

Title: Sexual behavior and drug consumption among young adults in a Latin American shantytown

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ABSTRACT

Background: Risky sexual behaviors of young adults have received increasing attention during the last decade. However, few studies have focused on the sexual behavior of young adults in shantytowns of Latin America. Specifically, studies on the association between sexual behaviors and other risk factors for STI and HIV transmission, such as the consumption of illicit drugs or alcohol are scarce in this specific context.

Methods: The study participants were 393 men and 400 women between 18 and 30 years of age, from a shantytown in Latin America. Data were obtained through a questionnaire administered by qualified personnel. Logistic regression techniques were used to estimate associations between use of any illicit drug, high-risk sexual behaviors and reported STI symptoms adjusting by alcohol consumption level and various socio-demographic characteristics.

Results: Among men, age of sexual debut was lower, number of lifetime sexual partners was higher, and there were higher risk types of sexual partners, compared to women. Though consistent condom use with occasional partners was low in both groups, reported condom use at last intercourse was higher among men than women. Also, a lifetime history of illicit drug consumption decreased the probability of condom use at last sexual intercourse by half. Among men, the use of illicit drugs doubled the probability of intercourse with a high-risk sexual partner in the past year and more than tripled the probability of reported STI symptoms.

Conclusion: Drug consumption is associated with high-risk sexual behaviors and reported STI symptoms in a shantytown in Latin America after controlling for alcohol

consumption level. Development of prevention programs for risky sexual behaviors, considering gender differences, is discussed.

BACKGROUND

In Peru, the HIV epidemic is still concentrated in high-risk populations, especially among men who have sex with men [1]. The estimated HIV prevalence is 0.3% in the general population, 1% among sexual workers, and between 14% to 22% among MSM [2, 3]. Although HIV incidence in Peru has remained constant during the last decade, the incidence among heterosexual women has increased. This is believed to be due to a bridge population of men who engage in sexual relations with both high and low-risk populations [4].

Risky sexual behaviors of young adults have received increasing attention during the last decade [5-9]. It is believed that more than two million adolescents become infected with HIV worldwide every year. The most common form of transmission in this group is sexual intercourse. Within at risk populations, young adults are at highest risk of acquiring sexually transmitted infections (STIs) and HIV because most are sexually active, single, have multiple partners since they are not in established monogamous relationships, engage in intercourse with sex workers, and frequently mix sex with alcohol or drugs [10-13]. Previous research conducted mainly in developed countries has found that high-risk sexual behaviors are associated with an individual's history of drug consumption [12, 13]. Moreover, it is likely that cultural and environmental factors influence this association in different ways in different regions of the world [14-17].

Drug consumption and its health consequences are an increasing problem in Peru. Between the year 2003 and 2005, the national survey on the use of drugs registered an increase of 3% from 11% to 14% in the number of people who admitted to consuming an illegal drug at least once in their lifetime [18]. Although Peru is one of the main

producers of coca leaves in the world, marijuana (11.9%) remains the most consumed drug over people's lifetime, followed by coca paste (3.7%) and cocaine (3.4%) [18].

Several studies on sexual behavior among young adults in urban areas have been conducted in Latin America [6, 19-21]. They have found, for example, that 80% of young adults between 18 and 29 years of age in Peru have had intercourse, and that of this group, 30% of young men report having had intercourse with a sex worker [19]. However, few studies have focused on the sexual behavior of this population in shantytowns of Latin America [17]. Thus, information about attitudes and behaviors related to sexual health in this population is limited. Specifically, studies on the association between sexual behaviors and other risk factors for STI and HIV transmission, such as the consumption of illicit drugs or alcohol are scarce in this specific context.

This study describes reported sexual behavior of young adults in a shantytown in Lima, Peru, by gender, and examines the association between drug consumption and high-risk sexual behaviors after adjusting for alcohol consumption level and other socio-demographic variables. We specifically examined the association between drug consumption and the following outcomes: 1) use of a condom during last sexual intercourse, 2) intercourse with high-risk sexual partners in the last year and 3) reporting STI symptoms. Examining the effect of alcohol and illicit drug use jointly would reveal the relative effects of alcohol and illicit drug use on the occurrence of risky sexual behaviors and reporting STI symptoms, which would have policy and programmatic implications.

METHODS

Study site

This cross-sectional study took place in Las Pampas de San Juan de Miraflores (PSJM), a shantytown with an estimated population of 40,000, of which approximately 25% are stably employed, located approximately 15 kilometers south of downtown Lima, Peru. Like many other shantytowns in Peru, PSJM was formed by residents who settled and later claimed unused land on the outskirts of Lima. Physically, this environment consists of steep and rocky desert hills with dusty soil, no natural vegetation, and less than one inch of rainfall per year. Most households have electricity but only about half have water or sewage connections. Underemployment and poverty are high in PSJM. The estimated annual median income in PSJM was \$2100 in 2000, compared to \$7600 for the rest of the country [22, 23]. This area was settled over 20 years ago, predominantly by individuals who emigrated from the Peruvian highlands. However, most young people were raised in PSJM and thus are fluent in Spanish despite their region of origin. Since 1986, the community of PSJM has been under health surveillance for various health research projects by physicians, public health care workers, nurses and social workers from the Peruvian non-governmental organization and A.B. PRISMA.

Sample

All PSJM residents had been registered during a census completed for previous epidemiological studies [24-26]. Young adult residents of the shantytown between the ages of 18 and 30 were randomly selected from a census and asked to participate in our study. Census data were obtained from AB PRISMA, a local nonprofit organization working in the community. A computer program generated a random sample from the census list to select potential enrollees. A total of 968 subjects (508 men and 460 women)

were contacted to participate in our study by trained personnel. Of the subjects contacted, 16 (11 men and 5 women) declined to participate, and 152 (97 men and 55 women) were unavailable for interviews. Seven interviewed men were excluded due to incomplete questionnaires. Hence, the total sample size was 793 subjects (81.9% response rate). We did not collect any additional information from subjects who did not consent to participate or were unavailable to be interviewed.

Design

Trained personnel with medical research experience in this community invited eligible participants to enroll in this study after the objectives, risks and benefits of study participation were explained. Attempts were made up to three times per individual to reach them at their home. It was stressed that involvement was voluntary and could be discontinued at any time. Only subjects who provided written consent were enrolled in the study. All interviews were conducted in Spanish. Though there may be some older adults whose native language is not Spanish, all of the young residents in this community are Spanish-speaking or bilingual. Interviewers completed a month long training course that included role-playing and mock interviews in order to increase the instruments' reliability. Our cross sectional study had two parts: an interview, which was administered by the trained personnel that lasted approximately 25 minutes; and a self-administered questionnaire about sexual behavior that lasted approximately 15 minutes.

This study was reviewed and approved by the local non-governmental organization A.B. PRISMA Institutional Review Board FWA# 00001219 for protection of human subjects in research.

Variables

The initial question on sexual behavior questionnaire was, “Have you ever had sexual intercourse?” It was followed by questions about condom use at last sexual intercourse, and the number of sex partners they had in the last three months, in the last year prior to assessment, and in their lifetime. Finally, we asked participants whether over the past year they had ever engaged in sex with potentially high-risk sexual partners, such as casual partners, same sex partners and/or sex workers, and whether they have had any STI symptom.

The main independent variable of interest was lifetime history of illicit drug use. We asked specifically about marijuana, coca paste and cocaine.

Regarding alcohol consumption level, a heavy episodic drinker (HED) was defined as a subject who consumed at least 5 alcoholic drinks in a row at least once per month every month for the last 12 months, as in Slutske (2005) [27].

Standard demographic variables adjusted for included sex, age (continuous), marital status (single/divorced vs. married/cohabitant) and educational level (primary or less/secondary vs. technical/university).

Data Analysis

As described previously, the key outcome variables in this study are various types of high-risk sexual behaviors. The main covariate of interest is lifetime history of illicit drug use. Logistic regression techniques were used to estimate association between high-risk sexual behavior and reported STI symptoms and lifetime use of illicit drugs, controlling for socio-demographic variables and alcohol consumption level. The results of these analyses are presented in the form of odds ratios, using 95% confidence

intervals; p-values are presented as an aid to interpretation. All analyses were done using STATA 8.0.

RESULTS

Sample Characteristics

The demographic characteristics of young adults are outlined in Table 1. The sample was composed of similar numbers of men and women (49.6% vs. 50.4%, respectively). By design, there were no significant age differences between men and women. However, there were differences in marital status, education, and work status: 34% of women were married or cohabitating, compared to 16% of men; 45% of women reported having more than 11 years of education compared to 30% of men; and the proportion of unemployed women was twice that of men.

Almost 40% of women had at least one child, compared to 16% of men. Also, among those with children, more than half had had an unplanned pregnancy (men: 55%, women: 61%, $p=0.375$). Less than 2% of participants reported having had an STI. However, when we asked about specific STI symptoms, 3% of men reported having had urethral discharge, ulcers or anogenital lesions, 3% of women reported having had ulcers or anogenital lesions, and 27% reported having had vaginal discharge. With regards to condom availability, about half of the women felt it would be difficult to get them, compared to 10% of men.

There were large differences in the heavy episodic drinking (31.3% vs. 2.8%) and in the lifetime use of illicit drugs (24% vs. 2%) between men and women. Marijuana was the most commonly used drug for both sexes, followed by coca paste and cocaine.

However, for all drugs examined, men reported more consumption than women (see Table 1).

Sexual Behavior

Most men (80%) reported having ever had sex, compared to 65% of women. The age of sexual initiation was two years younger for men than for women (16.9 ± 2.4 vs. 18.4 ± 2.5). As expected, more men reported having had occasional sex partners than women (23.4% vs. 1.5%, $p < 0.001$). Only men reported sex with commercial sex workers or same sex partners. Additionally, 12% of men had sex with an occasional partner, sex worker or same sex partner under the influence of alcohol during the last three months, compared to less than 1% among women. Also, seven men had sex with an occasional partner, sex worker or another man while under the influence of an illicit drug during the last three months (Table 2).

Men had more sexual partners than women in all the assessed time periods: men had more than two times the number of sex partners in the past year and more than four times the lifetime number of sexual partners than women. Among those who reported having occasional partners during the last year, men also had a greater number of partners than women (3.2 ± 5.2 vs. 1.3 ± 0.5 , $p = 0.076$).

More men reported condom use at last intercourse than women (48.7% vs. 29.8, $p < 0.001$). Differences in condom use between the genders remained significantly different during the last sexual encounter when we analyzed only participants who were single (condom use: men 56%, women 43%, $p = 0.021$). Also, reported condom use was higher among men than women during the last sexual intercourse with an occasional partner, but this difference was not statistically significant. However, consistent condom

use with occasional partners was low in both groups (45% among men and 40% among women, $p=0.837$). Among men, only 84% used condoms consistently during sexual intercourse with female sex workers. More than 95% of men reported using condoms during their last sexual intercourse with a female sex worker.

Illicit drug use, heavy episodic drinking and risky sexual behaviors

We estimated the association between condom use at last intercourse and lifetime history of illicit drug use, adjusting for sociodemographic variables (gender, age, marital status, education and work status). We found that being male (OR=1.9, 95% CI=1.2-2.8, $p=0.004$), single (OR=4.4, 95% CI=2.8-7.0, $p<0.001$) and having ever used any illicit drug (OR=0.5, 95% CI=0.3-0.8, $p=0.006$) were all associated with condom use at last intercourse (these data not presented in tables). After HED was added to the adjusted model, its effect was not significant (OR=1.2, 95% CI=0.7-2.0, $p=0.469$) and there were no significant shifts in any of these estimates.

We then estimated the association between having had casual sex in the past year and lifetime history of illicit drug use, again adjusting by sociodemographic variables. This analysis was conducted only for men because few women reported ever using any illicit drugs and having occasional sex in the past year. We found that lifetime history of drug use, being single and being younger were associated with having had casual sex in the past year (Table 3: model 1). After HED was added to the adjusted model, it was also associated with having had casual sex in the past year, and there was a slight decrease in the association between lifetime history of drug use and having had casual sex in the past year after HED was added (Table 3: model 2).

The association between ever having sex with an occasional partner, sex worker or another male under the influence of alcohol during the last three months and lifetime history of illicit drug use was also estimated only for men. In the model adjusting only for sociodemographic characteristics, we found that having ever used illicit drugs and being unemployed were associated with ever having had sex with an occasional partner, sex worker or another male under the influence of alcohol during the last three months (Table 3: model 1). After HED was added to the adjusted model, it was also associated with this risky activity (Table 3: model 2), but the association between lifetime history of drug use and this outcome was no longer significant in this model (Table 3: model 2).

Finally, again only for men, we estimated the association between ever reporting any STI symptom and having ever used any illicit drug. In the model adjusting for sociodemographic variables, we found that lifetime history of illicit drug use (OR=3.4, 95% CI=1.4-8.1, p=0.007) was significantly associated with reporting STI symptoms (Table 3: model 1). When HED was added to the adjusted model, HED effect was no found to be significant, but there were no significant shifts in any of the other estimates (Table 3: model 2).

DISCUSSION

In this study, the consumption of illicit drugs is associated with some high-risk sexual behaviors and with reporting STI symptoms in this population of young adults living in a shantytown in Latin America, even after controlling for alcohol consumption. As expected, men reported more risky sexual behaviors than women, but their reported condom use at last sex was higher than among women. However, consistent condom use was low in both groups, especially with occasional partners, and it is possible that

because men report more occasional partners, that their higher reported condom use relates to condom use with this group.

An important limitation to the interpretation of our results is that it was done in a population of young adults in a shantytown in Lima. Hence, it is not possible to generalize to populations in other regions or from different socioeconomic levels. Second, information was self-reported and there may be some social desirability bias. Also, because it was retrospective, some information may have been forgotten by respondents. The large discrepancy between data reported by men and women is consistent with the literature: one in which men exaggerate the report of certain sexual behaviors, while women underreport those same sexual behaviors [20, 28]. Though several strategies were used to reduce this bias (training of interviewers, previous evaluation of the instrument, and privacy while survey was administered), it may not have been sufficient. However, other studies suggest that using self-reporting, which was the case in this study, is reliable for recording sexual behavior and use of drugs [29]. Third, the cross-sectional and retrospective design of our study does not allow us to establish a causal association between the consumption of illicit drugs and risky sexual behavior. Also, having ever consumed illicit drugs might be associated with other characteristics of the participants, such as antisocial personality traits, sensation seeking behavior or mental disorders, which might better explain this association [12, 30-32]. Finally, the few participants who reported risky sexual behaviors, being heavy episodic drinkers and had consumed drugs at least once in their lifetime, especially among women, made it difficult to analyze these data with statistical significance due to insufficient power.

Nevertheless, our results are interesting because there are few studies that describe sexual behavior and drug consumption in shantytowns in Latin America, especially after adjusting for HED. The lifetime prevalence of illicit drug use was higher in our study than that reported for the same age group in the Peruvian National Survey in 2005 (24% vs. 19%) [18]. It is possible that these differences are due to varying sociodemographic characteristics, including the low socioeconomic status of people living in the shantytown [32]. This study also found that HED and drug consumption were independently associated with some high-risk sexual behaviors such as having had high-risk sexual encounters during the last year. However, not using a condom during the last sexual encounter and reporting STI symptoms, direct consequence of having risky sexual behaviors, were only associated with having ever used illicit drugs. These findings are consistent with other studies [30, 33]. Although, only HED was associated with having had risky sexual partners under the influence of alcohol in the adjusted model, it is possible that our study did not have enough power to disentangle this difference. Nonetheless, it has been suggested that alcohol and drug use interferes with the process of reasoning and decision-making, increasing the chance of high-risk sexual behaviors and consequently, STIs [21]. However, considering that we cannot establish any temporal or causal relationship between lifetime history of alcohol or illicit drug use and high-risk sexual behaviors, it is possible that those factors are maladaptive behaviors that share a common origin [12, 32]. It is clear, however, prevention of STI and HIV efforts should focus on those who ever used any illicit drug.

With regards to gender differences in sexual behaviors, most of the results found in this study were quite similar to those from other studies done in Peru [19]. However,

the proportion of women that had occasional sexual encounters during their lifetime (1.5%) in our study was low compared to the 5% of women that reported their last sexual partner as an occasional partner in the National Survey of STI and HIV Prevalence in young adults in Peru . Also, the proportion of men that reported ever having had sex with a female sexual worker was lower than that reported in the National Survey (14% vs. 29%). It is possible that this more inhibited sexual behavior among women is due to cultural factors, especially "machismo" [34, 35]. In a Latin American cultural context, it is considered inappropriate for women to enjoy and experience their sexuality fully; furthermore it is often punished emotionally or physically by the partner or the family [34, 36]. Additionally, most of the residents in this shantytown came from the Peruvian highlands, with a more traditional conservative culture, especially related to sexual behavior: expression of one's sexuality in the highlands is less observed than the coast or rainforest of Peru [6, 35]. These factors might explain the low rate of occasional partners during intercourse among women. Alternatively, it is possible that socioeconomic factors, such as the high rate of unemployment and the high number of women with children, contribute to diminishing women's empowerment, thus forcing them to accept the cultural model ("machismo") that is imposed upon them [35-38].

It is also possible that the low rate of condom use among women is associated to the erroneous perception that their risk of being infected by a STI or HIV is low because they have few high-risk sexual behaviors [20]. However, it is clear that the increase of STI and HIV prevalence among women is the consequence of the heterosexual transmission from a sub-group of bisexual men or from men with contact with sexual workers [39, 40]. Thus, it is necessary that STI/HIV prevention programs among women

focus on increasing awareness of this fact and of the importance of using condoms with any partner. Also, preventive programs that facilitate the access to condoms among women in shantytowns are essential, especially if almost 50% of women considered it difficult to get condoms.

The results of this study provide useful information for the development of more appropriate prevention programs that focus on the specific needs of people living in dense urban areas, such as in this shantytown. Delaying sexual initiation, improving information on family planning, promoting access to condoms, and developing better skills to negotiate the use of condoms, especially in high-risk situations, are key messages to be focused on more intensely in this population. Further studies that identify common factors and mechanisms that explain the association between high-risk sexual behavior and drug consumption are essential. Using this analysis as baseline information, more studies must evaluate the effectiveness of interventions in this context in order to better guide the fight against STIs, HIV and drug consumption in a particularly sensitive group.

Competing interest:

The author(s) declare that they do not have competing interest.

Authors' contributions

All four authors are responsible for the design of the study, main responsible for the data collection was JAGB, further JAGB made all the statistical analysis, the interpretation of findings were made by all four authors. All authors read and approved the final content of the manuscript.

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Table 1: Sociodemographic characteristics of study sample (n=793)

	Men n=393		Women n=400		p*
	%	n	%	n	
Age mean (SD)	22.3 (3.2)		22.4 (3.3)		0.777
Marital Status					
Single	66.0	264	84.0	330	<0.001
Married/Cohabitant	16.0	63	34.0	136	
Education Level					
Primary or less (completed fewer than 6 years)	2.8	11	4.3	17	<0.001
High school (completed 7-11 years)	66.7	262	50.3	201	
College (Completed more than 11 years)	30.5	120	45.5	182	
Occupation					
Employed	32.3	127	24.5	98	<0.001
Under-employed	30.8	121	12.8	51	
Unemployed	16.3	64	36.0	144	
Student	20.6	81	26.8	107	
Have children					
Have had unplanned pregnancy	16.3	64	38.0	152	<0.001
	54.7	35	61.2	93	0.375
Ever had STI					
	1.0	4	1.3	5	0.758
Reported STI symptoms					
Genital ulcers or sores	3.6	14	3.3	13	0.808
Urethritis	3.3	13	-	-	-
Vaginal discharge	-	-	26.8	107	-
Consider it difficult to get condoms					
	10.2	40	46.8	187	<0.001
Ever drug use					
Marijuana	21.9	86	1.0	4	<0.001
Coca Paste	5.9	23	0.3	1	<0.001
Cocaine	4.8	19	0.3	1	<0.001
Heavy episodic drinking					
	31.3	123	2.8	11	<0.001
Ever use of any illicit drug					
	24.2	95	1.5	6	<0.001

n: Number of participants

*chi square/kruskal-wallis

Table 2: Sexual behaviors of 18 to 30 year olds in this PSJM sample (n=574)

	Men		Women		p*
	%	n	%	n	
Ever had sex	79.4	312	65.5	262	<0.001
Age of sexual debut mean (SD)	16.9	(2.4)	18.4	(2.5)	<0.001
Ever had sex with					
Occasional partner	27.2	85	1.9	5	<0.001
Sex worker	14.1	44	-	-	-
Same sex person	1.6	5	-	-	-
Last year had sex with					
Occasional partner	23.4	73	1.5	4	<0.001
Sex worker	6.7	21	-	-	-
Same sex person	1.3	4	-	-	-
Sex under alcohol influence with occasional partners, FSW or SSP[‡]	12.2	38	0.8	2	<0.001
Sex under drug influence with occasional partners, FSW or SSP	2.2	7	-	-	-
Number of sexual partners (reporting mean, SD)					
Last 3 months	1.5	(2.0)	1.0	(0.1)	<0.001
Last year	2.2	(3.1)	1.1	(0.4)	<0.001
Lifetime	5.2	(12.1)	1.5	(1.0)	<0.001
Number of casual partners last year	3.2	(5.2)	1.3	(0.5)	0.076
Number of FSW last year	2.0	(1.5)	-	-	-
Unprotected sex (non-condom use)					
At last sexual intercourse	51.3	160	70.2	184	<0.001
At last intercourse with occasional partner	27.1	23	40.0	2	0.530
At last intercourse with FSW	4.6	2	-	-	-
Always condom use					
Occasional partner	44.7	38	40.0	2	0.837
Sex worker	84.1	37	-	-	-

n: Number of participants

*chi square/kruskal-wallis

[‡] SSP: same sex partner

Table 3: Estimated association between illicit drug use, reported risky sexual behavior and STI symptoms among men between 18 to 30 years in this PSJM sample (n=312).

	Intercourse with a casual partner during the last year				Sex with a casual partner, sex worker or MSM under the influence of alcohol during the last 3 months				Ever had any STI symptom			
	Model 1		Model 2		Model 1		Model 2		Model 1		Model 2	
	OR 95% CI	p	OR 95% CI	p	OR 95% CI	p	OR 95% CI	p	OR 95% CI	p	OR 95% CI	p
Heavy episodic drinking^ε	-	-	2.0 (1.1-3.7)	0.019	-	-	3.1 (1.4-6.8)	0.004	-	-	1.0 (0.4-2.7)	0.945
Ever illicit drug use*	3.2 (1.8-5.6)	<0.001	2.5 (1.4-4.7)	0.002	2.5 (1.2-5.2)	0.012	1.8 (0.8-3.8)	0.147	3.4 (1.4-8.1)	0.007	3.3 (1.3-8.6)	0.014
Age^ψ	0.9 (0.8-0.9)	0.042	0.9 (0.8-0.9)	0.044	0.9 (0.8-1.0)	0.117	0.9 (0.8-1.0)	0.158	1.0 (0.9-1.2)	0.546	1.0 (0.9-1.2)	0.545
Education[£]	1.2 (0.6-2.2)	0.564	1.2 (0.7-2.3)	0.496	1.6 (0.8-3.6)	0.209	1.7 (0.8-3.9)	0.171	1.4 (0.5-3.8)	0.468	1.4 (0.5-3.9)	0.467
Employment[¥]	1.3 (0.7-2.8)	0.411	1.2 (0.6-2.5)	0.604	3.0 (1.4-6.8)	0.007	2.7 (1.2-6.2)	0.022	1.9 (0.6-5.7)	0.273	1.9 (0.6-5.7)	0.274
Marital status[∞]	4.6 (1.5-13.7)	0.006	4.5 (1.5-13.6)	0.007	3.7 (0.8-16.4)	0.088	3.4 (0.8-15.4)	0.108	0.4 (0.1-1.1)	0.070	0.4 (0.1-1.1)	0.070

^ε Heavy episodic drinking: yes vs. no (ref)

* Ever use illicit drug: yes vs. no (ref)

^ψ Age: continuous

[£] Educational level: High school or less vs. College (ref)

[¥] Employment: unemployed vs. employed or student (ref)

[∞] Marital status: single vs. married or cohabitant (ref)