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Alcohol and Sexual Risk: An Event-Level Analysis in Commercial Sex Setting

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Abstract

Objective—To assess the episodic relationship between alcohol and sexual risk in multiple-client occasions among female sex workers (FSWs).

Methods—Data on alcohol use and sexual episodes with clients from the past two days were collected among FSWs in Guangxi, China (n=336 for yesterday, and n=299 for the day before yesterday). Logistic regression using generalized estimating equations with robust variance estimation was used to assess the alcohol-sexual risk relationship, controlling for contextual variables salient in the setting of commercial sex. Results: alcohol use among FSWs was associated with a higher likelihood of unprotected sex with clients during both days. This relationship was modified by the number of clients received within a day. Additionally, having a larger number of drinks was associated with higher odds of unprotected sex, but the association was not consistent across the two days.

Conclusion—Findings from the study support an association between alcohol use and sexual risk among FSWs. The design of alcohol and sexual risk reduction intervention among FSWs in China may take advantage of the interaction between contextual factors and alcohol use on sexual risk.

1. Introduction

Consumption of alcohol has been hypothesized to augment sexual risks by interfering with a person's judgment (Steele and Josephs, 1990). Such a speculation in conjunction with an increasing epidemic of HIV and sexually transmitted infections (STIs) has aroused much

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Statement 2. Contributors

Authors Xiaoming Li designed the study and wrote the protocol. Author Zhiyong Shen and Yuejiao Zhou conducted literature searches and provided summaries of previous research studies. Author Yiyun Chen conducted the statistical analysis. Author Yiyun Chen wrote the first draft of the manuscript and all authors contributed to and have approved the final manuscript.

Statement 3. Conflict of Interest

All other authors declare that they have no conflicts of interest.

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concern. Although the integration of alcohol use reduction into HIV/STIs intervention has been widely promoted (CDC, 2000), mixed findings on the relationship between alcohol use and sexual risks fail to justify the effort of intervening on alcohol use to reduce HIV/STIs risk (Weinhardt and Carey, 2000).

Alcohol use has been associated with unprotected sex in most of the global association studies (Dingle and Oei, 1997). Yet evidence provided by this method is insufficient as no information is available to indicate whether the sexual risk behaviors occurred on the same occasions as alcohol use (Leigh and Stall, 1993). A more rigorous approach is event-level study, which ensures the concurrency of alcohol use and unprotected sex (Testa and Collins, 1997). Yet current findings from event-level studies are inconclusive (Brown and Vanable, 2007; Weinhardt and Carey, 2000). Additional researches with improved designs are urgently needed (Testa and Collins, 1997).

Most event-level studies correlated alcohol and sex on a single occasion, but analysis on multiple occasions is more appropriate (Weinhardt and Carey, 2000). Additionally, few event-level studies incorporated sex-related alcohol expectancy, which was proposed as an alternative explanation for the alcohol-sexual risk association (Crowe and George, 1989). There has also been a lack of attention to the context of drinking and sex. In response, this study will involve alcohol expectancy and contextual factors to assess the episodic relationship between alcohol and sex in multiple-client occasions among female sex workers (FSWs), a population at dual risk for alcohol use and sexual risk behaviors (Chen et al., 2012).

Alcohol use is an inseparable part of commercial sex. Many studies have documented a high prevalence of heavy drinking among FSWs (Li et al., 2010). We hypothesized that FSWs who used alcohol would be more likely to engage in unprotected sex with clients, and that more alcohol use would be associated with a higher likelihood of unprotected sex. Given that drunk clients may be more belligerent about condoms (Wilson et al., 1990), we also tested if clients' intoxication would be associated with more unprotected sex. Responding to the criticality of concurrent sexual partners (Lurie et al., 2009; Mah and Halperin, 2010), we hypothesized that receiving multiple clients within a day would be associated with more unprotected sex, and this association would be modified by alcohol use.

2. Method

2.1. Study site

The study was conducted in Guangxi, China. Guangxi has witnessed the nation's fastest growth of HIV incidents with a rate of 20 new cases each day in 2009. A total of 48,703 HIV/AIDS cases by June of 2009 placed Guangxi at second place among China's 31 provinces in terms of cumulative HIV cases (Liu, 2009). Specifically we chose two tourist cities (City A and City B) in Guangxi to be the research sites. There were an estimated 2,000 FSWs working in more than 150 commercial sex venues in each city.

2.2. Participants and Survey Procedure

The owners and/or managers of sex work venues were contacted first for permission, outreach health workers then approached FSWs in the establishments to ask for their participation. Street-based sex workers were recruited through direct personal contact or peer referral. A total of 1,022 women (515 in City A and 507 in City B) agreed to participate and written informed consent was obtained from each one of them. Participants finished a self-administered survey in private spaces. Trained interviewers were available to provide assistance. The study protocol was approved by the Institutional Review Boards at Wayne State University in the U.S. and Beijing Normal University in China.

2.3. Measurement

2.3.1. Social and demographic characteristics—Participants were asked to provide information on their age, income (in Yuan), marital status, residency (rural or urban household registration), ethnicity, education, and etc. For the ease of interpretation, we dichotomized marital status into ever and never married, ethnicity into Han (the largest ethnic group in China) and non-Han, and education into no more than and more than middle school.

2.3.2. Event-level measures—All event-level variables were measured separately for the day prior to the survey (“yesterday”) and the day immediately before (“the day before yesterday”).

Alcohol Use was assessed by questions: “Have you used any alcohol?” (yes/no). “How many drinks did you take?” and “How many hours did you drink?”. The latter two questions were answered by those who responded yes to the first one.

Number of clients and unprotected Sex with Clients were assessed among FSWs who reported having sex with any client, who were asked to recall the total number of clients and if a condom was used (yes/no) with each client. Participants can have multiple measures on unprotected sex within a day.

Client’s Intoxication was assessed by one question: “Was the client drunk or high on alcohol?” (yes/no). FSWs were asked to recall the intoxication status of each client with whom they had sex.

2.3.3. Correlates of HIV-risk behavior and alcohol use—*Venue support for condom use* was assessed with 8 items. A composite score was created by indexing 8 items (Cronbach $\alpha = 0.72$) with a dichotomized response (yes/no). A mean score across items was calculated for each participant with a higher score indicates more venue support.

Perceived HIV/STDs Susceptibility was assessed using two items: “What are the chances of you getting the HIV [STDs]?” (1 = very likely, 2 = likely, 3 = unlikely, 4 = very unlikely). The final index ($\alpha = 0.78$) was created based on the mean score of the two items and was reversed with a higher score indicating more perceived susceptibility.

Sex-related Alcohol Expectancies was measured by 12 items (Cronbach $\alpha = 0.89$), modified from a developed scale (Dermen and Cooper, 1994). Each item was measured on a 4-point scale from “1 = not at all” to “4 = very much”. A mean score was calculated across the 12 items.

2.4. Analysis

Analyses were carried out by STATA version 11 (StataCorp, 2011). First, descriptive statistics were presented to illustrate sample characteristics by drinking status. Next, logistic regressions were performed among FSWs who had sex with clients to test for the alcohol use-sexual risk relationship. Also to test the drinking quantity-sexual risk association, regressions were performed among FSWs who could recall the number of drinks. Generalized estimating equation (Zeger and Liang, 1986) was used to account for correlation within participant. Continuous variables were kept in their original form during regression to avoid analytical bias (Royston et al., 2006).

3. Results

A total of 336 and 299 FSWs reported to have engaged in sex with clients during yesterday and the day before yesterday respectively and nearly one third of FSWs reported alcohol use during each day (Table 1). Drinking and non-drinking FSWs differed in most variables of interest. Compared to non-drinkers, drinking FSWs tended to have accepted more clients, but have served less intoxicated ones. In addition, a higher proportion of drinkers than non-drinkers reported having unprotected sex with at least one client. On average, FSWs who used alcohol were generally younger, scored lower on venue support, and higher on sex-related expectancies about alcohol as compared to non-drinking FSWs.

Main results from multivariate regression were presented in Table 2, with those from bivariate regression also being presented to provide a full scope of the findings. Most of the results were consistent between the two days. After adjusting for relevant factors, FSWs who used alcohol were more likely to have unprotected sex with clients than those who did not. Yet this association weakened as the number of clients increased within each day. Moreover, FSWs were less likely to have unprotected sex if the client was intoxicated, though this association was only significant during yesterday. Additionally, higher odds of unprotected sex were observed among FSWs who reported less venue support and higher HIV/STD susceptibility. Analysis among drinkers only revealed that FSWs who had a larger number of drinks were more likely to have unprotected sex than those who had less drinks, but this association was only significant for yesterday. Most findings from this sub-population were concordant with those from the whole sample, despite of a lower stability across the two days.

4. Discussion

This is one of the first studies which examined the event-level association between alcohol use and sexual risk among FSWs. The study focuses on alcohol use and sexual experience during the last two days, which reduces the recall burden among participants (Crosby et al., 1996).

Alcohol use was related to unprotected sex with clients among FSWs in the study, which is inconsistent with some prior researches (Weinhardt and Carey, 2000). But it is noteworthy that in these previous studies, data were collapsed across partner type, a strong modifier in the alcohol use-sexual risk relationship (Seage et al., 1998). In fact, alcohol use was found to increase unprotected sex during encounters involving non-steady partners in studies which differentiated among partner types (Brown and Vanable, 2007; Colfax et al., 2004; Seage, et al., 1998; Weatherburn et al., 1993). As clients were mostly non-steady partners (Stein et al., 2009), our finding adds to a limited but growing number of researches to suggest that alcohol use among FSWs may have a negative impact on condom use with non-steady partners.

Studies among MSM had reported a relationship between binge drinking and unprotected sex (Benotsch et al., 2006; Colfax, et al., 2004; Prestage et al., 2009). Correspondingly, we found that a larger number of drinks was associated with an increased likelihood of unprotected sex. However because a very small number of FSWs who used alcohol could recall the quantity of drinking, we did not have sufficient statistical power to ensure the stability of test results across both days. Recalling the accurate number of drinks may be difficult when the drinking quantity was large and other emotion-intensive activities (e.g., sexual episodes) were involved. Future studies could improve the quality of recalling drinking volume by the use of appropriate anchor events.

The influencing mechanism of multiple sexual partnerships on the spread of HIV remains unclear. Our study found that with an increase in the number of clients received within a day, FSWs were more likely to have unprotected sex, but alcohol use was less likely to predict unprotected sex. It is speculated that the accumulated burden on FSWs to take repetitive initiative of condom use could lead to “safer sex fatigue” (Kiene et al., 2008). The intensity of serving multiple clients within a day may surpass other risk factors on influencing condom use, as was demonstrated by a diminished impact of alcohol use on unprotected sex with the accumulation of clients. Although further investigation is warranted, efforts may be initiated to resolve potential safer sex fatigue among FSWs.

Contrary to the knowledge that accepting drunk clients may increase sexual risk (Oberzaucher, 2006), clients’ intoxication was associated with fewer episodes of unprotected sex in the study. However, some evidence had shown that FSWs found it easier to put condoms on drunk clients because they would hardly realize it (Soni et al., 2010), and that drunk clients might not care about whether the woman was wearing a female condom (Ray and Maposhere, 1997). Although the role of clients’ intoxication was unconfirmed, these findings may shed light on the importance of appropriate skills of condom use in the face of drunk clients. Rational discussion of condom use with drunk clients may be difficult, but FSWs may be taught various practical tactics of condom use to deal with intoxicated clients.

The findings of the study should be interpreted with its methodological limitations. First, a convenient sample of FSWs in Guangxi may not be representative. Second, a large proportion of missing value on the number of drinks may limit the statistical power and validity of the drinking quantity-sexual risk association. Third, only one assessment of alcohol use was taken for a day, which prevents us from conducting within-person analyses for drinking and non-drinking occasions within the day. Also because only a few FSWs who had sex used alcohol for one day but not the other, we were unable to perform within-person analyses across the two days. Both analyses could have provided even stronger test for our hypotheses.

5. Conclusions

The findings of the study confirm FSWs’ vulnerability to alcohol-related sexual risks in the setting of commercial sex, and underscore the importance of incorporating alcohol use reduction into HIV/STDs risk reduction programs among FSWs. The study also put into urgency the need to improve consistency of condom use for multiple sexual encounters, as is typically the case in commercial sex setting. Future interventions may also focus more on teaching FSWs practical tactics of condom use in the face of difficult (e.g. intoxicated) clients.

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Research highlights

- We modeled on alcohol use and sexual behaviors with clients among sex workers.
- We examined the event-level associations between alcohol use and sexual risk.
- Alcohol use increases likelihood of unprotected sex with clients.
- Effect size of alcohol use declines with an increase in the number of clients.
- A larger number of drinks was related to more unprotected sex.
- Clients' intoxication was related to less unprotected sex.

Demography, drinking-related characteristics, psychological and venue-level index of FSWs who had sex with clients during the past two days¹

Table 1

Variables of interest	Yesterday		The day before yesterday			
	Drinkers (N=125)		Non-drinkers (N=211)		Drinkers (N=101)	
	%(n)	%(n)	%(n)	%(n)	%(n)	%(n)
Total number of drinks taken						
1-4	16.98(9)	/	/	15.00(6)	/	/
5-8	16.98(9)	/	/	12.50(5)	/	/
9-12	20.75(11)	/	/	25.00(10)	/	/
13	45.28(24)	/	/	47.50(19)	/	/
Total number of clients accepted						
1 client	34.40(43)	28.91(61)		28.71(29)	32.32(64)	<0.001
2-3 clients	12.80(16)	48.82(103)		7.92(8)	44.95(89)	
4 clients	52.80(66)	22.27(47)		63.37(64)	23.79(49)	
Had at least one client who got drunk	53.93(66)	75.90(148)		37.74(20)	63.39(71)	0.001
Had unprotected sex with at least one client	55.20(69)	15.17(32)		65.35(66)	14.14(28)	<0.001
Age (in year)						
20	40.80(51)	21.80(46)		45.54(46)	21.21(42)	<0.001
20-25	42.40(53)	35.55(75)		37.62(38)	36.87(73)	
26-30	11.20(14)	20.85(44)		15.84(16)	19.19(38)	
> 30	5.60(7)	21.80(46)		0.99(1)	22.73(45)	
Income (in yuan)						
1000	18.70(23)	25.24(53)		23.23(23)	23.74(47)	0.69
1000-2000	34.18(42)	22.86(48)		29.29(29)	24.75(49)	
>2000	47.15(58)	51.90(109)		48.48(47)	51.52(102)	
High school and above education	35.14(39)	32.41(70)		39.78(37)	29.50(59)	0.08
	Mean (SD)	Mean (SD)		Mean (SD)	Mean (SD)	
Venue support for condom use (0-1)	0.55(0.01)	0.61(0.01)		0.54(0.01)	0.62(0.01)	<0.001
Perceived HIV/STDs susceptibility (1-4)	1.77(0.03)	1.78(0.03)		1.76(0.03)	1.79(0.03)	0.42

Variables of interest	Yesterday		The day before yesterday		p value ²
	Drinkers (N=125)		Non-drinkers (N=211)		
	% (n)	% (n)	% (n)	% (n)	
Sex-related expectation about alcohol (1-4)	1.55(0.03)	1.46(0.02)	1.57(0.02)	1.44(0.02)	<0.001

¹Number of observations may not add up to total sample size due to missing values;

²P-value from chi-squared analysis or two sample t-test.

Table 2

Multiple logistic regression using generalized estimating equation with robust variance estimation of condom use in relation to alcohol use by the past two days

Predictors	Unprotected sex with clients (drinkers vs. non-drinkers)				Unprotected sex with clients (drinkers who reported number of drinks)			
	OR	aOR	(95% CI)	OR	aOR	(95% CI)	OR	aOR
Event-level & alcohol-related variables								
Alcohol use (yes/no)	8.92 ^{***}	/	/	15.87 ^{***}	/	/	/	/
With first client	/	12.71 ^{***}	(6.05–26.74)	/	15.75 ^{***}	(6.42–38.61)	/	/
With second client	/	8.46 ^{***}	(3.97–18.02)	/	12.92 ^{***}	(5.23–31.91)	/	/
With third client	/	5.63 ^{***}	(2.36–13.47)	/	10.60 ^{***}	(3.85–29.18)	/	/
With fourth client	/	3.75 [*]	(1.30–10.80)	/	8.70 ^{***}	(2.63–28.73)	/	/
Number of drinks	/	/	/	/	/	/	1.06	1.14 [*]
Clients got intoxicated	0.69	0.37 [*]	(0.17–0.81)	1.06	0.58	(0.28–1.20)	0.51	0.12 ^{**}
Number of clients	1.53 ^{***}	/	/	1.63 ^{***}	/	/	1.37 ^{***}	/
Drinkers	/	1.28 [*]	(1.05–1.55)	/	1.47 ^{***}	(1.16–1.87)	/	1.02
Non-drinkers	/	1.92 ^{***}	(1.56–2.37)	/	1.80 ^{***}	(1.47–2.20)	/	/
Measures under the HIV-risk behavior & alcohol use								
Venue support for condom use	0.07 ^{***}	0.08 ^{**}	(0.02–0.35)	0.09 ^{***}	0.20 [*]	(0.05–0.83)	0.07 ^{**}	0.28
Perceived HIV/NASTDs susceptibility	0.56 ^{**}	2.41 ^{**}	(1.43–4.07)	0.63 [*]	1.99 [*]	(1.07–3.72)	2.1 [*]	5.36 ^{**}
Sex-related alcohol expectation	1.97 [*]	1.58	(0.78–3.20)	2.06 [*]	1.38	(0.58–3.29)	0.94	1.7
Social & demographics characteristics								
Age	0.95 ^{**}	1	(0.94–1.05)	0.91 ^{***}	0.98	(0.92–1.04)	0.94	1.05
Education	0.76 [*]	0.96	(0.46–2.00)	0.81	0.67	(0.30–1.49)	0.64	0.17
Income (in thousand)	0.84 ^{***}	0.89	(0.76–1.04)	0.85 ^{***}	0.92	(0.80–1.05)	0.98	1.14

* p<0.05;

** p<0.01;

p<0.001

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