	.012
Any unprotected anal or vaginal sex	79%	83%	75%	86%	75%	2.8	3	.430

**Table 3.**

Predictors of heavy substance use among YMSM in Buenos Aires, Argentina, 2007–2009

Predictor	Simple Logistic Regressions			Multiple Logistic Regression		
	OR	95% CI	Sig	AOR	95% CI	Sig
Heavy alcohol use						
Age	0.95	0.84-1.09	.473	1.00	0.87-1.15	.994
Education	0.92	0.66-1.29	.641	1.04	0.71-1.54	.835
Employed	0.61	0.32-1.18	.143	0.49	0.23-1.03	.058
Mood Reactivity	1.56	1.10-2.22	.013	1.82	1.18-2.79	.007
Mood Level	1.08	0.79-1.48	.649	1.12	0.76-1.67	.568
Loneliness	1.05	0.51-2.16	.904	1.04	0.41-2.60	.940
Age-Discordant Childhood Sexual Experience	0.46	0.20-1.08	.075	0.42	0.17-1.01	.053
Gay sexual identity	0.52	0.21-1.31	.166	0.58	0.21-1.63	.302
Drug use 1+times/week						
Age	1.06	0.95-1.18	.335	1.07	0.94-1.21	.293
Education	0.71	0.53-0.95	.023	0.84	0.59-1.19	.327
Employed	0.60	0.35-1.04	.068	0.70	0.38-1.29	.255
Mood Reactivity	1.15	0.86-1.54	.334	1.22	0.87-1.70	.252
Mood Level	0.67	0.50-0.89	.006	0.73	0.52-1.03	.072
Loneliness	2.33	1.20-4.50	.012	1.46	0.65-3.29	.360
Age-discordant Childhood Sexual Experience	1.27	0.68-2.38	.457	1.04	0.53-2.05	.915
Gay sexual identity	0.26	0.11-0.58	.001	0.28	0.11-0.71	.008

NOTE: In unweighted regressions, 2 additional associations were significant (Alcohol Use & Employed, multiple regression  $p=.016$ ; Drug Use & Employed, simple regression  $p=.032$ ) and 1 association became non-significant (Alcohol Use & Mood Reactivity, simple regression  $p=.067$ ).

**Table 4.**

Sexual risk behavior and frequency of substance use in past two months among YMSM in Buenos Aires, Argentina, 2007-2009

Sexual Risk Behavior	Frequency				Correlation with Alcohol Use				Correlation with Drug Use			
	Gay		Non-Gay		Gay		Non-Gay		Gay		Non-Gay	
	n	M (SD) range	n	M (SD) range	n	r	n	r	n	r	n	r
# of oral, vaginal, or anal sex partners	36	8.60 (9.75) 1-38	192	14.25 (21.84) 1-275	36	.43 **	182	-.17 *	36	.38 *	191	.05
Frequency of UAI or UVI with m/w/t	36	13.23 (24.66) 0-140	191	6.37 (11.59) 0-92	36	.11	181	.01	36	-.21	190	.23 **
Receptive UAI with man	36	7.68 (13.68) 0-80	164	0.44 (2.27) 0-25	36	.18	154	-.16 *	36	-.22	163	-.01
Insertive UAI with man	36	5.29 (13.12) 0-80	166	1.82 (5.66) 0-50	36	.14	156	-.01	36	-.10	165	.22 **
UVI with a woman	2	3.50 (NA) 3-4	167	2.62 (7.04) 0-92	2	NA	158	-.01	2	NA	166	.21 **
UAI with a woman	2	0.50 (NA) 0-1	167	1.59 (3.18) 0-27	2	NA	157	.04	2	NA	166	.22 **
Receptive UAI with a transvestite	5	0.40 (0.55) 0-1	125	0.19 (0.85) 0-7	5	-.32	117	-.31 **	5	.17	125	.00
Insertive UAI with a transvestite	5	.60 (1.35) 0-3	125	0.93 (2.24) 0-15	5	-.79	120	-.05	5	-.41	125	.19 *

\*  
p< .05

\*\*  
p< .01

\*\*\*  
p< .001

Note: Sexual risk behavior variables were log-transformed prior to Pearson correlations. Table shows weighted results. In unweighted correlations, 2 associations become non-significant (Alcohol Use & # of sex partners, gay, p=.052; Drug Use & Insertive UAI with transvestites, non-gay, p=.297).