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Alcohol Use and Sexual Risks: Use of the Alcohol Use Disorders Identification Test (AUDIT) Among Female Sex Workers in China

Yiyun Chen[1], **Xiaoming Li**[2], **Chen Zhang**[3], **Yan Hong**[3], **Yuejiao Zhou**[4], and **Wei Liu**[4]

[1]Department of International Health, Bloomberg School of Public Health, Johns Hopkins University, Baltimore, MD, U.S.A

[2]Carman and Ann Adams Department of Pediatrics, Prevention Research Center, Wayne State University School of Medicine, Detroit, Michigan, U.S.A

[3]Department of Social and Behavioral Health, School of Rural Public Health, Texas A&M Health Science Center, College Station, TX, U.S.A

[4]Guangxi Center for Diseases Control and Prevention, Nanning, China

Abstract

The association between alcohol use and sexual risks among female sex workers (FSWs) has been insufficiently studied. This article reports a cross-sectional study of the relationship between alcohol use risk, measured by the Alcohol Use Disorders Identification Test (AUDIT), and sexual risk behaviors among 1,022 FSWs in Guangxi, China. Bivariate analysis showed that FSWs at higher AUDIT levels tended to have earlier sexual initiation, younger age of involvement in the sex trade and were more vulnerable to sex under the influence of alcohol. Multivariate analysis revealed an independent association of problem drinking with both unprotected sex and a history of sexually transmitted diseases. Alcohol use in commercial sex shall be considered as an occupational hazard that requires immediate intervention. Future longitudinal studies are needed to confirm the association between alcohol use and sexual risks among this most-at-risk population.

Background

Globally there is considerable burden of disease with regard to both alcohol use and unsafe sex. According to a comparative risk assessment by the World Health Organization (WHO), alcohol use has been identified as a leading cause of mortality and disability, contributing 58 million or 4% of all disability adjusted life years (DALYs) lost worldwide(Ezzati, Lopez, Rodgers, Vander Hoorn, & Murray, 2002; WHO, 2002). At the same time, unsafe sex accounted for 3.0% of the total DALYS lost globally especially through the HIV infection, which causes the loss of 92 million or 6.3% of all DALYs annually with the proportion of infection attributable to unsafe sex ranging from 25% in Eastern Europe to 95% in Africa (WHO, 2002). The interplay between alcohol use and unsafe sex, however, may further amplify the contributions of alcohol and unsafe sex to the global burden of the disease (WHO, 2005).

Despite the serious implications of the alcohol-sex relationship, relatively limited literature exists on the co-occurrence of the two risk situations, especially among people vulnerable to alcohol use, sexual risk behavior and HIV. Since both alcohol use and sexual behaviors are

Corresponding author: Yiyun Chen, MSPH, Department of International Health, Bloomberg School of Public Health, Johns Hopkins University, 615 N. Wolfe Street, Baltimore, MD 21205, Phone: 757-748-4932, yiychen@jhsph.edu.

culturally-contextualized, WHO has recommended conducting studies in countries that varied widely in culture and prevalence of these behaviors (WHO, 2005). Researches from different countries that can contribute to the understanding of the alcohol-sex-HIV nexus and highlight some commonalities across cultures are to be of global relevance (WHO, 2005). Therefore, the current study attempts to fill in the gaps in knowledge regarding alcohol and sex among female sex workers (FSWs) in China, a nation being burdened by HIV/AIDS and with a rapid increase in alcohol use particularly within certain high-risk groups.

By the end of 2009, there was an estimated 740,000 people living with HIV/AIDS in China, of whom 44.3% contracted HIV through heterosexual contact (China Ministry of Health, 2009). As sexual transmission continues to be the predominant route of HIV transmission in China, commercial sex has been recognized as one of the major driving forces behind this growing epidemic. The number of female sex workers (FSWs) in China was growing concurrently with the expansion of HIV infections (Hong & Li, 2009). An estimated 4 to 10 million FSWs currently exist in China with a sexually transmitted disease (STD) prevalence ranging from 40% to 50% (Ma et al., 2002; Qu, 2002; van den Hoek et al., 2001) and HIV prevalence between 1% to 11% (Chen et al., 2005; Yu & Chen, 1999), which could be severely underestimated as a result of the high mobility and low rate of participation in voluntary counseling and testing among this population. This alarming trend calls for immediate action to launch proper HIV prevention among FSWs and therefore generates an imperative need to identify determinants of sexual risk behaviors among FSWs.

Alcohol use has long been recognized as an inseparable component of commercial sex (Plant, Plant, & Thomas, 1990). Apart from the entertaining aspect of alcohol drinking, the economic reliance of entertainment establishments on alcohol selling further consolidated the status of alcohol in the commercial sex industry (Wang, Li, Stanton, Zhang, & Fang, 2010). Although traditional Chinese culture discouraged alcohol use among women (Cochrane, Chen, Conigrave, & Hao, 2003), alcohol consumption has become much more prevalent among FSWs in China (Rogers, Ying, Xin, Fung, & Kaufman, 2002; Wang, et al., 2010). Authors of two studies from China documented that 30% to 42% of FSWs drank before having sex and both studies reported that at least one-third of FSWs experienced monthly intoxication (Rogers, et al., 2002; Wang, et al., 2010). Researchers from countries where female drinking was forbidden or strongly condemned by the local culture have also reported excessive alcohol consumption among FSWs (Nieuwkerk, 1992; Samet et al., 2010).

In contrast to growing awareness of the overlap between HIV-related risk and alcohol use among FSWs as well as a long-term concern for the role alcohol plays in HIV and STD transmission, few studies have been conducted in China to specifically examine the association between alcohol use and unprotected sex within this “dual risk” population. Based on a qualitative study among 69 FSWs in Beijing, Rogers et al proposed alcohol consumption as a likely risk factor for HIV-related risk behaviors (Rogers, et al., 2002). In one study conducted in Beijing and Nanjing, alcohol intoxication was found to be associated with participation in commercial sex among female migrants (Yang et al., 2005). In a study among FSWs in a rural county in Guangxi, China, drinking alcohol before having sex with clients was found to be associated with having an acute STD (Wang, et al., 2010).

Although the relationship between alcohol use and sexual risks has been documented in some studies, the existing global literature produced mixed results regarding association between alcohol use and unprotected sex. Alcohol consumption was reported to be linked to sexual risk-taking and HIV infection (Cooper, 2002, 2006; Leigh & Stall, 1993) in some studies, whereas some others researchers found no positive association of alcohol

consumption with either unprotected sex or HIV/STD infections (Degraaf, Vanwesenbeeck, Vanzessen, Straver, & Visser, 1995; Folch et al., 2008; M. A. Plant, 1990; Yadav et al., 2005). One possible reason for the discrepancies was the use of different types of alcohol use measures in various studies (Li, Li, & Stanton, 2010). Therefore, there is a need to use standard measures of alcohol use to confirm or refine the observed associations between alcohol consumption and sexual risk behaviors (Kalichman, Simbayi, Kaufman, Cain, & Jooste, 2007).

Following the recommendation in the literature (Kalichman, et al., 2007; Li, et al., 2010), we used one of the standard measures of alcohol use and misuse, the Alcohol Use Disorders Identification Test (AUDIT) (Saunders, Aasland, Babor, de la Fuente, & Grant, 1993) in the current study. We hypothesized that FSWs who scored higher on AUDIT were more likely to engage in HIV related sexual risk behaviors. Because some researchers have suggested that sexual behaviors tended to differ by sexual relationship (Yang, Xia, Li, Latkin, & Celentano, 2010), the association between alcohol use and sexual risk behavior were examined separately for stable and casual sexual relationships.

Methods

Study Site

Data used in this study were derived from the needs assessment in 2009 of a venue-based HIV and alcohol use risk reduction intervention among FSWs in Guilin and Beihai, two of the most famous tourism cities in Guangxi Zhuang Autonomous Region (Guangxi), China. Guangxi Province has the highest incidence of HIV infection and second highest HIV prevalence among 31 provinces in China. A total of 48,703 HIV-infected cases were reported by June 2009 and new cases of HIV were reported at a rate of 30 per day. Sexual transmission has been increasing in Guangxi and accounted for 65% of the new HIV infections between 2008 and 2009 (Liu, 2009). A booming economy and a prosperous tourism industry in Guangxi have created a market for commercial sex (Liu, 2009).

Participants and Survey Procedures

Participants were recruited from nine different types of commercial sex settings including night clubs, saunas, karaoke, bars, hair salons, massage parlors, mini-hotels, restaurants, and the streets. The owners and/or managers of the establishments were contacted for their permission to conduct research in their premises. Street-based sex workers were recruited through direct personal contact or referral from their peers. A total of 1,022 women (515 in Beihai and 507 in Guilin) agreed to participate in the study. Written informed consent was obtained from each of the participants and the survey was conducted in private spaces in or near the locations where the participants were recruited. For participants who needed help to complete the survey, trained interviewers were available to provide necessary assistance. The study protocol was approved by the Institutional Review Boards at Wayne State University in the U.S. and Bejing Normal University in China.

Measures

Demographic information—Demographic characteristics included age, ethnicity, education, marital status, living arrangement, home residency, and monthly income (in Chinese Yuan) were assessed in this study. For the purpose of data analysis in this study, we dichotomized ethnicity into Han versus non-Han. Han is the dominant ethnic group, accounting for about 92% of the total Chinese population (China National Bureau of Statistics, 2005). Similarly, education was dichotomized into no more than middle school versus higher than middle school, marital status into ever married versus never married, home residency into rural versus urban, living arrangement into living alone versus living

with other people. The monthly income was categorized into three groups: no more than 1000 Yuan, 1001 to 2000 Yuan, more than 2000 Yuan.

Alcohol use—Alcohol use was measured using AUDIT, a culturally validated tool for screening of hazardous and harmful alcohol consumption (Babor, Higgins-Biddle, Saunders, & Monteiro, 2001). AUDIT consists of 10 questions assessing hazardous alcohol use (Items 1-3), dependence symptoms (Items 4-6) and harmful alcohol use (Items 7-10). The hazardous alcohol use included frequency of drinking, typical quantity of drinking, and frequency of heavy drinking (e.g. how often participants had more than 6 drinks in one episode). The dependence symptoms included impaired control (the frequency of being unable to stop drinking once started), increased salience of drinking (the frequency of being unable to do normal activities because of drinking), and morning drinking (need a drink in the morning to get going after a heavy drinking session). The harmful alcohol use contained guilt after drinking, blackouts, alcohol-related injuries, and concerns from others. AUDIT scale score ranges from 0 to 40. Based on the guidelines provided in the AUDIT scoring manual and previous research, two different scoring systems were employed in the current study. The first system used a score of 8 or higher as an indicator for probable drinking problem and a score of 13 or higher for probable alcohol dependence (Saunders et al., 1993). The second scoring system divided alcohol use into four levels of risk with different cut-offs: low risk (AUDIT score = 0-7); risk drinking (AUDIT score = 8-15); heavy drinking (AUDIT score =16-19); hazardous drinking (AUDIT score = 20-40) (Babor et al., 2001). We reported the distribution of participants according to both scoring systems but the second one was adopted in the multivariate analysis.

HIV related sexual risks—Sexual risks included inconsistent condom use, history of STD infections, and sex under the influence of alcohol. For condom use, participants were asked about their overall frequency of condom use (never, occasionally, sometime, often and always) with casual or stable partners and the number of times (0-3) they had used condoms during their most recent three sexual episodes with casual or stable partners. Inconsistent use of condom was defined as “not always” using condoms during lifetime or not using a condom every time during most recent three sexual episodes. Sex under the influence of alcohol was assessed by the questions “How often have you used alcohol before having sex with casual partners (or clients)?” and “How often have you had sex with intoxicated clients?” Response to each question was initially based on a 5-point scale ranging from “never” to “always” and was subsequently dichotomized (“ever/never”) for the purpose of data analysis in the current study. *Perceived peer risk involvement* was assessed using four items and participants were asked how many of the FSWs they knew drank alcohol, got intoxicated, drank with clients, and had sex with clients after drinking on a 5-point scale (none, some, about half of them, most, almost all of them). For the purpose of data analysis in the current study, the responses were dichotomized into “most” (including both “most” and “almost all of them”) vs. other responses (none, some, or about half of them) in the final analysis.

Data Analysis

Among the 1,022 women who participated in the survey, 983 provided non-missing responses to the AUDIT questions and these participants comprised the sample for the current study. First, Analysis of Variance (ANOVA) was conducted to examine the AUDIT score at both item and scale levels by age groups. Second, ANOVA for continuous variables and Chi-square statistics for categorical variables were conducted to examine the difference in social demographic characteristics by four alcohol use risk levels. Third, ANOVA and Chi-square statistics were employed to examine the bivariate associations between alcohol risk levels and different sexual risks. Finally, multivariate logistic regression was performed

to further examine the independent association of alcohol consumption with sexual risks. Three major sexual risk variables (inconsistent condom use with stable partners, inconsistent condom use with casual partners, and history of STDs) were used as dependent variables and the alcohol risk levels as independent variables in the regression models. Adjusted odds ratios (aOR) and 95% confidence intervals (95% CI) were obtained from the regression analysis. Key demographic characteristics including monthly income, age, ethnicity, residence, educational attainment and marital status were controlled for in all the regression analyses. All analyses were carried out using SPSS version 16.0 for Windows (SPSS Inc., 2007).

Results

Sample characteristics

The average age of the respondents (N=983) was 24.42 (SD=6.12) and most of them (78%) reported having received a high school education. Participants of Han ethnicity comprised 84% of the sample and 45% of the participants were urban residents. A majority of FSWs in the study (74%) had never married. About one third of them lived by themselves and another third lived with co-workers. Less than half of the participants (42%) earned more than 2000 Yuan a month.

Alcohol use and alcohol use problems

As shown in Table 1, alcohol consumption and problem drinking were highly prevalent among FSWs in the current study with an average AUDIT score of 9.33. Overall, more than one half of the FSWs scored ≥ 8 (probable drinking problem) and one-third scored ≥ 13 (probable alcohol dependence) on the AUDIT. Scores for each AUDIT domain significantly differed by age groups with a similar trend (e.g., AUDIT domain scores decreased with advancing age). Younger FSWs tended to have significantly higher risk as measured with each of the AUDIT items, except for impaired control, morning drinking and alcohol-related injuries.

Alcohol use risk and demographic characteristics

Table 2 presents the association between demographic characteristics and alcohol risk levels. FSWs who received at least a high-school education were more likely to be at higher levels of alcohol risk. Alcohol risk levels were also significantly associated with marital status and monthly income with FSWs who were married and/or had a monthly income over 2000 Yuan being more likely to have higher risk of drinking problems.

Alcohol use and sexual risk

Compared to their counterparts, FSWs with a higher level of alcohol risk reported more sexual risk behaviors (Table 3). FSWs who were at a higher risk level of alcohol had a younger age of sexual debut, younger age of being involved in commercial sex, higher likelihood of inconsistent condom use with stable and casual partners during both lifetime and most recent three sexual intercourses, higher likelihood of having sex under the influence of alcohol with both types of partners, and higher prevalence of a history of STD infection. Alcohol risk level was also positively associated with perceived peer risk involvement with FSWs at a higher risk level being more likely to perceive other FSWs involved in all four alcohol-related risk behaviors (drinking alcohol, getting intoxicated, drinking with clients, and having sex with clients after drinking).

Multivariate analysis

The multivariate analysis confirmed an independent association between alcohol risk levels and sexual risk behaviors. After adjusting for socio-demographic variables, problem drinking (risk drinking, heaving drinking and hazardous drinking) remained significantly associated with inconsistent condom use with both casual and stable partners. Although there was an increased likelihood of engaging in unprotected sex with the advancing alcohol risk levels, the pattern of this positive association was slightly different between recent three sexual episodes and life-time overall frequency regardless of partner types. During the recent three sexual episodes, hazardous drinkers (those with AUDIT score ≥ 20) were the most at risk of unprotected sex, doubling the risk among low risk drinkers (those with AUDIT score ≤ 7) with stable partners (aOR: 2.35, 95% CI: 1.25-4.40) and tripling the risk with casual partners (aOR: 3.46, 95% CI: 2.05-5.84). Yet heavy drinkers (those with AUDIT score between 15-19) were most likely to have used condom inconsistently with both types of partners in lifetime sexual experiences. Compared with low risk drinkers, heavy drinkers were 4 times more likely to have inconsistent condom use with stable partners (aOR: 4.25, 95% CI: 1.85-9.79) and 3 times more likely with casual partners (aOR: 3.30, 95% CI: 2.09-5.21). Alcohol use risk was also associated with a history of STD infection with FSWs at higher alcohol risk levels being more likely to have been infected with STDs, but the association was only significant among FSWs engaged in hazardous drinking (aOR: 2.68, 95%CI: 1.28-5.63).

As shown in Table 4, monthly income and marital status appeared to be significantly correlated with inconsistent condom use in the multivariate analysis. The likelihood of inconsistent condom use with stable partners during the last three sexual episodes decreased by 36% when monthly income decreased from 1000-2000 Yuan to less than 1000 Yuan (aOR: 0.64, 95% CI: 0.42-0.98). FSWs with a monthly income over 2000 Yuan had about 40% lower odds of inconsistent condom use with casual partners during both lifetime (aOR: 0.62, 95% CI:0.43-0.89) and last three sexual episodes (aOR: 0.67, 95% CI: 0.46-0.98) when compared with FSWs at the lowest income level. Other things being equal, a married FSW would be about twice as likely as a single FSW to have inconsistent condom use with casual partners during lifetime sexual experiences (aOR: 1.67, 95% CI: 1.07-2.59).

Discussion

As one of the first attempts to examine the relationship between alcohol use and sexual risk among FSWs in China using a standardized alcohol screening instrument, the current study helps to expand our knowledge in understanding the role of alcohol use in sexual risk behaviors. We found out in the descriptive analysis that alcohol use risk was associated with a series of sexual risk behaviors including early sexual debut, no condom use during the debut, younger age of commercial sex debut, having sex under the influence of alcohol, and inconsistent condom use. Although using different measures of alcohol use, some of these findings were comparable with studies from other countries. The relationship between alcohol use and early sexual experience was identified in studies from other low and middle income countries including Belarus, the Russian Federation, Kenya and South Africa (WHO, 2005). It has also been reported in studies conducted from high-income countries that drinking problems and alcohol exposure in early life were associated with involvement in commercial sex and many sex workers might have already developed an addiction to alcohol prior to their involvement in commercial sex (DeRiviere, 2005; Pedersen & Hegna, 2003; Silbert, Pines, & Lynch, 1982). Even though the cross-sectional nature of these studies precludes us from establishing a causal relationship between alcohol use and initiation of sex or the sex trade involvement, repeated confirmations of the association underscore the importance of alcohol risk reduction intervention targeting young women who are at risk of problem drinking and/or engaging in the sex trade.

FSWs often use alcohol, either coerced by clients or voluntarily, to facilitate the involvement in commercial sex, or to numb themselves by avoiding emotional involvement with irregular clients (Kumar, 2003; Nishigaya, 2002). They might also rely on alcohol to cope with the stress and anxiety they face regarding their involvement in commercial sex (Li et al., 2010). In the current study, the finding that FSWs with higher alcohol use risk were more likely to have both casual and commercial sex after drinking corresponds to those previous findings regarding the relationship between alcohol use and alcohol-related sexual behaviors. Furthermore, this finding also provides a new layer of information regarding a gradient relationship between alcohol use risk and alcohol-related sexual behaviors. All of these potential mechanisms behind the prevalent alcohol use among FSWs may imply a vicious circle where early alcohol use is associated with engaging in the sex trade which in turn is related to future drinking problem. A well-designed longitudinal study is needed to determine the temporal relationships between alcohol use and commercial sex involvement.

A positive association between alcohol use and unprotected sex was consistently recorded in most studies from low- and middle-income countries, though not among high-income countries (Li, et al., 2010). Results from our study tend to concur with those from low- and middle-income countries. The multiple regression analyses showed a highly significant positive relationship between alcohol use risk and the occurrence of unprotected sex even after adjusting for key socio-demographic characteristics. A positive association between alcohol risk and history of STD in the study further confirmed the findings regarding the relationship between drinking risk and unprotected sex. In addition, we not only documented a positive association between alcohol use and sexual risk, but also indentified an elevated risk of unprotected sex with the advance of AUDIT levels among FSWs in China. This evidence may lend more support to the finding of such an association.

When different types of partnership were considered, we found a positive association between alcohol use risks and sexual risk behaviors with both types of sexual partnership (stable and casual partners). Yet this finding was inconsistent with some other studies where a significant association between alcohol use and sexual risk behaviors was reported with casual partners, but not with stable partners (Cooper & Orcutt, 2000; Fortenberry, Orr, Katz, Brizendine, & Blythe, 1997; Seage et al., 1998) In the current study, even though the magnitude of association between problem drinking and inconsistent condom use was slightly stronger for sex with casual partners especially during the most recent three sexual episodes, the overall patterns were similar between the two types of partnership. The finding of a positive association between alcohol use and unprotected sex with both causal and stable partners would alarm the urgency of alcohol-related HIV prevention that targets both types of partnership.

The finding that higher alcohol risk levels were associated with higher education attainment is very likely to be the reflection of the association between education and working environment. It has been widely documented that FSWs can be classified into a multi-layer spectrum with those who work in higher-income establishments (e.g. KTVs and night clubs) having received more education than those at a lower level of the hierarchy (e.g. personal service venues or street walkers) (Fang et al., 2007; Huang Y, 2004; Yi et al., 2010). As in many other countries, alcohol sale was an important income revenue for entertainment establishments such as KTVs and night clubs in China and thus drinking was more prevalent among FSWs working in those establishments. Studies from other countries have also reported higher levels of alcohol use among FSWs in alcohol-selling or alcohol-serving venues (Chersich et al., 2007; Degraaf, et al., 1995; Yadav, et al., 2005). Therefore, the association between higher education and higher drinking risk among FSWs may be confounded by types of working environments.

Limitations

Some limitations of the study must be acknowledged for an appropriate interpretation of the results. As mentioned above, the cross-sectional design constrained our ability to draw causal conclusions regarding the associations between alcohol use and sexual risk behaviors. The study is also limited by its convenient sampling which may limit the generalizability of the findings. Moreover, although the AUDIT scale has provided us with more precision in describing alcohol use (Kalichman, et al., 2007), the data in the current study were still global-level measures that prevent us from a more accurate event-level assessment of alcohol use and sexual behaviors (Weinhardt & Carey, 2000). Furthermore, the data were collected from self-reporting which may be subject to social desirability and recall bias. Finally, “clients” and “casual partners” were two overlapping concepts and their co-appearance in the questionnaire may cause either over- or under-reporting of certain behaviors.

Implications

Despite those limitations, the findings have some important implications for future research and interventions. First, the positive association between problem drinking and sexual risk calls for efforts to integrate alcohol use reduction into HIV prevention intervention among FSWs, especially among those working at high-income entertainment establishments. Considering that many FSWs might have been addicted to alcohol before engaging in sex work, more intensive efforts toward this group of FSWs may be warranted. Second, given that alcohol use for many FSWs are job-related, alcohol use in working places can be considered as an occupational hazard which may require regular screening and intervention. FSWs at higher risk of drinking problems may be included into venue-based intervention with special emphasis of both alcohol and sexual risk reduction. Third, more event-level analyses are needed for a greater degree of precision in estimating the association in future studies. Finally, longitudinal study is needed to assess the relationship between alcohol use and sexual risk in order to better understand the dynamics of alcohol use among FSWs and the role of alcohol use in HIV infection and transmission among this most-at-risk population.

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Table 1

AUDIT scores by age group

	Age Group (Years)			
AUDIT Domains/Items	**Entire Sample**	**15-20**	**21-29**	**30-50**
N (%)	983(100%)	297(30%)	512(52%)	174(18%)
Hazardous Alcohol Use				
Frequency of drinking	2.25 (1.53)	2.59 (1.49)	2.30 (1.51)	1.53 (1.47) ****
Typical quantity	1.92 (1.68)	2.49 (1.65)	1.88 (1.63)	0.93 (1.44) ****
Frequency of heavy drinking	1.59 (1.56)	1.96 (1.60)	1.57 (1.55)	0.99 (1.34) ****
Dependence Symptoms				
Impaired control	0.56 (1.15)	0.68 (1.30)	0.48 (1.05)	0.58 (1.15)
Increase salience of drinking	0.41 (0.93)	0.58 (1.11)	0.34 (0.84)	0.31 (0.81) ***
Morning drinking	0.20 (0.70)	0.20 (0.74)	0.19 (0.67)	0.21 (0.74)
Harmful Alcohol Use				
Guilt after drinking	0.47 (0.97)	0.65 (1.15)	0.40 (0.88)	0.38 (0.87) ***
Blackouts	0.33 (0.82)	0.47 (0.97)	0.26 (0.72)	0.29 (0.78) **
Alcohol-related injuries	0.29 (0.91)	0.38 (1.05)	0.26 (0.89)	0.20 (0.74)
Others concerned	1.48 (1.76)	1.83 (1.83)	1.41 (1.75)	1.05 (1.55) ****
Total AUDIT Score	9.33 (7.35)	11.77 (7.33)	8.96 (6.94)	6.28 (7.29) ****
Risk Level (AUDIT Score)				
Probable drinking problem (≥8)	545 (55%)	202 (68%)	284 (56%)	59 (34%) ****
Probably alcohol dependence (≥13)	314 (32%)	132 (44%)	147 (29%)	35 (20%) ****
Low risk (0-7)	438 (45%)	95 (32%)	228 (45%)	115 (66%)
Risk drinking (8-15)	332 (34%)	115 (39%)	182 (36%)	35 (20%)
Heaving drinking (16-19)	123 (13%)	45 (15%)	66 (13%)	12 (7%)
Hazardous drinking (20-40)	90 (9%)	42 (14%)	36 (7%)	12 (7%) ****

Note: The number of participants for some of the variables did not add up to the total sample size because of missing data.

** p<0.01;

*** p<0.001;

**** p<0.0001

Table 2

Alcohol use risk level by demographic characteristics of female sex workers in Guangxi, China

	AUDIT Score				
	Entire Sample	**0-7**	**8-15**	**16-19**	**20-40**
N (%)	983 (100%)	438 (45%)	332 (34%)	123 (13%)	90 (9%)
Beihai City	477 (49%)	224 (51%)	162 (49%)	59 (48%)	32 (36%)
Guilin City	506 (52%)	214 (49%)	170 (51%)	64 (52%)	58 (64%)
Han Ethnicity	816 (84%)	375 (86%)	268 (82%)	97 (80%)	76 (85%)
Urban Residency	432 (45%)	191 (45%)	146 (45%)	47 (39%)	48 (54%)
≥High-school (HS) Education	367 (78%)	142 (33%)	136 (42%)	45 (37%)	44 (49%) **
Never Married	714 (74%)	286 (66%)	263 (80%)	98 (80%)	67 (76%) ****
Live Alone	346 (35%)	158 (46%)	118 (36%)	42 (34%)	28 (31%)
Live with Co-workers	336 (34%)	146 (33%)	120 (36%)	47 (38%)	23 (26%)
≥2000 Yuan Monthly Income	405 (42%)	162 (38%)	127 (39%)	67 (55%)	49 (54%) ****

Note: The number of participants for some of the variables did not add up to the total sample size because of missing data.

** $p<0.01$;

**** $p<0.0001$

Table 3

Alcohol use and sexual risk

	AUDIT Score				
Sexual Risk Behaviors	**0-7**	**8-15**	**16-19**	**20-40**	**p-value**
Age of sexual debut (SD)	19.18 (2.73)	18.32 (1.89)	18.05 (1.89)	18.02 (1.91)	<0.0001
Age of first sex trade (SD)	21.93 (5.66)	20.60 (4.18)	20.28 (3.80)	19.63 (3.58)	<0.0001
No condom use during the debut	120 (31%)	113 (40%)	38 (33%)	37 (45%)	<0.05
Inconsistent condom use with stable partner					
Lifetime	236 (76%)	206 (86%)	84 (92%)	59 (88%)	<0.0001
Most recent three sex intercourse	182 (59%)	170 (71%)	64 (70%)	51 (75%)	<0.01
Inconsistent condom use with casual partner					
Lifetime	141 (35%)	156 (54%)	68 (60%)	46 (57%)	<0.0001
Most recent three sex intercourses	90 (23%)	114 (39%)	52 (46%)	41 (50%)	<0.0001
Had casual sex after drinking	169 (42%)	155 (53%)	69 (60%)	60 (72%)	<0.0001
Had sex with clients after drinking	62 (29%)	104 (34%)	49 (42%)	43 (48%)	<0.01
Had sex with intoxicated clients	93 (23%)	53 (17%)	33 (28%)	27 (33%)	<0.01
Inconsistent condom use with clients after drinking					
Lifetime	46 (54%)	55 (48%)	21 (38%)	26 (55%)	
Most recent three sex intercourses	43 (57%)	56 (51%)	23 (44%)	24 (59%)	
Had a history of STD	28 (6%)	18 (6%)	15 (12%)	13 (15%)	<0.05
Perceived Peer Risk Involvement					
Most FSWs drink	92 (21%)	202 (61%)	96 (78%)	72 (80%)	<0.0001
Most FSWs get intoxicated	25 (6%)	79 (24%)	45 (37%)	41 (47%)	<0.0001
Most FSWs drink with clients	61 (14%)	174 (53%)	80 (65%)	69 (78%)	<0.01
Most FSWs have sex with clients after drinking	12 (3%)	21 (6%)	9 (7%)	10 (11%)	

Note: The number of participants for some of the variables did not add up to the total sample size because of missing data.

Table 4

Logistic Regression

	Inconsistent condom use with stable partner		Inconsistent condom use with casual partner		Sex under the influence of alcohol		History of STD
	Life time	Last 3 episodes	Life time	Last 3 episodes	Casual sex	Commercial sex	Ever had STD
Drinking Risk (AUDIT Level)							
Low risk (R)							
Risk drinking	2.05 (1.28, 3.28) **	1.78 (1.22, 2.61) **	2.44 (1.75, 3.41) ***	2.17 (1.52, 3.10) ***	1.91 (1.37, 2.66) ***	1.27 (0.85, 1.90)	0.80 (0.42, 1.54)
Heaving drinking	4.25 (1.85, 9.79) ***	1.81 (1.06, 3.07) *	3.30 (2.09, 5.21) ***	2.88 (1.81, 4.58) ***	2.39 (1.52, 3.76) ***	1.63 (0.99, 2.67)	1.75 (0.85, 3.59)
Hazardous drinking	2.48 (1.11, 5.55) *	2.35 (1.25, 4.40) **	2.60 (1.55, 4.37) ***	3.46 (2.05, 5.84) ***	4.61 (2.64, 8.04) ***	2.26 (1.31, 3.89) **	2.68 (1.28, 5.63) **
Monthly income (Yuan)							
≤1000							
1001-2000	0.60 (0.35, 1.03)	0.64 (0.42, 0.98) *	0.89 (0.61, 1.29)	0.82 (0.55, 1.22)	1.90 (1.29, 2.79) ***	1.52 (0.97, 2.38)	1.43 (0.68, 3.01)
>2000	0.62 (0.37, 1.06)	0.76 (0.50, 1.15)	0.62 (0.43, 0.89) **	0.67 (0.46, 0.98) *	1.92 (1.33, 2.76) ***	1.85 (1.21, 2.81) **	1.78 (0.89, 3.57)
Age	0.99 (0.95, 1.04)	1.01 (0.97, 1.05)	0.99 (0.96, 1.02)	0.97 (0.94, 1.01)	1.08 (1.05, 1.12) ***	1.04 (1.00, 1.08)	1.03 (0.97, 1.09)
Non-Han ethnicity	0.62 (0.36, 1.08)	1.01 (0.63, 1.61)	1.10 (0.75, 1.61)	1.12 (0.75, 1.67)	1.04 (0.71, 1.54)	1.17 (0.76, 1.82)	1.45 (0.77, 2.73)
Rural residence	1.31 (0.86, 1.99)	1.17 (0.83, 1.63)	0.86 (0.64, 1.15)	0.89 (0.66, 1.22)	1.12 (0.83, 1.50)	1.26 (0.90, 1.76)	0.91 (0.54, 1.53)
≥HS education	0.98 (0.64, 1.52)	0.94 (0.66, 1.33)	0.86 (0.64, 1.17)	0.87 (0.63, 1.19)	0.83 (0.61, 1.12)	1.01 (0.72, 1.41)	0.81 (0.47, 1.38)
Married	1.26 (0.69, 2.29)	0.91 (0.57, 1.45)	1.67 (1.07, 2.59) *	1.35 (0.84, 2.16)	0.78 (0.50, 1.22)	0.91 (0.55, 1.51)	0.69 (0.31, 1.55)

Note: The number of participants for some of the variables did not add up to the total sample size because of missing data.

* p<0.05;

** p<0.01;

*** p<0.001;

**** p<0.0001