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Event-level analysis of alcohol consumption and condom use in partnership contexts among men who have sex with men and transgender women in Lima, Peru

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HIV, STI, Men who have sex with men, Transgender women, Alcohol, Peru

Commonly Used Abbreviations

AUD - Alcohol Use Disorder

CI – Confidence interval

CIAI – Condomless insertive anal intercourse

CRAI – Condomless receptive anal intercourse

MSM – Men who have sex with men

TGW – Transgender women

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1.0 Introduction

Alcohol use prior to intercourse is common among men who have sex with men (MSM) and transgender women who have sex with men (TGW) in Peru, and associated with the high prevalence of HIV infection in these populations (Colfax et al., 2004; Lane et al., 2008; Ludford et al., 2013; Purcell et al., 2001; Silva-Santisteban et al., 2012). Previous epidemiologic research has defined a prevalence of HIV infection between 10-29% among MSM and TGW in Peru (Sanchez et al., 2007), identified a high frequency of alcohol use and alcohol use disorders (AUDs) in these groups, and established an association between alcohol use and sexual risk behavior (Asamblea General de las Naciones Unidas, 2013; Deiss et al., 2013; Herrera et al., 2016; Vagenas et al., 2014). However, little is known about how specific sexual partnership contexts influence alcohol consumption prior to intercourse, how alcohol consumption prior to intercourse affects partner-specific condom use practices, and how alcohol use may influence disclosure of HIV serostatus and other alternative HIV prevention strategies.

Alcohol use is common and associated with sexual risk behavior among MSM/TGW in Peru. Typical patterns of alcohol use in urban Peru involve communal consumption of shared bottles of beer among circles of friends (S. E. Brown et al., 2015). This pattern of consumption both privileges the role of alcohol use in social interactions and contributes to binge drinking as opposed to moderate use. In a recent WHO report, heavy alcohol use within the past 30 days was described among 23.6% of men older than 15 years old (2014). Similarly, a previous study of over 5,000 MSM in Peru found that 62.8% of participants met screening criteria for an AUD (Ludford et al., 2013). In a sample of 556 social-media using MSM, the odds of engaging in high-risk sexual behavior were 52% greater among participants who reported consuming ≥ 5 alcoholic drinks in a day at least once per week (Young et al., 2016), a habit that was reported by over half of the sample. Finally, among MSM in Peru who tested positive for at least one

sexually transmitted infection (STI) and/or practiced high-risk sexual behavior, the prevalence of AUDs was 45% (Herrera et al., 2016). Research from other global contexts has reflected similar associations between alcohol use, sexual risk behavior, and HIV/STI risk as found in Peru (Lewis et al., 2005; Scott-Sheldon et al., 2013; Shuper et al., 2009). However, while these studies establish an association between alcohol consumption, sexual risk behavior and STI/HIV risk, they primarily address general patterns of behavior without exploring the event-level associations between partner-specific alcohol consumption and sexual risk behavior among MSM in Latin America.

As a result, it is unclear is how patterns of alcohol use and sexual risk behavior may be influenced by the sexual partnership contexts of MSM/TGW in Peru. A prior global meta-analysis found no association between event-level alcohol use and condomless intercourse, but acknowledged that variations in partnership characteristics across global contexts could have influenced the outcome (Leigh, 2002). In Peru, a study of low-income men found that alcohol use prior to sex was associated with increased likelihood of condomless anal intercourse (CAI) and the presence of at least one STI, including HIV (Maguina et al., 2013). Though this analysis confirmed an event-level association between alcohol use and sexual behavior, the study did not differentiate between heterosexual men, MSM, and TGW and did not take into account how the distinct sexual partnership contexts of MSM and TGW may influence event-specific patterns of alcohol consumption and sexual risk behavior.

Improved understanding of the specific partnership contexts that influence alcohol consumption, the partner-level associations between alcohol use and condomless intercourse, and the potential impact of alcohol use on alternative HIV prevention techniques is essential to the integration of substance use treatment into a comprehensive STI/HIV prevention strategy for MSM/TGW. The objectives of our analysis were to

assess: 1) Participant and partner-specific characteristics associated with alcohol use prior to intercourse, 2) Patterns of alcohol use and CAI within specific sexual partnership contexts of MSM and TGW in Peru, and 3) The potential impact of alcohol consumption on HIV serostatus disclosure and other alternative prevention strategies in this population.

2.0 Methods

2.1 Recruitment

We performed a secondary analysis on alcohol consumption prior to sex, condomless receptive and condomless insertive anal intercourse (CRAI and CIAI, respectively), and their relationships to participant- and partner-level characteristics among MSM and TGW in Peru. Data were collected from August 2012-June 2014 as part of a screening study for two ongoing clinical trials of partner management and notification following STI diagnosis. The primary study sought to evaluate interventions to improve partner notification among MSM and TGW following an STI diagnosis. Potential participants were identified by community-based peer recruiters at venues frequented by MSM and TW in Lima and Callao. Recruitment venues were identified based on previous ethnographic mapping of sites visited by MSM and TGW and included bars, discos, saunas, pornographic movie theaters, commercial sex zones, and public spaces like volleyball courts and public squares (Clark et al., 2014). Potential subjects were invited to participate in a study, "about whether or not people tell the people they have had sex with about a sexually transmitted infection." All participants in the screening study were asked to complete a computer-based survey and to undergo a physical exam and laboratory testing for gonorrhea/chlamydia and syphilis infection. HIV testing was offered to all participants but was not required as a condition of

participation. Inclusion in the screening study was limited to those who: 1) Were anatomically male at birth, 2) Were 18 years or older and, 3) Reported engaging in anal or oral intercourse with a male or male-to-female transgender partner in the preceding 12 months. All 1,607 men and TGW enrolled in the screening study were included in this analysis.

2.2 Study Protocol

Participants completed a computer-assisted self interview (CASI) behavioral survey. After completing the survey, they received a physical exam, HIV/STI testing, pre-/post-test counseling, and on-site treatment for symptomatic STIs, if noted during the exam, according to the guidelines of the Peruvian Ministry of Health. Participants were compensated for their time and transportation costs with 10 *Nuevos Soles* (~$3.50 USD), 5 condoms, and 5 lubricant sachets at the screening visit.

All participants provided written informed consent prior to beginning any study procedures. Study procedures were approved by the Office for Human Research Participant Protection (OHRPP) of the University of California, Los Angeles and the *Comite de Bioetica* of Asociación Civil Impacta Salud y Educación, Lima, Peru.

2.3 Data Collection

Participants completed a computer-assisted self-interview (CASI) survey that included questions on their age, city of residence, and education level. Participants were asked to describe their sexual orientation (heterosexual, bisexual, homosexual, transgender, or other), their sexual role during intercourse (*activo*/insertive, *pasivo*/receptive, or *moderno*/versatile, or other), and their total number of sexual partners in the previous 30 days. Participants were also asked to self-report any prior STI diagnoses (gonorrhea, chlamydia, syphilis, genital herpes, genital warts, urethritis, proctitis, and/or HIV). These responses were not verified with actual test results.

Partner characteristics were assessed through participant report. Partner data was collected through 3 sets of identical questions about each of the 3 most recent partners (within a maximum interval of 90 days). These questions asked about the relationship type, the gender, sexual orientation, and sexual role of the partner (as perceived by the participant), and the partner's HIV serostatus (if known). Partnership types were defined as "Main partners, or someone you are in a stable relationship with," "Casual partners, or people you have sex with one or more times, but don't have a stable relationship with," "Anonymous partners, or people you have sex with but don't know their full name or how to contact them," and "Commercial partners, or people who give you money or buy you things in exchange for sex, or who you give money or buy things in exchange for sex." Colloquial terms were also included to provide examples of different partner types. Details regarding the last sexual encounter with each partner were assessed by including questions on type of intercourse (anal/vaginal/oral), position during anal intercourse (insertive/receptive/both), and condom use during each sexual act reported. Partners who were identified as female and had a report of engaging in vaginal sex were excluded from the study. Participants were also asked, "The last time you had sex with this person, did you drink alcohol before having sex?" (Yes/No).

2.4 Main Outcomes and Main Predictor

The outcomes of interest were event-specific CRAI and CIAI. Associations between CRAI and/or CIAI, and alcohol use were analyzed on the event-level, according to self-reported alcohol use before each partner-specific sexual encounter.

We also analyzed participant and partner characteristics associated with alcohol consumption, CRAI, and CIAI during partner-specific sexual encounters. This additional

analysis allowed us to assess for changes in likelihood of alcohol consumption and condomless intercourse between different partnership contexts.

2.5 Data Analysis

Univariate analysis was used to describe participant and partner characteristics. Bivariate analysis was used to estimate the association of participant and partner characteristics with CRAI, CIAI, and alcohol consumption prior to sex. Bivariate and multivariate analyses were conducted using generalized estimating equation (GEE) models with quasi-likelihood adjusting of the standard error and confidence interval (CI) to account for data clustering (Cui, 2007). Under the GEE model, Poisson regression was used to calculate prevalence ratios and 95% CIs with an independent working correlation, which provided the least deviation while using a robust estimation of errors (Barros & Hirakata, 2003; Jang, 2011).

Bivariate analysis of participant age, education level, sexual orientation, and sex role, and partner sexual orientation, sex role, partner type, knowledge of self HIV serostatus, and knowledge of partner HIV serostatus was conducted to test for associations with CRAI and/or CIAI. Age was divided into the categories of "younger (<36 years old)" or "older (≥36 years old)" based on the mean age and standard deviation of the study sample. Variables were then included in the adjusted model according to significance of association during bivariate analysis ($p<0.10$) and conceptual reasoning. Multivariate analysis of the association between alcohol use and CRAI and/or CIAI controlled for participant age, education, sex role, knowledge of self HIV serostatus and partner sex role, type, and knowledge of partner HIV serostatus. All analyses were performed in Stata 14.0 (StataCorp, College Station, TX, USA).

3.0 Results

3.1 Participant & Partner Characteristics

We analyzed data from 1,607 participants (Table 1). The mean age of participants was 28.8 years old (Standard Deviation = 8.07), with 83.4% of participants living in Lima, and 60.2% having attended university or technical school. A majority of participants described their sexual orientation as homosexual (57.5%), followed by 25.8% identified as bisexual, 9.9% as transgender, 3.9% as heterosexual, and 3.5% who chose not to describe their orientation. Almost all participants (94.0%) reported knowing their HIV serostatus, with 47.0% (n=756/1,607) being HIV-infected and a near equal amount knowing they were HIV-uninfected (47.1%, n=757/1,607).

Participants reported 4,774 partner-specific sexual events (Table 2). Participants classified 48.0% of these partners as casual, 34.1% as primary, 10.3% as anonymous, 6.4% as commercial sex clients, and 1.3% as commercial sex workers. Partners were most often identified as homosexual (48.3%) or bisexual (27.7%). The median number of sexual partners reported per participant in the 30 days prior to enrollment was 2.0 (IQR 1-4). Before engaging in intercourse, 80.5% of all participants reported that they did not know their partner's HIV serostatus, whereas 8.9% stated they knew their partner was HIV-infected and 11.6% knew their partner was HIV-uninfected. Out of the sexual encounters of participants who knew their self HIV serostatus, these participants knew the serostatus of 21.0% (n=950/4519) of their partners. Only 12.2% (n=31/255) of participants who did not know their self HIV serostatus knew the serostatus of their partner.

3.2 Prevalence of Outcomes

Of 4,774 sexual contact events reported, 16.1% (n=768) included CRAI and 15.1% (n=722) included CIAI by the participant. Participants reported consuming alcohol prior to 21.8% (n=1,042) of all sexual encounters. Alcohol use before sex was most common with casual partners (24.2%; n=554/2,292) and commercial sex workers (23.3%; n=14/60) as opposed to clients of sex work (21.3%; n=65/305), primary (19.8%; n=321/1,625) or anonymous partners (18.0%; n=88/490). In sexual encounters where alcohol was consumed, the prevalence of condomless sex was greatest in primary relationships (44.5%; n=143/321) followed by contacts with commercial sex workers (42.9%; n=6/14), casual partners (33.4%; n=185/554), sex work clients (29.2%; n=17/65), and anonymous partners (14.8%; n=13/88).

3.3 Associations with Outcomes

A lower frequency of alcohol use prior to sex was observed in participants who had graduated secondary school (PR=0.65, 95% CI = 0.54 – 0.79) or completed any post-secondary education (PR= 0.45, 95% CI= 0.38 - 0.54), as seen in Table 3. Partnership characteristics associated with an increased frequency of alcohol use were interactions with casual partners (PR=1.16, 95% CI= 0.99-1.36) and commercial sex workers (PR=2.21, 95% CI= 1.33-3.67), though only the latter was statistically significant. Other trends ($p<0.10$) towards partner-specific alcohol use were observed with *moderno* (PR=1.17, 95% CI= 0.99-1.37) and transgender partners (PR=1.48, 95% CI= 0.96-2.29).

Participant characteristics associated with CRAI and CIAI were completion of secondary school (CRAI: PR=1.60, 95% CI = 1.13-2.28; CIAI: PR=1.54, 95% CI= 1.07-2.22) or any post-secondary education (CRAI: PR=1.56, 95% CI=1.11-2.19; CIAI: PR=1.36, 95% CI=0.96-1.92). Any condomless anal intercourse (CIAI or CRAI) was more commonly reported with primary partners (46.8%; n=762/1627) as compared with

all other partner types. As expected, CRAI and CIAI were differentially associated with corresponding sexual roles, as *pasivo* and *moderno* participants were more likely to report CRAI (*Pasivo:* PR=3.57, 95% CI= 2.28-5.59; *Moderno:* PR=3.42, 95% CI= 2.22-5.24) and less likely to have CIAI (*Pasivo:* PR= 0.33, 95% CI= 0.23-0.49; *Moderno:* PR= 0.80, 95% CI= 0.65-0.99).

3.4 Multivariate analysis of Alcohol use and CRAI & CIAI

Table 4 shows that alcohol use prior to sex was significantly associated with both CRAI (PR=1.26, 95% CI=1.05-1.53) and CIAI (PR= 1.37, 95% CI= 1.12-1.67), after adjusting for participant age, education, sex role, and knowledge of self HIV serostatus, and partner type, sex role, and knowledge of partner HIV serostatus.

3.5 Knowledge of partner HIV serostatus

Condomless anal intercourse occurred more frequently with partners whose HIV serostatus (whether infected or uninfected) was known (39.7%; n=389/979), compared to partners of unknown serostatus (29.0%; n=1,101/3,795). Both CRAI and CIAI were more commonly reported with partners who were known to be HIV-uninfected (CRAI: PR= 1.47, 95% CI= 1.17-1.84; CIAI: PR= 1.44, 95% CI=1.13-1.85). However, for partners who were known to be HIV-infected, only CIAI was more frequent (PR=1.42, 95% CI=1.06-1.91).

When limited to partners of unknown HIV serostatus, alcohol consumption was associated with an increase in the prevalence of condomless anal intercourse from 26.6% (n=743/2,793) to 38.5% (n=333/864). In addition, participants who had consumed alcohol before sex with a given partner were less likely to report knowing that person's HIV serostatus (PR = 0.73, 95% CI = 0.59 – 0.89; Data not shown in table).

3.6 Knowledge of participant self HIV serostatus

Participants who denied knowing their own HIV serostatus were less likely to know the serostatus of their partner (PR=0.58, 95% CI= 0.34-0.98; Data not shown in table). This sub-group of participants was also more likely to drink alcohol before sex (PR=1.69, 95% CI=1.28-2.23) compared to those who reported knowing their own HIV status.

Participants who described themselves as HIV-uninfected were more likely to engage in both CRAI (PR=1.52, 95% CI=1.26-1.83) and CIAI (PR=1.41, 95% CI=1.15-1.72) when compared to HIV-infected participants, while subjects who did not know their HIV status were more likely to report CRAI only (PR=1.70, 95% CI=1.20-2.39).

4.0 Discussion

In our event-level analysis of alcohol consumption and sexual risk behavior among MSM and TGW in Lima, Peru we found that partner-specific alcohol use prior to intercourse was associated with both CRAI and CIAI. Partnership contexts that significantly or trended towards an association with a higher frequency of alcohol use included sex with commercial sex worker or casual partners and interactions with partners whose sexual role or sexual identity was described as *moderno* or transgender. Participants who did not know their self HIV serostatus were less likely to know the serostatus of their partner and more likely to drink alcohol before intercourse. Raising concern for the efficacy of harm reduction strategies like serosorting or seropositioning in serodiscordant relationships, knowledge of a specific partner's HIV serostatus was negatively associated with alcohol consumption.

Our study complements previously published data by providing further insight into how partner-specific interactions shape alcohol consumption and sexual risk behavior among MSM and TGW. A previous event-level analysis of alcohol use and sexual practices among men in Peru also evaluated a cohort of low-income men but did not differentiate the subjects according to sexual orientation, and classified partnerships solely as either casual or stable, and either more or less than six months in duration (Maguina et al., 2013). In contrast, our findings describe specific participant characteristics and partnership contexts associated with alcohol use prior to intercourse and the subsequent association of these factors with sexual risk behavior. The partner-specific associations between drinking and CRAI and CIAI identified in our analysis reflect part of a complex constellation of HIV-associated risks factors among Peruvian MSM and TGW. These risk factors, including alcohol consumption, condom use practices, rates of partner change or concurrency, and baseline prevalence of STI/HIVs in at-risk networks, collectively increase the likelihood for ongoing STI/HIV transmission through MSM and TGW sexual partnerships. In this context, our findings help to provide a more detailed understanding of how individual behavioral practices are defined by and operate within specific same-sex partnership contexts in Peru.

In our sample of Peruvian MSM and TGW, drinking alcohol before sex was more common with commercial sex worker and casual partners, reflecting similar associations described in previous studies with other populations (J. L. Brown & Vanable, 2007; Cooper & Orcutt, 2000; Vanable et al., 2004). This finding could also be supported by the additional association of transgender and *moderno* partners with alcohol consumption due to the large participation in commercial work among the Peruvian transgender population (Silva-Santisteban et al., 2012). Though our results cannot draw a causal conclusion, non-primary relationships as these could be associated with increased alcohol consumption

due to the venues where these interactions often occur (i.e. bars, clubs etc.) (Qing Li, 2010). Irrespective of location, the often temporary, unstable, and unfamiliar nature of these partnerships may make knowledge-based strategies to decrease STI/HIV risk less common. These strategies, including partner disclosure of STI/HIV status, discussions on agreements/concerns surrounding condom use, and familiarity with a partner's previous sexual activity and sexual networks, all depend on open, honest discussions of sexual practices and potential STI/HIV risks. However, the high prevalence of alcohol use observed within these partnership contexts is likely to impair these discussions and introduce another dimension of risk that further exacerbates the potential for STI and HIV transmission during condomless anal intercourse.

Despite the importance of partner-specific contexts in defining alcohol use and sexual practices, current alcohol screening and STI/HIV prevention guidelines focus on individual patterns of behavior rather than partner-level interactions. Widely used screening tests for problem drinking, such as the Alcohol Use Disorder Identification Test (AUDIT) (Saunders et al., 1993) and CAGE questionnaire (Ewing, 1984), do not assess for changes in frequency of alcohol use with different partner types or within specific partnership contexts. Future interventions could assess the accuracy and efficacy of adding a partner component to alcohol screening measures to identify interpersonal contexts of alcohol consumption, which can lead to assessment of sexual risk behavior.

In addition to the association of alcohol use with specific partnership types, our findings have important implications for alternative HIV harm-reduction practices like serosorting and seropositioning. Seropositioning is an alternative HIV prevention technique that takes advantage of the lower efficiency of STI/HIV transmission during insertive anal intercourse by relegating the HIV-infected partner to the receptive position (Baggaley et al., 2010; Koblin et al., 2006). When participants in our study knew a

partner was HIV-infected, they were more likely to report CIAI with that partner. In contrast, CRAI was more commonly practiced when the participant knew their partner was HIV-uninfected. These results were evaluated without accounting for the affects of participant and partner characteristics. However, this association of knowledge of partner HIV serostatus may be evidence of use of seropositioning although we did not specifically present the question. Though seropositioning as a STI/HIV prevention strategy has been described in the global MSM and TGW community (Rodger et al., 2015; Snowden et al., 2009; Xia et al., 2006), it has not been previously been reported in Peru (Clark et al., 2008). If alternative prevention methods like serosorting or seropositioning are being used, the behavioral effects of alcohol use prior to sex are likely to undermine the effectiveness of these strategies in that they depend on an accurate knowledge of a partner's HIV serostatus. In our findings, alcohol consumption prior to sex was associated with lower likelihood of participants knowing their own or their partner's serostatus, as well as an increased likelihood of engaging in CRAI and CIAI with that partner. These findings suggest that alcohol use both impairs the ability to acquire knowledge of a partner's serostatus, and may inhibit the use of traditional and alternative prevention strategies during intercourse.

4.1 Limitations

It is important to note the limitations of our secondary analysis. Though alcohol use prior to sex was assessed, we did not collect information on the quantity of alcohol consumed or the participant's state of inebriation. Due to the secondary nature of our analysis, the study was not designed to collect detailed information on quantity of alcohol use or extent of inebriation. In addition, the communal patterns of alcohol consumption common in urban Peru complicate efforts to quantify an individual's specific quantity of

drinks consumed. Our study also did not inquire about meeting place venues or alcohol use by the partner, information that could have given insight as to why participants drank and whether certain contexts were more often associated with one or both partners consuming alcohol. Detailed, event-level understanding of frequency and quantity of alcohol consumption prior to intercourse among MSM and TGW in Latin America will be an important area for future study.

Finally, it is important to emphasize that the generalizability of our study results may be limited. A fraction (21.8%, n=1,042/4,774) of our sexual events were preceded by alcohol consumption and our results are only applicable to these incidents. In addition, while our assessment of participants' interactions with up to three of their most recent sexual partners provides a great deal of information on alcohol use in partnership context, it does not provide exhaustive detail, particularly with participants with a large number of recent sexual contacts. Our participants, while not purposefully seeking STI testing, included individuals recruited from STI/HIV clinic settings and included a large number of HIV-infected individuals. As a result, this population may be considered at higher risk for HIV and STIs and may not accurately represent the larger population of MSM and TW in Peru.

4.2 Conclusion

Alcohol consumption before sex among MSM and TGW in Peru was more common with partners who were identified as *moderno* or transgender and in relationships defined as casual or commercial, and was negatively associated with knowledge of a partner's HIV serostatus. Both partner-specific alcohol use and knowledge of a partner's HIV serostatus were associated with CRAI and CIAI in our event-level analysis. These findings show that within the larger group of MSM and TGW

in Peru, specific constellations of risk behavior exist within specific partnerships interactions and increase the overall risk of STI/HIV transmission within their sexual networks. Further research will focus on the reasons for increased alcohol consumption in certain partnership contexts among MSM and TGW in Peru, and on designing and implementing alcohol screening and STI/HIV prevention services specific to these risk contexts.

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Table 3: Unadjusted Bivariate Analysis of Participant and Partner Characteristics with Alcohol Use Prior to Sex

	PR	95% CI	p
Participant Characteristics			
Age			
≤35	1	REF	
≥36	0.85	0.69-1.04	0.11
Education			
Did Not Graduate Secondary school	1	REF	
Graduated Secondary School	0.65	0.54-0.79	<0.01
Technical School/University/Professional School	0.45	0.38-0.54	<0.01
Sexual Orientation			
Heterosexual	1	REF	
Bisexual	1.08	0.72-1.62	0.72
Homosexual	0.99	0.67-1.47	0.97
Transgender	1.32	0.85-2.05	0.21
Did Not Self-Identify[1]	1.81	1.09-3.02	0.02
Sex Role			
Activo (Insertive)	1	REF	
Moderno (Versatile)	1.05	0.86-1.28	0.62
Pasivo (Receptive)	1.02	0.82-1.27	0.85
Did Not Self-Identify[1]	1.71	1.16-2.52	<0.01
Participant Self-Reported HIV Serostatus			
HIV-Infected	1	REF	
HIV-Uninfected	0.89	0.77-1.04	0.14
Unknown	1.69	1.28-2.23	<0.01
Partner Characteristics			
Partner Type			
Primary	1	REF	
Casual	1.16	0.99-1.36	0.06
Anonymous	0.97	0.75-1.26	0.82
Commercial Sex Client	1.24	0.95-1.62	0.12
Commercial Sex Worker	2.21	1.33-3.67	<0.01
Sexual Orientation			
Heterosexual	1	REF	
Bisexual	0.85	0.68-1.08	0.17
Homosexual	0.66	0.53-0.83	<0.01
Transgender	1.48	0.96-2.29	0.08
Did Not Self-Identify[1]	1.51	0.27-0.39	<0.01
Sex Role			
Activo (Insertive)	1	REF	
Moderno (Versatile)	1.17	0.99-1.37	0.07
Pasivo (Receptive)	0.94	0.77-1.15	0.54
Did Not Self-Identify[1]	2.03	1.66-2.49	<0.01
Partner HIV Serostatus			
Unknown	1	REF	
HIV-Infected	0.86	0.67-1.10	0.23
HIV-Uninfected	0.66	0.51-0.85	<0.01
CRAI with Partner			
No	1	REF	
Yes	1.05	0.88-1.25	0.59
CIAI with Partner			

Table 4: Adjusted and Unadjusted Prevalence Ratios (PR) of Participant and Partner Cha

	CRAI											
	Unadjusted			Adjusted			Unadjusted			Adjusted		
	PR	95% CI	p	PR	95% CI	p	PR	95% CI	p	PR	95% CI	
Participant Characteristics												
Age												
≤35 years old	1	REF		1	REF		1	REF		1	REF	
≥36 years old	0.76	0.58-0.99	0.05	0.86	0.67-1.10	0.0.23	0.83	0.63-1.08	0.170.0	0.86	0.66-1.11	0.24
Education												
Did Not Graduate Secondary School	1	REF		1	REF		1	REF		1	REF	
Graduated Secondary School	1.77	1.23-2.56	<0.01	1.60	1.13-2.28	0.01	1.57	1.08-2.27	0.02	1.54	1.07-2.22	
Technical /University/ Professional School	1.67	1.19-2.35	<0.01	1.56	1.11-2.19	<0.01	1.38	0.98-1.94	0.61	1.36	0.96-1.92	
Participant Sex Role												
Activo	1	REF		1	REF		1	REF			REF	
Moderno	6.54	4.19-10.2	<0.01	3.42	2.22-5.24	<0.01	0.66	0.54-0.81	<0.01	0.80	0.65-0.99	
Pasivo	7.54	4.80-11.8	<0.01	3.57	2.28-5.59	<0.01	0.15	0.11-0.22	<0.01	0.33	0.23-0.49	
[1]Did Not Self-Identify	2.11	0.80-5.55	0.13	1.83	0.71-4.67	0.21	0.64	0.36-1.13	0.12	0.79	0.45-1.39	
Participant Self-Reported HIV Serostatus												
HIV-Infected	1	REF		1	REF		1	REF		1	REF	
HIV-Uninfected	1.44	1.18-1.75	<0.01	1.52	1.26-1.83	<0.01	1.62	1.31-1.99	<0.01	1.41	1.15-1.72	
Unknown	1.61	1.11-2.35	0.01	1.70	1.20-2.39	<0.01	1.37	0.88-2.15	0.16	1.32	0.88-1.98	
Partner Characteristics												
Partner Type												
Primary	1	REF		1	REF		1	REF		1	REF	
Casual	0.52	0.45-0.61	<0.01	0.49	0.41-0.59	<0.01	0.50	0.41-0.61	<0.01	0.53	0.44-0.64	
Anonymous	0.57	0.44-0.75	<0.01	0.60	0.44-0.81	<0.01	0.36	0.25-0.51	<0.01	0.38	0.27-0.53	
Commercial Sex Client	0.52	0.37-0.72	<0.01	0.57	0.38-0.86	<0.01	0.31	0.17-0.56	<0.01	0.42	0.24-0.75	
Commercial Sex Worker	0.21	0.07-0.66	<0.01	0.56	0.19-1.64	0.30	0.79	0.38-1.62	0.51	0.79	0.40-1.59	
Partner Sex Role												
Activo	1	REF		1	REF		1	REF		1	REF	
Moderno	0.89	0.75-1.06	0.19	0.88	0.73-1.05	0.16	5.33	3.79-7.49	<0.01	3.45	2.46-4.85	
Pasivo	0.11	0.07-0.18	<0.01	0.17	0.11-0.28	<0.01	5.90	4.18-8.35	<0.01	3.49	2.43-5.01	
[1]Did Not Self-Identify	0.070	0.03-0.15	<0.01	0.11	0.05-0.24	<0.01	4.33	2.89-6.49	<0.01	3.01	1.99-4.56	
Partner HIV Serostatus												
Unknown	1	REF		1	REF		1	REF		1	REF	
HIV-Infected	1.10	0.79-1.53	0.55	0.94	0.68-1.31	0.71	1.42	1.06-1.91	0.02	0.92	0.69-1.23	
HIV-Uninfected	1.47	1.17-1.84	<0.01	1.22	0.99-1.51	0.06	1.44	1.13-1.85	<0.01	1.05	0.84-1.32	
Alcohol Consumption Prior to Intercourse												
No	1	REF		1	REF		1	REF		1	REF	
Yes	1.19	0.97-1.45	0.09	**1.26**	1.05-1.53	0.02	1.29	1.05-1.59	0.02	**1.37**	1.12-1.67	

1 Did Not Self-Identify encompasses "I Don't Know, Other, and Missing" responses