Alcohol Use, Unprotected Sex, and Sexually Transmitted Infections Among Female Sex Workers in China

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Abstract

Background and Objective—Alcohol use has been suggested to interfere with condom use and to increase sexual risk behaviors. However, data on the prevalence of this practice among female sex workers and its association with condom use and sexually transmitted infections (STIs) are limited.

Methods—Data were collected through the baseline survey of an HIV prevention project among 454 establishment-based female sex workers in Guangxi, China, in 2004. Both global association and situational analysis were performed using 2 measures of alcohol use (alcohol intoxication and drinking alcohol before having sex with a client). Multiple logistic regression analyses were performed to examine the association of alcohol use with women's condom use and STIs.

Results—One-third of women reported being intoxicated with alcohol at least once a month during the previous 6 months, and about 30% reported using alcohol before having sex with clients. In comparison with women who did not use alcohol before engaging in sex with clients, women who did so reported significantly less consistent condom use and higher rates of both current STIs and a history of STI. However, alcohol intoxication was not associated with condom use and STIs. These findings indicate event-specific rather than global associations of alcohol use with inconsistent condom use and STIs.

Conclusion—Alcohol use before commercial sex is associated with unprotected sex and increased risk for STIs. Interventions that address both alcohol use and HIV risk behaviors in the context of commercial sex may have a great impact in preventing the spread of HIV in China.

Although the actual HIV sero-prevalence in China remains uncertain, the current official estimate of the number of persons infected with HIV is approximately 700,000 (range, 450,000–1,000,000).[1] Among reported cases, two-thirds were male, more than half of whom were 16 to 29 years of age.[2] In the past few years, there has been a shift in the HIV epidemic from intravenous drug injection to heterosexual transmission and from isolation of the epidemic among high-risk groups to involvement of the general population.[1,3] Since 2007, sexual transmission has increased and become the main mode for the spread of HIV in China.[2] Contributing to China's HIV epidemic is widespread commercial sex work; there are an

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estimated 4 to 10 million commercial sex workers in China.[4] The rate of HIV infection among commercial sex workers has been consistently increasing over the past few years. High HIV prevalence rates were reported among commercial sex workers at sentinel surveillance sites, with 10.3% in Yunnan Province and 16% in Guangxi Province.[5,6] A community-based study of 966 commercial sex workers in Guangdong province found that 14% were infected with syphilis, 32% with Chlamydia, and 8% with gonorrhea.[7] Behavioral-risk assessment data reveal that significant proportions of sex workers never use condoms. In 2001, a total of 37% of commercial sex workers in China reported never using condoms with their clients.[8]

As one of the modifiable factors that may influence sexual risk behavior, drinking alcohol has received increased attention in HIV-prevention studies in recent years. Alcohol use and intoxication has been linked with increased HIV sexual risk behavior (multiple sex partners and unprotected sex) among injection drug users.[9] Problem drinking was found to be associated with an increased risk of sexually transmitted infections (STIs) across a wide variety of populations.[10] However, a recent meta-analysis reviewing 13 studies on alcohol and condom use revealed that drinking is related to nonuse of condoms at first sexual encounters, but it is unrelated to condom use in recent sexual encounters.[11] Some studies have reported that drinking is related to unprotected sex for casual sexual partners but not for primary partners. [12,13] These data suggest that the relationship between alcohol use and unprotected sex depends on context and sexual experiences of partners. Nevertheless, several individual studies have not detected a significant association between alcohol use and STIs.[14,15]

Although alcohol use has long been recognized as a component of commercial sex,[16] few studies have specially examined alcohol use and its relationship with unprotected sex and STIs in the context of commercial sex. In the Netherlands, FSWs in clubs reported heavy drinking, and two-thirds gained earnings from sale of alcoholic beverage.[17] A sample of establishment-based FSWs in the Philippines found that 19% of FSWs used alcohol before sex and 37% had sex with intoxicated clients; both groups were associated with an increased risk of STIs.[18] A community-based study in Mombasa, Kenya, reported that 33% of FSWs were binge drinkers, having more than 5 drinks at at least 1 occasion in the previous month; binge drinking was related to unprotected sex, sexual violence, and STIs.[19] Another study among male clients of FSWs in Mumbai, India, found that drinking alcohol when visiting FSWs was associated with unprotected sex, anal sex, and more than 10 lifetime FSW partners.[20] In addition, FSWs' drinking was found to be associated with group sex in India[21]; anal intercourse, sex during menses, and intravenous drug use in Nairobi, Kenya[22]; and condom breakage in Mombasa, Kenya.[19] Several studies reported that both FSWs and their male clients used alcohol to facilitate participation in commercial sex. In South India, FSWs reported using alcohol with clients to facilitate enjoyment and involvement or to numb themselves to take clients without emotional involvement.[21] Male clients of FSWs in India brought alcohol for FSWs to drink so that they meet their sexual demands and fantasies.[23] However, several studies have not found significant associations between alcohol use and unprotected sex and STIs among FSWs.[19,22,24]

Data on alcohol use and abuse among FSWs in China are limited. In a sample of FSWs in Beijing, Rogers et al[25] found that alcohol was used during sex work by 42% of FSWs and 32% of male clients. Alcohol intoxication was found to be significantly associated with participation in commercial sex among female migrants in Beijing and Nanjing, China. Although traditional Chinese cultural normative values discourage alcohol consumption by women,[26] certain social and cultural aspects of commercial sex place FSWs at elevated risk of alcohol use and alcohol-use–related unprotected sex. First, commercial sex is illegal in China and sexual relations outside of marriage is strongly stigmatized and often referred to as a "social evil" in the conservative Chinese culture.[27] Male clients often deliberately use drinking as a means of decreasing inhibition or an "excuse" for engaging in commercial sex and other high-

risk behaviors. Second, many entertainment establishments in China rely on the heavy consumption (purchase) of alcohol to drive profitability; part of the FSWs' job is to promote alcohol use. Third, some FSWs are likely to use alcohol to cope with the stress and anxiety they feel regarding their involvement in commercial sex.[28],[29]

Using the baseline data from a large HIV-prevention project among a group of establishment-based FSWs in China, this study provides enhanced understanding of the relationship between alcohol use, unprotected sex, and STIs among FSWs. Specifically, we address the following 3 research aims: (1) To describe the patterns of alcohol use among this FSW population; (2) To examine socio-demographic, behavioral, and psychological correlates of alcohol use; (3) To examine whether alcohol use is associated with condom use, current STIs, and a history of STI among female sex workers (FSWs).

METHODS

Study Site

The study was conducted in a suburban area (H County) of Nanning, the capital city of Guangxi Zhuang Autonomous Region ("Guangxi") in 2004. The original study was a community-based voluntary counseling and testing (VCT) intervention study.[30] This analysis is based on the baseline data of the original VCT intervention study.

Guangxi has witnessed an alarming increase in HIV prevalence in the past decade. A total of 48,703 HIV-infected cases were reported by June 2009, which placed Guangxi second among 31 Chinese provinces in terms of HIV seropositive cases.[31] In the first half of year 2009, new cases of HIV were reported at a rate of 30 per day, which placed Guangxi first in the nation in terms of new cases reported. Until recently, IDU had been the major source of HIV infection, but sexual transmission has been increasing rapidly in recent years such that it has accounted for 65% of the new infections between 2008 and 2009.[31] A prosperous economy, increased international contact, and growing tourism in Guangxi have created a market for commercial sex. HIV prevalence among FSWs ranged from 1% to 11% in sentinel surveillance sites in Guangxi.[31]

Participants and Survey Procedure

The detailed recruitment procedure has been described elsewhere.[30] Briefly, the research team and local health workers conducted an ethnographic mapping of entertainment establishments providing commercial sexual services and identified 85 establishments in the survey areas. The owners and/or managers of these establishments were contacted for their permission to conduct research in their premises. We received permission from owners and/or managers of 57 (67%) establishments. Trained outreach health workers from the county antiepidemic station and local hospitals approached women in these establishments and invited them to participate in this study. Among the 582 women contacted, 454 (78%) women agreed to participate in this study and completed a self-administered questionnaire, and 410 (90.3%) women provided specimens or received clinical examination for testing of 5 STIs (i.e., syphilis, gonorrhea, Chlamydia, trichomonas, and genital warts). Participants were compensated the equivalence of US $3 for their participation.

Questionnaire Survey

A structured questionnaire was administered to all women who provided written informed consent. The self-administered survey was conducted in separate rooms or private spaces where participants were recruited (e.g., workplace, living quarters). The questionnaire was pretested in 2 waves among 22 women (7 in wave 1 and 15 in wave 2) to determine that the content and language were appropriate for the study population. No person was allowed to stay with the

participant during the survey except the interviewer who provided the participant with necessary assistance. For participants with limited literacy (approximately 10%), the interviewer read each question and response options from his or her copy of the questionnaire while the participant marked the response on her own copy. Therefore, the interviewers would not see their answers. The questionnaire took about 1 hour to complete. The study protocol was approved by the institutional review boards at Wayne State University in the United States, Beijing Normal University, and Guangxi CDC in China.

The questionnaire gathered data on demographics such as age, ethnicity, education level, hometown, marital status, and living arrangement. Information was collected on women's sexual behavior, including age at first sexual intercourse, duration of sex work, the maximum number of clients per day, the average number of clients per week, number of FSWs at the establishment, and sex after drinking alcohol. The survey also contained questions regarding HIV/STI knowledge, condom use skill, susceptibility, severity, self-efficacy of condom use, perceived benefits of unprotected sex, perceived establishment-level support, and condom use.

STI Testing

Screening was conducted by trained STD clinicians and laboratory technicians for 5 common STDs (*Neisseria gonorrhoeae*, *Chlamydia trachomatis*, trichomoniasis, syphilis, and *genital warts*). Blood specimens were drawn and assessed for syphilis using the Rapid Plasma Reagin (Xinjiang Xinde Co., China). Positive results were confirmed using the Serodia Treponema Pallidum Particle Agglutination (Fujirebio Inc., Tokyo, Japan) procedure. Cervical swab specimens were obtained from women to detect *N. gonorrhoeae*, *C. trachomatis*, and *trichomonas vaginalis*. *N. gonorrhoeae* was identified using standard culture procedure. Chlamydial infection was detected by rapid antigen test (Clearview, Unipath, United Kingdom). Trichomoniasis was diagnosed by detecting the motile parasite under a microscope. Genital warts were diagnosed by clinical examination performed by the STI clinician. All STI assays were conducted at the county antiepidemic station STI Laboratory. Investigators from the China CDC National Resource Center for STD Control provided supervision and quality control for all STI testing and diagnosis. All women who tested positive for any of the 5 STIs were provided with free treatment and were asked to notify their main partner about STI status and encourage their partners to be tested for STIs.

Measures

The primary variables of interest included women's alcohol use, condom use, STI history, and STI testing. HIV/STI knowledge, condom use skills, perceived susceptibility and severity, self-efficacy of condom use, perceived benefits of unprotected sex, and perceived establishment-level support were also included in this analysis.

Alcohol Use—Alcohol use was assessed by 2 items: "Have you been intoxicated with alcohol at least once per month in the last six months?" (yes/no) and "Have you ever used alcohol before having sex with a client?" (yes/no). Women were considered to have been intoxicated or to have consumed alcohol before having sex if they responded "yes" to these questions.

Consistent Condom Use—Participants were asked about the overall frequency of condom use with clients (never, occasionally, sometime, often, and always) and the number of times (0–3) they had used a condom during their last 3 episodes of commercial sex. The consistent use of condoms was defined in this study as using a condom every time during the previous 3 sexual episodes or always using a condom with their clients over life time.

Proper Use of Condoms—Proper use of condom was measured by asking women who reported any use of condoms as to how often they put on a condom before penetration when

having sex with a client. Proper use of condom was assessed along a 5-point Likert scale ranging from "never" to "always." For the purpose of data analysis, all responses other than "always" were combined into "improper use." "Proper use of condoms" was defined in this study as always putting on a condom before penetration when having sex with a client.

HIV/STI Knowledge—There were 22 items in the questionnaire addressing knowledge of STI symptoms (10 items), HIV transmission modes (6 items), and misconception of HIV transmission through routine daily contact (6 items). STI and HIV knowledge was measured by adding the number of correct answers to 10 questions on STI symptoms and 6 questions on HIV transmission. Conversely, HIV misconception was measured by adding the number of incorrect answers to 6 questions regarding the possibility of HIV transmission. The internal consistency estimates (Cronbach αα) for the 3 knowledge subscales were 0.82, 0.90, and 0.79, respectively. The sum of the correct answers to the 22 knowledge questions was retained as a single score of HIV/STI knowledge, with higher scores reflecting increased knowledge about the transmission and symptoms of HIV/STI.

Condom Use Skill—Participants were asked to sort 6 preprinted pictorial cards describing major steps of condom use. Using procedures developed by Wright et al,[32] a picture sequencing score was calculated for each participants on the basis of 2 criteria: closeness of each picture to its correct absolute position, and number of pictures that were sequenced correctly, regardless of their absolute position. To calculate these scores, each picture was initially numbered from 1 to 6 indicating its correct order. Then 1 point was given for every picture with a lower number that was placed to its left (maximum possible score of 15), and 1 point was given for each correctly adjacent pairs of pictures (maximum possible score of 5). These 2 scores were summed, yielding a maximum score of 20, with higher scores indicating increased condom use skills.

Susceptibility—The Susceptibility scale assessed perceived personal vulnerability to negative consequences resulting from sexual risk behavior. Participants were asked to rate the likelihood for them to acquire HIV or STI in the future (e.g., "how likely do you think it is that you would get an HIV or STI in the future?"). The 4-point response choices ranged from "very unlikely" to "very likely." This 2-item scale had a Cronbach α of 0.66. A composite score was obtained by summing responses to the 2 items, with higher scores indicating higher levels of perceived susceptibility.

Severity—This scale consists of 3 items assessing respondents' perception of negative consequences resulting from sexual risk behavior. Participants were asked to assess their perceptions regarding negative consequences resulting from being infected with HIV (e.g., "one will lose his/her friends if he/she becomes infected with HIV"). The 2 response choices included "disagree" and "agree." The Cronbach α for this 3-item scale was 0.71. A composite score was obtained by summing the numbers of positive responses across the 3 items, with higher composite scores indicating higher levels of perceived severity.

Self-Efficacy of Condom Use—The self-efficacy scale assessed personal belief about one's own ability to use a condom. There were 5 items measuring self-efficacy (e.g., "I can persuade my partner to use a condom if he is unwilling to use it;" "I will refuse to have sex if my partner does not want to use a condom"). The Cronbach α for the 5 items was 0.55. A composite score was created by summing the numbers of positive responses (e.g., "agree") across the 5 items. The composite score ranged from 0 to 5, with a higher score indicating a higher level of self-efficacy of condom use.

Perceived Benefits—Five items were used to measure perceived benefits of unprotected sex (e.g., "if I do not use condoms, my clients will pay me more"; "if I do not use condoms, my clients will come back in the future"). The Cronbach α was 0.75. A composite score was created by summing the numbers of positive responses (e.g., "agree") across the 5 items. The composite score ranged from 0 to 5, with a higher score reflecting a higher level of perceived benefits of unprotected sex.

Perceived Establishment-Level Support—Four items were used to assess perceived establishment-level support for condom use. These items included women's perceptions of the attitudes of their supervisor (called "mommy") toward condom use, access to condoms in the establishment, and discussion of condom use with their "mommy." The Cronbach α for the 4 items was 0.66. A composite score of perceived establishment-level support was created by indexing positive condom use attitudes and establishment practice (i.e., requiring and/or reminding FSWs to use condoms, allowing FSWs' refusal of sexual intercourse if a client does not use a condom, discussing condom use with FSWs, and providing FSWs with condoms). The composite score ranged from 0 to 5, with a higher score indicating a higher level of support for condom use.

Analysis

First, descriptive statistics (mean, standard deviation, and percentage) were calculated for socio-demographic and behavioral variables. Bivariate associations between alcohol use (both alcohol intoxication during the previous 6 months and alcohol use before engaging in commercial sex) and these variables were examined using χ^2 tests for categorical variables (Cochran-Mantel-Haenszel chi-square was used for ordinal variables) or Student t tests for continuous variables.

Second, the associations of the 2 alcohol use measures with HIV/STI knowledge, condom use skills, susceptibility, severity, perceived benefits of unprotected sex, and perceived establishment-level support were examined using Student t tests. Bivariate association between the 2 alcohol use measures and consistent condom use, proper use of condom, self-reported history of any STI, and current STI were assessed using Pearson's χ^2 tests.

Third, multiple logistic regression analyses were performed to further examine the association of alcohol use with consistent condom use and current STI. The dependent variables in the regression analyses were overall consistency of condom use and current STI status. For each of the dependent variables, 2 regression models were tested. The first model contained socio-demographic factors including age, ethnicity, education, hometown, marital status, living arrangement, and alcohol use. The second model (full model) expanded the first model by including behavioral, psychological, and structural variables that were associated with consistent condom use or STI status in bivariate analyses ($P < 0.10$). Adjusted odds ratios (aORs) and their 95% confidence intervals (CIs) were calculated. All statistical analyses were performed using the SAS 9.1.3. statistical software package (SAS Institute Inc., Cary, NC).

RESULTS

Characteristics of Study Sample

Baseline data were collected from 454 FSWs between March and May 2004. The average age of the women was 23.5 years; the participants had received an average of 5.7 years of formal education. Approximately 60% of the women received no more than primary school education. More than half of the women were of Han ethnicity, and Zhuang ethnicity constituted about one-third of the sample. Three quarters of the women lived with other FSWs, 14% lived alone, and 12% lived with relatives. Most (80%) of the women grew up in rural areas. Forty percent

of the women were married. The women had worked as sex workers for an average of 12.2 months. The women had their sexual debut at a mean age of 18.6 years. On average, each woman had 2 sexual clients per week, and a maximum of 1.2 clients per day.

As shown in Table 1, demographic characteristics and sexual behavior were compared between women who did and did not report ever having used alcohol before having sex with their clients, and between women who had and had not been intoxicated with alcohol. Of 454 FSWs interviewed, 133 (29.4%) women reported having had sex with their clients after drinking alcohol and 149 (32.8%) reported having had alcohol intoxication at least monthly during previous 6 months. There was no association of drinking alcohol before having sex or alcohol intoxication with ethnicity, education, living arrangement, hometown, and number of sexual clients. Women who used alcohol before having sex with a client and/or who reported alcohol intoxication were younger, more likely to be single, to have worked as sex worker for a longer period, and to have had their sexual debut at a younger age than women who denied alcohol use before sex and alcohol intoxication. Women who used alcohol before having sex and/or reported having been intoxicated reported more FSWs working at their entertainment establishments.

Bivariate Association of Alcohol Use With Consistent Condom Use and STIs

Table 2 depicts the association of psychological and structural factors with alcohol use. Women who used alcohol before having sex with a client reported a significantly higher level of perceived benefits of unprotected sex and misconception of HIV transmission ($P < 0.05$). Condom use skills, susceptibility, severity, self-efficacy of condom use, perceived establishment-level support were not associated with drinking alcohol before having sex. Monthly alcohol intoxication during the previous 6 months did not correlate with any of the variables at $P < 0.05$ level except susceptibility.

About a quarter and 15% of FSWs reported consistently using condoms during the last 3 commercial encounters and during their sexual life with clients, respectively. Among the participants who reported any use of condoms, approximately three-quarters reported that they always put on a condom before penetration when having sex with a client. Of 454 women in the study, 88 (19.4%) women reported a history of any STI. Of 410 women who were tested for 5 STIs, 41.5% were positive with at least 1 of the 5 STIs (Table 3).

Table 3 displays the association of alcohol use with condom use and STIs. Inconsistent condom use over their life time, a positive history of any STI, and being tested positive with an STI were significantly associated with drinking alcohol before having sex with a client. There were no significant differences between alcohol intoxication and condom use, a history of any STI, and current STI status. Consistent condom use during the most recent 3 commercial sexual encounters and proper use of condom were not associated with either of the alcohol use measures.

Multivariate Analyses of Factors Associated With Consistent Condom Use and STIs

Separate multiple logistic regression analyses were conducted for consistent condom use and STIs to determine which of these factors continued to be significant predictors (Table 4). Models 1 and 3 show that drinking alcohol before having sex with clients was significantly associated with inconsistent condom use and having a current STI, after controlling for socio-demographic factors. Women who used alcohol before having sex were 2 times less likely to use condoms consistently and 1.63 times more likely to be infected with any of the 5 STIs. In addition, women who were of non-Han ethnicity were less likely to use condom consistently. Women who grew up in urban areas were more likely to be infected with STIs.

Several behavioral, psychological, and structural variables that were associated with condom use or STIs at the bivariate level were added to Models 2 and 4 (full models). Non-Han ethnicity remained as a significant risk factor for consistent condom use in the full model (Model 2). In addition, a number of perceptions were significantly predictive of consistent condom use in the full model. Misconception of HIV transmission and perceived benefit of unprotected sex were negatively associated with consistent condom use and self-efficacy of condom use was positively associated with consistent condom use. However, alcohol use before engaging in commercial sex did not remain as a significant risk factor for consistent condom use in the full model (Model 2, aOR = 0.76, 95%CI = 0.36 –1.61). As shown in Model 4, none of the perceptions were associated with current STIs while having grown up in urban areas, and drinking alcohol before engaging in commercial sex were positively associated with having an STI.

DISCUSSION

One-third of the FSWs in our study reported using alcohol before engaging in the act of commercial sex with clients, and a similar proportion had been intoxicated with alcohol at least once per month during the previous 6 months. Younger age, single, longer period of sex work, early sexual debut, and working at a larger entertainment establishment are risk factors for alcohol use among FSWs. Chinese FSWs who used alcohol before sex, compared with whose who did not, were less likely to use condoms consistently and more likely to be infected with an STI. These findings are consistent with results from several studies conducted in Philippines and India.[18,20]

Alcohol may impair FSWs' mental judgment and lead to poor decision-making on condom use. It is also possible that FSWs drank with their client before sex and had difficulty in convincing an intoxicated client to use a condom.[33] However, alcohol intoxication was not found to be significantly associated with condom use and STI. This lack of association may result because alcohol intoxication is a general global measure of alcohol use and abuse. These incidences of alcohol intoxication might or might not be associated with specific commercial or noncommercial sexual encounters.

The finding in the current study confirmed the findings in previous studies that alcohol use in commercial sex is a prevalent problem in China.[25] Several social and cultural aspects of commercial sex may encourage FSWs to consume alcohol in their work places. First, all establishment-based commercial sex in China is operated under licensed practices of entertainment or personal services. Most of these sites involved heavy alcohol consumption (night clubs, dancing halls, discos, bars, restaurants, and hotels) and part of the FSWs' job is to promote alcohol use (to generate income for the establishment) or to entertain the clients by drinking with them, before engaging in commercial sex. Second, the secrecy and social stigmatization associated with commercial sex have created stress, conflict, and fear among FSWs[28,29] and they may use alcohol to cope with the anxiety and physical fatigue in their daily lives.

Data in the current study suggest that perceived benefits of unprotected sex and misconception of HIV transmission are significantly associated with using alcohol before having sex with a client. Future alcohol use and HIV risk reduction interventions among FSWs should focus on knowledge of HIV/STI transmission and prevention, and increasing the awareness and recognition of the severity and long-term negative health and financial consequences of unprotected sex. In addition, susceptibility was found to be positively associated with alcohol intoxication. Although the alcohol intoxication is a general global measure, women with a recent history of alcohol intoxication reported higher level of susceptibility. Future study is needed to further examine this relationship.

Drinking alcohol before having sex with clients was significantly associated with consistent condom use in multivariate analysis which includes only basic demographic variables. The increased risk did not persist in full model which includes other behavioral factors. Perhaps, this is because self-efficacy of condom use and perceived benefits of unprotected sex are stronger predictor factors for consistent condom use. The direct effect of alcohol use on consistent condom use was washed out when adding these variables into the model. It is also possible that self-efficacy of condom use and perceived benefits of unprotected sex were mediating the effect between alcohol use and unprotected sex.

There are several potential limitations in the current study. First, despite the efforts to recruit participants across a broad range of the FSW population using ethnographic mapping, the study sample remains a convenience sample. Caution should be used in generalization of findings from this study to other FSWs. Second, the use of self-report data raises questions about response bias, in that women may give socially desirable answers. It is possible that women misreported or underreported their risk behaviors, particularly in the context of alcohol. Third, because the original study (e.g., VCT among FSWs) was not specifically designed to evaluate alcohol use, information such as the quantity, frequency, or types of alcohol consumed, type of FSW establishment, FSW serving alcohol, and violence were not collected. Finally, some measures have relatively low reliability estimates (e.g., Cronbach $\alpha = 0.55$ for self-efficacy of condom use). Self-efficacy of condom use was included in the analysis because previous studies have identified it as a robust predictor of consistent condom use.[34,35]

Implications of the Findings

To our knowledge, this is the first study to evaluate the relationship of alcohol use with condom use and biomarkers of HIV risk in China. Findings from the current study have important implications for the development of HIV prevention interventions in the context of commercial sex work. First, our study has demonstrated that drinking alcohol before having sex with clients was significantly associated with inconsistent condom use and having a current STI, suggesting that alcohol may influence FSW's ability to practice safer sex and it may amplify the current and future course of the HIV epidemic in China. Thus, interventions that address both alcohol use (e.g., assisting FSW adopt safer drinking patterns) and HIV risk reduction may have a great impact in preventing the spread of HIV in China. Second, FSWs who work at larger entertainment establishments are more likely to drink alcohol before having sex with their clients. Therefore, venue-based alcohol use and HIV risk reduction intervention approaches should be used to target FSWs, their supervisors, and their clients. Third, HIV interventions should focus on increasing FSWs' knowledge on STI symptoms (e.g., only 26.8% of women knew that pain during intercourse is a symptom of STI) and correcting their misconception of HIV transmission (e.g., 49.6% and 62% of women thought that a person can get HIV by using a same swimming pool with a person who has HIV or being bitten by a mosquito, respectively). Finally, future HIV-prevention studies need to adopt standardized measures of alcohol use and abuse and use a longitudinal design to acquire in-depth understanding of the relationship between alcohol use and HIV risk in various settings.

Acknowledgments

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TABLE 1

Bivariate Associations of Socio-Demographic and Behavioral Factors With Alcohol Use Among a Group of Female Sex Workers in China

Characteristics	Overall	Drinking Alcohol Before Having Sex[*]			Alcohol Intoxication		
		Yes (n = 133)	No (n = 319)	t	Yes (n = 149)	No (n = 305)	t
Mean age (yr)	23.5 (5.1)	22.8 (4.9)	23.9 (5.1)	−2.07[‡]	22.1 (4.7)	24.2 (5.2)	−4.12[§]
Ethnicity[†]							
Han	54.7%	49.2%	57.0%	2.55	50.3%	56.5%	2.90
Zhuan	31.5%	36.7%	29.4%		37.2%	29.2%	
Other (Jingpo, Tong, etc.)	13.7%	14.1%	13.6%		12.4%	14.3%	
Mean schooling years	5.7 (3.3)	5.3 (3.5)	5.8 (3.2)	−1.38	5.8 (3.2)	5.7 (3.4)	0.32
Education[†]							
Primary school	58.4%	63.9%	56.1%	0.89	61.1%	56.7%	1.04
Junior high school	34.5%	27.8%	37.3%		31.5%	36.4%	
Senior high school	7.1%	8.3%	6.6%		7.4%	6.9%	
Living arrangement[†]							
Alone	14.0%	12.1%	14.7%	1.23	14.9%	13.8%	0.17
With other FSWs	74.5%	78.0%	73.0%		73.0%	74.7%	
With family member/relatives	11.5%	9.9%	12.2%		12.2%	11.5%	
Hometown[†]							
Rural	79.5%	81.9%	78.5%	0.90	77.9%	80.4%	0.37
County seat	13.4%	11.0%	14.4%		14.5%	12.8%	
Medium/large city	7.1%	7.1%	7.1%		7.6%	6.8%	
Marital status[†]							
Single with boyfriend	35.8%	35.3%	36.0%	15.70[§]	36.2%	35.3%	21.68[§]
Single with boyfriend	24.0%	35.3%	19.2%		36.2%	18.5%	
Married	40.2%	29.3%	44.8%		27.5%	46.2%	
Mean duration of prostitution (mo)	12.2 (12.2)	14.5 (13.6)	11.3 (11.4)	2.42[‡]	14.4 (13.2)	11.1 (11.5)	2.77[¶]
Mean age at first sexual intercourse (yr)	18.6 (2.1)	18.0 (1.7)	18.9 (2.2)	−4.64[§]	17.9 (1.9)	19.0 (2.1)	−4.97[§]
Mean no. clients per week	2.0 (1.7)	1.9 (1.4)	2.0 (1.9)	−0.50	1.9 (1.6)	2.0 (1.8)	−0.47
Mean no. clients per day	1.2 (0.6)	1.3 (0.6)	1.2 (0.6)	0.74	1.3 (0.7)	1.2 (0.6)	1.05

Characteristics	Overall	Drinking Alcohol Before Having Sex*			Alcohol Intoxication		
		Yes (n = 133)	No (n = 319)	t	Yes (n = 149)	No (n = 305)	t
Mean no. FSWs at the establishment	16.4 (9.8)	18.4 (9.5)	15.6 (9.8)	2.79¶	18.6 (9.8)	15.3 (9.6)	3.32§

Numbers in parenthesis are standard deviations.

*
There are 2 missing values for this variable.

†χ^2 test.

‡$P < 0.05$.

§$P < 0.001$.

¶$P < 0.01$.

TABLE 2

Bivariate Associations of Psychological and Structural Factors With Alcohol Use Among a Group of Female Sex Workers in China

Variables	Overall	Drinking Alcohol Before Having Sex*			Alcohol Intoxication		
		Yes (n = 133)	No (n = 319)	t	Yes (n = 149)	No (n = 305)	t
HIV/STI knowledge (0–22)	11.1 (3.8)	10.8 (3.7)	11.2 (3.9)	−1.06	10.6 (3.6)	11.3 (3.9)	−1.82[†]
STI symptoms (0–10)	3.3 (2.9)	3.3 (2.8)	3.3 (2.9)	−0.03	3.2 (2.7)	3.3 (2.9)	−0.43
HIV transmission (0–6)	4.4 (2.2)	4.4 (2.1)	4.4 (2.2)	0.01	4.3 (2.2)	4.4 (2.2)	−0.84
HIV misconception (0–6)	2.6 (2.0)	2.9 (2.1)	2.5 (2.0)	1.96[‡]	2.8 (2.1)	2.4 (2.0)	1.92[†]
Condom use skills (0–20)	17.7 (3.2)	17.3 (3.3)	17.9 (3.1)	−1.87[†]	17.6 (3.2)	17.8 (3.2)	−0.66
Susceptibility (0–6)	2.5 (1.2)	2.6 (1.2)	2.5 (1.1)	1.23	2.7 (1.3)	2.4 (1.1)	2.42[‡]
Severity (0–3)	1.8 (1.2)	1.7 (1.2)	1.9 (1.1)	−1.54	1.7 (1.2)	1.8 (1.2)	−1.10
Self-efficacy of condom use (0–5)	3.2 (1.4)	3.2 (1.3)	3.3 (1.4)	−0.51	3.3 (1.4)	3.2 (1.4)	0.30
Perceived benefit of unprotected sex (0–5)	1.9 (1.7)	2.2 (1.6)	1.7 (1.6)	3.23[§]	1.8 (1.6)	1.9 (1.7)	−0.90
Perceived establishment-level support (0–4)	1.3 (1.3)	1.2 (1.2)	1.3 (1.3)	−0.67	1.3 (1.2)	1.3 (1.3)	−0.04

Numbers in parenthesis are standard deviations.

*
There are two missing values for this variable.

[†] $P < 0.10$.

[‡] $P < 0.05$.

[§] $P < 0.01$.

TABLE 3

Bivariate Associations of Condom Use and Sexually Transmitted Infections With Alcohol Use Among a Group of Female Sex Workers in China (%)

Variable	Overall	Drinking Alcohol Before Having Sex			Alcohol Intoxication		
		Yes	No	χ^2	Yes	No	χ^2
Consistent condom use over life time (%)							
No	84.9	91.0	82.4		89.3	82.9	
Yes	15.1	9.0	17.6	5.40[*]	10.7	17.1	3.18[†]
Consistent condom use during the last three sexual encounters (%)							
No	76.0	78.8	74.8		79.7	74.3	
Yes	24.0	21.2	25.2	0.83	20.3	25.7	1.63
Proper use of condom (%)							
No	27.1	32.4	24.8		31.1	25.1	
Yes	72.9	67.6	75.2	2.22	68.9	74.9	1.45
Self-reported history of any STI (%)							
No	80.6	72.9	83.7		75.8	82.9	
Yes	19.4	27.1	16.3	6.94[‡]	24 2	17.1	3.24[†]
Any positive STI test (%)							
No	58.5	48.7	62.4		53.8	60.6	
Yes	41.5	51.3	37.6	6.50[*]	46.2	39.4	1.70

§ $P < 0.001$.

[*] $P < 0.05$.

[†] $P < 0.10$.

[‡] $P < 0.01$.

TABLE 4

Odd Ratios From Multiple Logistic Regression Analysis Showing Predictor Factors for Consistent Condom Use and STI Among a Group of Female Sex Workers in China

| | Consistent Condom Use (n = 428) | | | | STI (n = 384)* | | | |
| | Model 1 | | Model 2 | | Model 3 | | Model 4 | |
Characteristics	aOR	95% CI	aOR	95% CI	aOR	95% CI	aOR	95% CI
Age (yr)	1.01	0.93–1.10	1.00	0.91–1.10	0.99	0.93–1.06	1.02	0.95–1.10
Ethnicity								
Han	1.00		1.00		1.00		1.00	
Non-Han (Zhuang, etc.)	0.37	0.19–0.72	0.35	0.18–0.71	0.88	0.55–1.40	0.79	0.49–1.27
Education								
Primary school or below	1.00		1.00		1.00		1.00	
High school	1.03	0.59–1.80	0.82	0.44–1.52	0.65	0.41–1.01	0.73	0.46–1.16
Hometown								
Rural	1.00		1.00		1.00		1.00	
Urban (county seat, city)	1.74	0.95–3.22	1.33	0.68–2.59	1.81	1.08–3.04	1.92	1.11–3.30
Marital status								
Single	1.00		1.00		1.00		1.00	
Married	0.79	0.34–1.86	0.93	0.37–2.34	0.62	0.32–1.22	0.62	0.31–1.24
Living arrangement								
Alone	1.00		1.00		1.00		1.00	
With other FSWs	0.94	0.44–2.02	1.01	0.45–2.28	1.18	0.65–2.15	1.00	0.54–1.85
With family members or relatives	1.49	0.57–3.95	1.40	0.49–4.00	1.00	0.45–2.25	0.96	0.42–2.20
Age at first sexual intercourse (yr)			1.07	0.91–1.26			0.91	0.80–1.04
Duration of sex work (mo)			0.96	0.93–1.00			0.98	0.96–1.00
No. FSWs at the establishment				n/e			0.99	0.97–1.01
Misconception of HIV transmission			0.81	0.69–0.95				n/e
Condom use self-efficacy			1.66	1.28–2.17			0.86	0.73–1.01
Perceived benefit of unprotected sex			0.72	0.58–0.89				n/e
Perceived establishment-level support			1.14	0.90–1.45				n/e
Drinking alcohol before having sex								
No	1.00		1.00		1.00		1.00	

Characteristics	Consistent Condom Use (n = 428)				STI (n = 384) [*]			
	Model 1		Model 2		Model 3		Model 4	
	aOR	95% CI	aOR	95% CI	aOR	95% CI	aOR	95% CI
Yes	0.48	0.24–0.97	0.76	0.36–1.61	1.63	1.04–2.56	1.64	1.02–2.63

n/e indicates not entered in the model; aOR, adjusted odd ratio; CI, confidence interval.

[*] 410 female sex workers provided blood sample for STI testing.