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Drinking Reasons and Alcohol Problems by Work Venue among Female Sex Workers in Guangxi, China

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Abstract

Objective—Alcohol use is a key determinant of sexual risk behaviors but pathways to alcohol use in the context of commercial sex still remain unclear. The present study explores reasons for drinking and their roles on alcohol use problems among female sex workers (FSWs) in different types of commercial sex venues.

Method—In 2009, a sample of 1,022 FSWs from Guangxi, China completed a survey containing a 10-item Alcohol Use Disorders Identification Test (AUDIT) and a 28-item measure of reasons for drinking. Factor analysis revealed five reasons for drinking: suppression, disinhibition, work requirement, sexual enhancement, and confidence booster.

Results—All identified reasons except for confidence booster appeared to be related to a higher tendency of developing alcohol use problems among FSWs. Types of commercial sex venues moderated the relationship between work requirement and alcohol use problems. Conclusions: Alcohol-risk reduction interventions among this population need to provide them with alternative approaches to regulate emotions and modify their misconceptions about alcohol's sexual enhancing function. More attention is needed to FSWs' vulnerability to the negative influence of occupational drinking.

Keywords

Reasons for Drinking; Alcohol Use Problems; Female Sex Workers; Venue Types; China

INTRODUCTION

A systematic review of global literature has revealed that female sex workers (FSWs) in many countries experienced heavy and/or harmful alcohol consumption (Li, Li, & Stanton, 2010). Drinking in the context of sexual encounter is particularly problematic since alcohol can alleviate inhibitions to engage in sexual risk behaviors (Bianchi, 2005). A growing body of literature has identified alcohol use as a key determinant of sexual risk behaviors (Bryant, Nelson, Braithwaite, & Roach, 2010; Chen et al., 2013; Morojele et al., 2006). Calls for actions to address the problem of excessive drinking among sex workers have been mounting up (Li et al., 2010; Samet et al., 2010a; Wang, Li, Stanton, Zhang, & Fang, 2010),

but pathways to alcohol use in the context of commercial sex still remain unclear. A better understanding of the reasons behind alcohol use among FSWs is of great importance for reducing alcohol use problems in this population.

Cox and Klinger (2011) have pointed out that one common pathway to alcohol use is motivational and identified two possible dimensions of such a pathway: drinking for the enhancement of positive emotions (i.e., positive affect enhancement) and, drinking for the reduction of negative feelings (i.e., negative affect reduction) (Armeli, Tennen, Affleck, & Kranzler, 2000; Conrod, Castellanos, & Mackie, 2008; Cooper, Frone, Russell, & Mudar, 1995; Simons, Gaher, Oliver, Bush, & Palmer, 2005). The regulation of positive and negative moods (i.e., affect regulation) is central to several theoretical models that explain reasons for drinking (Cooper, 1994; Cooper et al., 1995; Cox & Klinger, 2011), and has inspired researchers to look into the mechanisms that link alcohol use to the regulation of positive/negative affective states (Labouvie & Bates, 2002).

Following the affect regulation paradigm, researchers have adapted more elaborated models such as the attention allocation model (Steele and Josephs, 1988, 1990) and the appraisal-disruption model (Sayette, 1993; Sayette et al., 2001) to clarify the connection between alcohol use and affect regulation. The attention allocation model indicates that alcohol helps to liberate wanted feelings and behaviors from inhibition by narrowing one's perception to the most salient cues; and the appraisal-disruption model claims that alcohol impairs one's appraisal of stressful information by suppressing negative appraisal of upcoming situations. Both the attention allocation model and the appraisal-disruption model have provided a meaningful link between alcohol use and affect regulation (Labouvie & Bates, 2002).

In addition, the use of alcohol to enhance sociability and confidence is also a widely recognized motivation for drinking (de Visser, Wheeler, Abraham, & Smith, 2013; Smith, Abbey, & Scott, 1993). Although drinking to improve social confidence is to some extent associated with affect regulation and attention allocation (Labouvie & Bates, 2002), it is unique in a sense that drinking motivated by social reasons is often a customary behavior made to avoid social costs rather than a personal pursuit made for emotional regulation (Cooper, Russell, Skinner, & Windle, 1992). Drinking to improve social confidence is therefore distinct enough to form a discrete motivation of drinking (Cooper, 1994).

The above mentioned paradigms and models of drinking motives have been widely adopted to understand reasons for alcohol use, but their application to FSWs, a population constantly living in the shadow of alcohol abuse, is relatively rare. The effort of addressing alcohol use problems among FSWs would likely benefit from the application of these theoretical or conceptual framework. In a limited albeit increasing number of studies that focus on alcohol use in sexual context, expectancies for sexual functioning and assertiveness have been found to predict excessive alcohol consumption and associated health problems (Nicolai, Moshagen, & Demmel, 2012; Zamboanga, 2005). Such expectancies are especially relevant in the context of commercial sex, for alcohol is also often used by FSWs and clients to facilitate participation in sex (de Ggraaf, Vanwesenbeeck, Vanzessen, Straver, & Visser, 1995; Gossop, Powis, Griffiths, & Strang, 1995; Kumar, 2003; Rogers, Ying, Xin, Fung, & Kaufman, 2002).

Also special to the context of commercial sex is the fact that alcohol use is largely occupational-related (Chen et al., 2012; Li et al., 2010). In many commercial sex venues, alcohol sale was directly related to the profitability of a venue and/or the income of sex workers (de Ggraaf et al., 1995). As a result, sex workers were often hired to promote sales of alcohol through engaging clients in drinking and providing them with sexual services (Harcourt & Donovan, 2005). Based on the existing knowledge about alcohol use in commercial sex settings, we anticipate that sexual enhancement and occupational requirement may serve as two major motivations of drinking among FSWs.

Previous researchers have recommended that any studies conducted among FSWs should give special attention to their work conditions (Vanwesenbeeck, 2001). Indeed different types of sex work venues appear to feature different patterns of alcohol use behaviors (Chen et al., 2012). FSWs working in night clubs tended to have a much higher level of alcohol consumption and prevalence of binge drinking than those working in other sites such as streets and brothels (Bautista et al., 2008; Chersich et al., 2007). Since drinking setting may be coupled with motivations to influence alcohol use behaviors (Morisky, Chiao, Ksobiech, & Malow, 2010), we further assume that work environment moderates the relationship between drinking motivations and alcohol use among FSWs.

FSWs in this study were recruited from Guangxi, China, where commercial sex industry is on the rise along with its rapid economic growth (Chen et al., 2013). Sexual transaction is law-prohibited in China and no official record of its prevalence is publically available, but according to estimation in the literature, the number of FSWs in China ranges from 4 to 10 million (Huang, Henderson, Pan, & Cohen, 2004; Pan, 2004; H. Yang et al., 2005). The large profit margin of alcohol sale and the popularity of drinking for entertaining people has made alcohol the most commonly used substance in commercial sex venues in China (Chen et al., 2013; Chen et al., 2012). A Previous study among FSWs in Guangxi has documented a high frequency of monthly alcohol use (67%) and a high rate of weekly intoxication (35%), with over a third of FSWs admitting using alcohol prior to sex (Chen et al., 2012).

To address the literature gap in identifying alcohol use motivations among FSWs, this study was designed to quantify the relationship between reasons for drinking and alcohol use problems with the following objectives: 1) explore reasons for drinking among FSWs, 2) assess the association between reasons of drinking and alcohol use problems among FSWs, and 3) examine the difference in the relationships of alcohol use reasons and alcohol use problems by work environment.

METHOD

Participants and study design

This study was based on data derived from a U.S. National Institutes of Health funded project conducted in 2009 in two cities of Guangxi Zhuang Autonomous Region in China. The data were cross-sectionally collected to facilitate the design of an alcohol-reduction intervention among FSWs. The procedures for sampling and recruitment were reported in detail elsewhere (Chen et al., 2013). Briefly, research participants were recruited from 60 entertainment establishments identified through ethnographic mapping. The illegality of

sexual transaction and the high fear of identity breaching among FSWs have made them a difficult-to-reach population. Because of the lack of formal and accurate census of commercial sex venues, we used convenient sampling, which is a common strategy to recruit similar populations (X. Yang, Xia, Li, Latkin, & Celentano, 2011). A total of 1,022 women consented to participate in a self-administered structured survey. For FSWs who had reading difficulty (less than 5%), interviewers read items and responses to the participants. The study protocol including consent and survey procedures was approved by the Institutional Review Boards at Wayne State University in the United States and Beijing Normal University in China.

Measures

Reasons for drinking—Participants were asked to rate their frequency of drinking due to each of 28 different reasons on a 5-point scale (1= never to 5 = almost always). The reasons included were chosen on the basis of relevant conceptual domains of alcohol use reasons from previous literature, and studies among FSWs regarding context of alcohol use in commercial sex.

Principle component analysis (PCA) with oblique rotation that allows correlation between factors was performed for 28 items. Five items (“my friends want me to drink”, “drinking can make me be brave”, “I want to make myself feel exited”, “drinking can help me to better relate to people I like”, and “drinking makes it easier for people to accept my requests”) were deleted due to small loadings (less than 0.40) following the general guideline in the literature (Worthington & Whittaker, 2006) and the remaining 23 items were used for subsequent scale construction. The final factorial structure contains five correlated factors: suppression, disinhibition, work requirement, sexual enhancement, and confidence booster (Table 1). The five factors accounted for 83.26% of the total variance. The first factor “suppression” is conceptually similar to negative affect regulation. The second factor “disinhibition” is theoretically parallel to positive affect enhancement, which as expected also incorporates the function of alcohol to enhance social atmosphere. The third factor “work requirement” corresponds to the profit mechanism in many commercial sex venues where alcohol sales are highly promoted. The fourth factor “sexual enhancement” corresponds to the expectancies that drinking can facilitate sexual activities either among FSWs or clients. The last factor “confidence booster” overlaps with “disinhibition” concerning the role of alcohol to improve sociability, but this factor weighs more towards the function of alcohol to improve internal confidence and to help avoid social cost during social interactions.

Demographic characteristics—Participants reported their age, ethnicity, types of hometown (rural vs. urban), education attainment, marital status, and monthly income (in Chinese currency Yuan). For the ease of interpretation, we categorized ethnicity into Han vs. non-Han (Han is the ethnic majority in China, accounting for more than 90% of the Chinese population), education attainment into “high school and above” vs. “below high school”, and marital status into “ever married” vs. “never married”. Age, monthly income, and age of alcohol debut were presented in a categorized form in descriptive analysis but were used as continuous variables in regression analysis (Royston, Altman, & Sauerbrei, 2006). Venues

from which participants were recruited were categorized into entertainment venues (e.g. night clubs), personal service venues (e.g. massage parlor), and street-based (Yi et al., 2010).

Age of alcohol debut—Participants were also asked to recall the age when they had their first full drink of alcohol, which was defined as at least one cup of beer, one shot of liquor or one glass of wine.

Perceived peer alcohol use—Perceived alcohol use among peers was assessed using three items: how many of your peers (i.e., FSWs you know) had been involved in drinking alcohol, being drunk, and drinking with clients. All three items have a 5-point scale with responses range from “none” to “almost all”. The three items have a Cronbach’s alpha of .87.

Alcohol use problem—Alcohol Use Disorders Identification Test (AUDIT) (Saunders, Aasland, Babor, Delafuente, & Grant, 1993) was used as a measure for alcohol use problem. The AUDIT score was developed to help identify excessive drinking as the cause of disorders. It consists of 10 questions covering three domains: hazardous alcohol use (typical quantity of drinking, frequency of drinking and heavy drinking), dependence symptoms (impaired control over drinking, increased salience of drinking and morning drinking) and harmful alcohol use (guilty feeling, black-out, injuries and others concerned about drinking). AUDIT score (Cronbach’s alpha=0.79 in the current study) ranged from 0 to 40 with a higher score indicating a more severe alcohol use problem. For descriptive analysis, we categorized AUDIT score into four levels (i.e., low risk, risk drinking, heavy drinking, and hazardous drinking) based on cut-off points suggested in the WHO guideline (Babor, Higgins-Biddle, Saunders, & Monteiro, 2001). AUDIT was used in its original metric in the regression analysis.

Analysis—Descriptive analysis was performed using Pearson’s Chi-squared test to examine differences in background variables, alcohol use problems, and drinking motivations by types of work environment. Bivariate regression was used to assess associations between reasons for drinking and alcohol use problems among three types of venues. Hierarchical multiple regression was employed to assess the relationships between reasons for drinking and alcohol use problems beyond the influence of background variables (Model 2 vs. Model 1), and also to evaluate the difference in these relationships by types of commercial sex venues (Model 3). Because only the relationship between work requirement and alcohol use problems appeared to be significantly modified by venue types, two interactions (i.e., personal service $\times$ work requirement, street-based $\times$ work requirement) were included in the final model. For all regression analyses, robust linear regression models were fit using bootstrapped iteratively reweighted least squares with 10,000 replications to reduce the effects of extreme or non-normal data for AUDIT score (Hamilton, 2004). All analyses were performed using STATA 11 (StataCorp, 2009).

RESULTS

We presented descriptive statistics of background characteristics, levels of drinking risk, and reasons for drinking by three types of commercial sex venue (Table 2). Significant

differences were found across three venue types in drinking risk and most social demographic characteristics. A majority of FSWs working at entertainment and personal-service venues were never married whereas nearly all of the street-based FSWs in the study were married. For entertainment and personal-service FSWs, proportions of urban and rural residents were evenly distributed, whereas most of the street-based FSWs were rural residents. Proportion of FSWs with at least high school education was highest in entertainment venues and lowest among street-based FSWs. A majority of FSWs working in entertainment venues were younger than 25 years old whereas those in personal service venues were older and street-based-FSWs were the oldest. Compared with street-based FSWs, entertainment and personal-service FSWs initiated alcohol use at a younger age and a higher percentage of them engaged in risk, heavy, and hazardous drinking based on their AUDIT scores. Among the five reasons for alcohol use, disinhibition and work requirement were adopted differently across three types of venues, with entertainment FSWs being the most likely to drink due to these two reasons and street-based FSWs being the least.

Bivariate associations between reasons for drinking and AUDIT scores were presented in Table 3. All five reasons for drinking were significantly associated with AUDIT scores in a positive direction among entertainment and personal-service FSWs. The association between work requirement and AUDIT scores was particularly strong among FSWs working in personal-service venues. For street-based FSWs, suppression was the only reason that has a significant association with AUDIT scores, though the magnitudes of all associations between five reasons and AUDIT scores were similar to those among entertainment and personal-service FSWs.

Table 4 presents the results of multivariate regression analysis of associations between reasons for drinking and AUDIT score beyond the influence of background variables. Social demographic characteristics, age of alcohol initiation and perceived peer alcohol use explained 36% of the variance in AUDIT scores (Model 1). FSWs who scored one unit higher on perceived peer alcohol use were 4.75 times (95% CI: 4.31–5.16) more likely to also score higher on AUDIT. Further adjustment of reasons for drinking led to an additional 7% increase in R-square (Model 2). Among five reasons for drinking, suppression, disinhibition, work requirement and sex enhancement were positively associated with AUDIT scores, whereas confidence booster was negatively associated with AUDIT scores. The strongest association appeared between work requirement and alcohol use problems with FSWs who were more likely to drink for occupational reasons being more likely to have a higher AUDIT score ($\beta=1.9$, 95% CI: 1.24–2.61).

Adding venue types and their interactions with work requirement in the final model further increased the R-square by 6% (Model 3). Perceived peer drinking was still positively associated with AUDIT scores but to a lesser extent ($\beta=1.74$, 95% CI: 1.17–2.34). AUDIT scores tended to decrease by 10% with each year of delay in initiating alcohol use among FSWs. Entertainment FSWs were 5 times more likely to score higher on AUDIT than personal-service and street-based FSWs. Notably the association between confidence booster and AUDIT score lost its significance after adjusting for venue types and interactions. In addition, work requirement, the strongest predictor of AUDIT score among all five reasons in Model 2 was no longer significantly associated with AUDIT among

entertainment and street-based FSWs. In contrast, the association between work requirement and AUDIT score remained strong among personal-service FSWs with those who had more alcohol due to occupational requirement being more likely to have a higher AUDIT score ($\beta=2.32$, 95% CI: 0.14–1.78). The other three reasons: suppression, disinhibition and sex enhancement were still positively associated with AUDIT score with no drastic change in the magnitude of coefficients as compared to the previous model. Disinhibition appeared to have the highest association with AUDIT score ($\beta=1.09$, 95% CI: 0.54–1.63), followed by suppression ($\beta=0.81$, 95% CI: 0.29–1.39), and sex enhancement ($\beta=0.69$, 95% CI: 0.18–1.17).

DISCUSSION

This study aims to explore reasons for drinking and their relationship with alcohol use problems, measured by AUDIT, among FSWs. The proposed measures of reasons were derived from previous research on reasons for drinking or alcohol-related literature among FSWs. Similar to other studies on alcohol use motives (Labouvie & Bates, 2002; Labrie, Hummer, & Pedersen, 2007), reasons found in this study form distinct domains but were also correlated and shared certain commonalities. Except for confidence booster, all other reasons were significantly associated with alcohol use problems among FSWs even after adjusting for social demographic characteristics, age of alcohol debut and perceived peer drinking which were known to predict alcohol use behaviors (Bertholet, Faouzi, Studer, Daeppen, & Gmel, 2013; Dawson, Grant, & Li, 2007). The relationship between work requirement and alcohol use problems differed by venues types.

The current study confirms among FSWs a positive relationship between suppression and alcohol use problems, which has been previously identified in other populations (Cooper et al., 1995; Doyle, Donovan, & Simpson, 2011; Merrill & Read, 2010; Stewart et al., 2011). Such an association collaborates with our knowledge on the life context of FSWs. Studies have shown that sex workers face many internal stressors such as depression and stigma and many external pressures including economic impoverishment and fear for police arrests. They may thus resort to alcohol use as a self-medication or maladaptive coping to reduce anxiety and negative feelings related to their illegal occupation (Fang et al., 2008; Hong, Li, Fang, & Zhao, 2007; Wechsberg, Lusenno, & Lam, 2005). The finding identified in the current study not only lends support to such a possibility that alcohol could be used proactively to cope with negative emotions among FSWs, but also adds to our knowledge that FSWs who drink to suppress negative feelings may be more likely to develop alcohol use problems than those who do not drink for this reason. Future interventions that aim to reduce alcohol-related harms among FSWs may assist this population to develop other approaches to adaptively cope with stress so that they may reduce their reliance on alcohol use in the face of various stressors.

In the current study, disinhibition appeared to be more strongly associated with alcohol use problems as compared to suppression, which is not in line with a previous study which documented that enhancement motives were less strongly associated with symptomatic or abusive drinking relative to coping motives (Cooper et al., 1992). A plausible reason for such a discrepancy is the difference in measures for alcohol use problems between the two

studies. In the study by Cooper and colleagues, drinking disorder is measured by abusive symptoms and was independent of drinking frequency and quantity, whereas our study used AUDIT which assesses both drinking pattern and abusive symptoms. The discrepancy in two studies may be attributable to the inclusion of drinking pattern in the AUDIT. In fact, in a later study conducted by Cooper and colleagues, when frequency of heavy drinking was analyzed as the outcome for drinking motives, enhancement motive was more strongly associated with heavy drinking than coping (Cooper, Agocha, & Sheldon, 2000).

Consistent with other studies which recognized alcohol as a facilitator of sexual encounters (Kumar, 2003; Nishigaya, 2002), the current study also identified sexual enhancement to be a reason for drinking among FSWs. Prior research has found that people who drink with the expectation for sexual enhancement may not necessarily engage in heavy drinking as the mere presence of alcohol in a situation is enough to heighten the appraisals of sexual potential of the situation (Davis et al., 2010). Yet in the current study we found that FSWs who drink to enhance sexual experience had a higher potential for developing alcohol use problems. This finding further highlights the importance of addressing sexual expectancy on alcohol use especially among FSWs who are at higher risk for excessive drinking and alcohol-induced unprotected sex (Kumar, 2003; Panchanadeswaran et al., 2008; Zachariah et al., 2003). Because alcohol may also be used to enhance sexual experiences by FSWs' male clients, who usually have more power over FSWs in deciding condom use (Blanc, 2001; Pulerwitz, Amaro, De Jong, Gortmaker, & Rudd, 2002; Xantidis & McCabe, 2000), it is highly suggested that interventions which attempt to modify expectancy of alcohol as a sex facilitator to target both FSWs and their clients in order to be effective. Venue based interventions is a potential way to address alcohol use behaviors for both FSWs and male clients (Samet et al., 2010b). Changing norms and correcting misconceptions about alcohol use within commercial sex venues could be a potential starting point. Further research is needed to understand the motivation of alcohol use among male clients of FSW.

Confidence booster, which reflects alcohol's role to help boost social confidence and avoid social cost, was the only reason that did not appear to be related to alcohol use problems among FSWs. This finding is somehow in contradiction with the common belief of alcohol's populous adoption in social encounters due to its function as a social lubricate (Orcutt, 1993). However despite evidence to the contrary of our common beliefs, this finding echoes with other studies which found that social motives were only associated with moderate alcohol use (Kuntsche, Knibbe, Gmel, & Engels, 2005) or were not associated with either drinking frequency or alcohol use problem (Merrill & Read, 2010). These studies indicated that social reinforcement motives do not serve as a central pathway to drinking. The finding in the current study also lent support to similar conclusion that drink to boost social confidence did not play a central role in producing alcohol use problems among FSWs. Such a phenomenon may hypothetically be explained by the fact that people who drink for confidence booster in social settings often drink in an obligated manner rather than voluntarily and thus have no internal urge to rely on alcohol than those who drink to manage emotions. One study in fact found that drinking was lower among drinkers who were non-internally motivated, or in other words, not motivated by enhancement or coping (Goldstein & Flett, 2009).

The relationship between work requirement and alcohol use problems differed by venue types in the study. Unlike personal-service FSWs, street-based and entertainment FSWs were not influenced by occupational drinking in terms of developing alcohol use problems. We suspect the lack of associations to be the result of a “flooring effect” for street-based FSWs or a “ceiling effect” for entertainment FSWs. Street-based FSWs (who were typically working “freelance”) often do not have such a mandate to drink during work and they may even dodge alcohol use to maintain self-control given the minimum protection they can get (Agha & Chulu Nchima, 2004; Harcourt & Donovan, 2005). In contrast, entertainment FSWs usually have easy access to abundant source of alcohol and are most likely to be invited or required to drink at work (Chen et al., 2012). Therefore the statistical variability of work requirement among entertainment and street-based FSWs may be too small to allow for the assessment of associations in these venues. Given the high demand of occupational alcohol use among entertainment FSWs, the lack of statistical association between work requirement and alcohol use problem in our data by no means undermines the importance in addressing the occupation-related drinking among this at-risk population. Additionally, the susceptibility of personal-service FSWs to alcohol use problems under occupational drinking may provide another potential explanation for the observed difference. The intensive exposure and social expectation to occupational drinking among entertainment FSWs could have prepared them to be capable of dealing with associated alcohol use problems, whereas personal-service FSWs were vulnerable to alcohol use problems when exposed to occupational drinking due to a lack of relevant experience. More studies are needed to unveil the mechanisms underlying these different patterns of associations by venue types. Interventions are needed to help personal-service FSWs tackle with the negative consequences of occupational alcohol exposure.

This study is one of the first investigations on reasons for drinking and their roles on alcohol use problems among FSWs. Yet the study results need to be interpreted with the following limitations in mind. First, the study used a cross-sectional design which limited our ability to make a causal inference of the relationships between reasons for drinking and alcohol use problems. Second, our study only included a convenient sample of FSWs from Guangxi and therefore the generalizability of our results may be limited. Third, the sample size for street-based FSWs is relatively small which limits our statistical power to assess relationships among this population. Fourth, some constructs of reasons for drinking in the study have not been previously used and future research will need to further validate these measures among different FSWs populations.

Despite these limitations, the findings of this study deepen our understanding of reasons for drinking, and provide implications for the design of interventions to reduce alcohol use problems among FSWs in different types of venues. The study found that FSWs who drink to suppress negative emotions or disinhibit positive feelings and those who engage in either voluntary or forceful drinking to facilitate sexual interactions may be more likely to develop alcohol use problems. The study also found that FSWs who work in personal-service venues were vulnerable to alcohol use problems once engaged in occupational drinking. Findings from this study highlight the importance of assisting FSW to develop alternative approaches to regulate emotions and modifying their misperceptions about alcohol’s sexual enhancing

function. Additionally, the study also calls for more effort to reduce alcohol use problems associated with occupational drinking among FSWs.

Biographies

Yiyun Chen, M.S.P.H., M.A., is a PhD student in social psychology at the University of Connecticut. She received a master's degree in public health from the Johns Hopkins University Bloomberg School of Public Health, and a master's degree in psychology from the University of Connecticut. Ms. Chen is currently a trainee under a NIMH-funded institutional training grant. Her research interests include but are not limited to psychosocial aspects of HIV/AIDS prevention, HIV medication adherence, and HIV-related risk factors such as alcohol and drug use. She has received extensive training in behavioral interventions and has been closely involved in several projects regarding HIV/AIDS prevention, care, and support. Her recent work focuses on multi-level analysis of HIV risk factors in sex work venues, as well as HIV medication adherence and food insecurity among people infected with HIV.

Xiaoming Li, Ph.D., is Professor and Director of the Pediatric Prevention Research Center at Wayne State University School of Medicine. He received his doctoral training at the University of Minnesota, in areas of educational psychology and research methodology. Dr. Li's research interests include global health issues related to tobacco smoking, alcohol and other drug use, stigma, mental health, and behavioral prevention intervention of HIV/AIDS. He has been funded by the World AIDS Foundation and NIH to conduct research in China since 2000. His recent work in China includes longitudinal psychosocial needs assessment among children and families affected by HIV/AIDS, culturally appropriate HIV behavioral prevention intervention among rural-to-urban migrant workers, and HIV and alcohol use risk reduction intervention among female sex workers and their clients. He has been also participating in HIV prevention research conducted in other international settings, including Namibia, Vietnam, India, Mexico, and The Bahamas.

Zhenzhu Tang, M.D., is the Director of the Centers for Disease Control and Prevention in the Guangxi Zhuang Autonomous Region. Dr. Tang graduated from the Guangxi School of Medicine in 1985 with a degree in Preventative Medicine. He obtained his master's degree from Guangxi Medical University in 2002. Dr. Tang has been conducting research related to HIV prevention, food security and nutrition, epidemiology, and public health management. He has published over 70 research papers as the first author, and has written two books. Dr. Tang is currently in charge of or involved in 7 research projects in China or abroad, and has been awarded 12 research-related prizes at the provincial or municipal level.

Zhiyong, Shen, M.D., is the Director of the Prevention and Control Division of HIV/AIDS under the Center for Disease Control and Prevention in the Guangxi Zhuang Autonomous Region. He received his degree in preventative medicine from the Guangxi School of Medicine in 1985, and a master's degree from Guangxi Medical University in 2004. Dr. Shen has long been involved in research related to infectious diseases, HIV, epidemics, and public health. He has published over 30 academic papers as the first author. Dr. Tang is currently involved in 5 research projects in China or abroad, and has been awarded research-related prizes at the provincial and municipal level for 3 times.

Yuejiao Zhou, M.D., is the Associate Director of the Prevention and Control Division of HIV/AIDS under the Center for Disease Control and Prevention in Guangxi Zhuang Autonomous Region. She has a Master's degree in Preventative Medicine and Public Health.

Dr. Zhou has been working on HIV/STD prevention among female sex workers, HIV voluntary counselling, and establishing comprehensive HIV prevention and treatment demonstration zones in China. She has been widely involved in the IX CDC-World Bank Loan Project, the 4th and 5th round of projects funded by Global Fund to fight HIV/AIDS, and the HIV Prevention Trial Network projects (HPTN033/058). Dr. Zhou has published over 30 research papers, and has extensive experiences working with communities.

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Table 1

Scale and Items Information on Reasons for Drinking

Scale (Cronbach's alpha)	Loading
Factor 1: Suppression (0.88)	
Drinking can make me relaxed when feeling depressed or nervous	0.613
Drinking can make me happy when I feel bad	0.563
Drinking can make me forget troubles	0.686
Drinking can bring me pleasure	0.495
I want to numb myself	0.736
Drinking can help me forget what I was doing	0.773
Factor 2: Disinhibition (0.84)	
Drinking can help me to fully engage in a party	0.697
I like the feeling that drinking brings to me	0.462
I drink in order to make friends	0.450
Drinking can bring much more fun when socializing	0.680
I like the atmosphere during alcohol drinking	0.540
Drinking can boost the atmosphere of a party	0.582
Factor 3: Work requirement (0.84)	
Clients want me to drink	0.892
To make clients feel happy	0.788
Drinking can help me make more money	0.522
Managers/madams want me to drink with clients	0.678
Factor 4: Sexual enhancement (0.83)	
Drinking can facilitate clients to finish sexual interaction more quickly	0.546
Drinking can improve the atmosphere of making sex	0.866
Drinking can add more fun to sexual behaviors	0.887
Factor 5: Confidence booster (0.74)	
I don't want to be laughed by others for not knowing how to drink	0.700
Drinking can improve my confidence	0.440
I don't want to feel being isolated because of not drinking alcohol	0.612
I want to make other people like me	0.491

Table 2

Demographic and Alcohol-related Characteristics by Venue Types

	Venue types		
	Entertainment (N=553)	Personal service (N=380)	Street-based (N=89)
Marriage ***	(N, %)	(N, %)	(N, %)
Never married	440(80.6)	280(74.3)	3(3.4)
Ever married	106(19.4)	97(25.7)	85(96.6)
Residence ***			
Rural	279(51.3)	208(56.1)	71(80.7)
Urban	265(48.7)	163(43.9)	17(19.3)
Ethnicity			
Non-Han	88(19.4)	63(16.6)	7(8)
Han	457(83.9)	316(83.4)	80(92)
Education ***			
< High school	317(57.7)	245(65.7)	78(89.7)
>=High school	232(42.3)	128(34.3)	9(10.3)
Age (in years) ***			
20	214(38.7)	85(22.4)	0(0)
20–25	213(38.5)	162(42.6)	2(2.2)
25–30	97(17.5)	90(23.7)	3(3.4)
>30	29(5.2)	43(11.3)	84(94.4)
Monthly income (in Yuan) ***			
1000	133(24.5)	100(26.5)	72(80.9)
1000–2000	174(32)	106(28)	16(18)
2000–3000	138(25.4)	59(15.6)	1(1.1)
>3000	98(18)	113(29.9)	0(0)
Age of alcohol debut (in years) ***			
16	165(29.8)	100(26.3)	6(6.7)
16–18	150(27.1)	88(23.2)	7(7.9)
18–20	137(24.8)	103(27.1)	11(12.4)
>20	101(18.3)	89(23.4)	65(73)
AUDIT levels ***			
Low risk (0–7)	97(18.2)	251(74.7)	41(85.4)
Risk drinking (8–15)	257(48.1)	61(18.2)	4(8.3)
Heavy drinking (16–19)	99(18.5)	18(5.4)	2(4.2)
Hazardous drinking (20–40)	81(15.2)	6(1.8)	1(2.1)
Reasons for drinking	Mean (SD)	Mean (SD)	Mean (SD)
Suppression	0.02(1.03)	–0.03(0.96)	–0.03(1.01)
Disinhibition ***	0.10(0.99)	–0.06(1.01)	–0.55(0.84)
Work requirement ***	0.50(0.95)	–0.64(0.64)	–0.70(0.51)
Sexual enhancement	0.01(1.15)	–0.02(0.78)	0.01(0.70)

	Venue types		
	Entertainment (N=553)	Personal service (N=380)	Street-based (N=89)
Confidence booster	−0.03(1.07)	0.005(0.89)	0.23(1.01)

*
p<0.05,

**
p<0.01,

p<0.001

Table 3

Bivariate Correlation between Reasons for Drinking, Peer Alcohol Drinking, and AUDIT Levels by Venue Types

	AUDIT Score		
	Entertainment	Personal-service	Street-based
	β^a [95%CI] ^b	β^a [95%CI] ^b	β^a [95%CI] ^b
Suppression	1.82 [1.22, 2.44]	2.75 [1.54, 3.48]	1.99 [0.83, 4.24]
Disinhibition	2.27 [1.68, 3.00]	1.99 [1.10, 2.95]	1.45 [−0.40, 5.57]
Work requirement	1.77 [0.79, 1.81]	5.70 [2.67, 7.10]	1.00 [−3.18, 10.19]
Sex enhancement	1.29 [0.79, 1.81]	2.26 [0.90, 4.00]	2.09 [−0.16, 4.83]
Confidence booster	1.31 [1.17, 2.35]	1.77 [0.78, 3.35]	0.61 [−1.06, 3.97]

^a Robust coefficient estimation;

^b 95% bootstrap bias-corrected confidence interval.

Table 4
Multivariate Resistant Regression Analysis of Reasons for Drinking and AUDIT Score

	AUDIT Score					
	Model 1		Model 2		Model 3	
<i>Block 1</i>	β^a	95% CI ^b	β^a	95% CI ^b	β^a	95% CI ^b
<i>Social demographics, alcohol debut and peer drinking</i>						
Marriage	0.61	[-0.49, 1.82]	1.10	[-0.15, 2.29]	0.93	[-0.17, 2.09]
Residence	-0.55	[-1.28, 0.19]	-0.51	[-1.31, 0.16]	-0.77	[-1.54, -0.09]
Ethnicity	0.22	[-0.85, 1.36]	0.11	[-0.91, 1.02]	-0.06	[-1.00, 0.71]
Education	0.86	[-0.004, 1.73]	1.02	[0.20, 1.85]	0.70	[-0.03, 1.51]
Income (in thousands)	-0.02	[-0.39, 0.37]	0.12	[-0.23, 0.50]	0.32	[-0.005, 0.68]
Age	-0.05	[-0.15, 0.05]	-0.04	[-0.14, 0.05]	0.01	[-0.10, 0.10]
Age of alcohol debut	-0.09	[-0.22, 0.03]	-0.06	[-0.18, 0.05]	-0.10	[-0.22, -0.01]
Perceived peer drinking	4.75	[4.31, 5.16]	3.18	[2.58, 3.77]	1.74	[1.17, 2.34]
<i>Block 2</i>						
<i>Reasons for drinking</i>						
Suppression	/	/	0.73	[0.22, 1.31]	0.81	[0.29, 1.39]
Disinhibition	/	/	1.07	[0.50, 1.65]	1.09	[0.54, 1.63]
Work requirement	/	/	1.90	[1.24, 2.61]	0.58	[-0.17, 1.31]
Sex enhancement	/	/	0.66	[0.10, 1.20]	0.69	[0.18, 1.17]
Confidence booster	/	/	-0.87	[-1.51, -0.19]	-0.58	[-1.20, 0.11]
<i>Block 3</i>						
<i>Venue types and interactions</i>						
Entertainment	REF	REF	REF	REF	REF	REF
Personal-service	/	/	/	/	-4.23	[-5.85, -3.03]
Street-based	/	/	/	/	-5.19	[-7.26, 0.11]
Personal-service × work requirement	/	/	/	/	1.87	[0.31, 3.39]
Street-based × work requirement	/	/	/	/	-0.41	[-1.99, 5.92]
Variance explained (R ²)	0.36		0.43		0.49	

^aRobust coefficient estimation;

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robust regression measure of fit
 c_p
95% bootstrap bias-corrected confidence interval;
 q

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