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Age Group Differences in HIV Risk and Mental Health Problems among Female Sex Workers (FSWs) in Southwest China

Shaobing Su¹, Xiaoming Li^{1,*}, Liying Zhang¹, Danhua Lin², Chen Zhang³, and Yuejiao Zhou⁴

¹ Carman and Ann Adams Department of Pediatrics Prevention Research Center, Wayne State University School of Medicine, Detroit, MI48201, USA

²Institute of Developmental Psychology, Beijing Normal University, Beijing, 100875, China

³ Division of epidemiology, Vanderbilt institute of global health, Nashville, TN37203, USA

⁴Center for Disease Control and Prevention, Guangxi, China

Abstract

HIV risk and mental health problems are prevalent among female sex workers (FSWs) in China. The purpose of this research was to study age group differences in HIV risk and mental health problems in this population. In the current study we divided a sample of 1,022 FSWs into three age groups (20 years, 21– 34 years, and 35 years). Results showed that among the three groups (a) older FSWs (35 years) were likely to be socioeconomically disadvantaged (e.g., rural residency, little education, employment in low-paying venues, and low monthly income); (b) older FSWs reported the highest rates of inconsistent, ineffective condom use and STD history; (c) younger FSWs (20 years) reported the highest level of depression, suicidal thoughts and suicide attempts, regular-partner violence, and substance use; (d) all health-related risks except casual-partner violence were more prevalent among older and younger FSWs than among FSW aged 21– 34 years; (e) age had a significant effect on all health indicators except suicide attempts after controlling for several key demographic factors. These findings indicate the need for intervention efforts to address varying needs among FSWs in different age groups. Specific interventional efforts are needed to reduce older FSWs' exposure to HIV risk; meanwhile, more attention should be given to improve FSWs' mental health status, especially among younger FSWs.

Introduction

Although the incidence rate of HIV infection among adults decreased dramatically or remained relatively stable from 2001 to 2011 in most countries (UNAIDS, 2012), China's HIV epidemic has shown no signs of abating in recent years. According to the 2012 China AIDS Response Progress Report from the Ministry of Health of the People's Republic China (MHPRC, 2012), the numbers of people living with HIV and deaths resulting from HIV have dramatically increased from 2007 to 2011. Sexual transmission, which increased from 33.1% in 2006 to 76.3% in 2011, has become the primary mode of HIV transmission in

*Corresponding author: Xiaoming Li The Carman and Ann Adams Department of Pediatrics Wayne State University School of Medicine 4707 St. Antoine, Suite W534, Detroit, MI 48201-2196 Phone: 313-745-8663; Fax: 313-745-4993 xiaoli@med.wayne.edu.

China (MHPRC, 2012); and female sex workers (FSWs) have become a high-risk population for transmitting HIV and other sexually transmitted diseases (STD) (UNAIDS, 2012). Increased epidemiological services have covered the health issues of FSW since 2000 (UNAIDS, 2012), but many FSWs are still subject to the risk of HIV, STDs, and mental health problems, which threaten their health (Zhang et al., 2013), drawing considerable attention from health researchers.

The prevalence of various HIV risks among FSWs has been documented in global literature (Couture et al., 2012; Hong and Li, 2011; Magnani et al., 2010; Nemoto et al., 2012). Inconsistent or ineffective condom use, a history of STD, and lack of HIV testing have been widely considered key HIV risks (Hong et al., 2012; Li et al., 2010; Li et al., 2011; Rusch et al., 2010; Zermiani et al., 2012; Zhang et al., 2011). Even though condom use can effectively prevent HIV transmission and other sexually transmitted infections among FSWs, only a small proportion of FSWs consistently and properly use condoms with their clients (Zhang et al., 2011; Li et al., 2010; Li et al., 2011; Lau et al., 2010). Recent studies in China revealed that 47.1% of FSWs had consistently used condoms during the previous month (Zhang et al., 2011), 15% consistently had used condoms throughout their sex lives (Yang et al., 2005), and 60% of FSWs knew how to use condoms effectively (Li et al., 2011; Yang et al., 2005). In addition, infections resulting from STD, which may increase the risk of HIV infection, are also prevalent among FSWs (Poon et al., 2011; Rusch et al., 2010; Zermiani et al., 2012; Wang et al., 2010). According to a review regarding the prevalence of HIV and STD among FSWs in China, a self-reported history of STD ranged from 4.8% to 53.2% (median=17.0%) (Poon et al., 2011). Periodic, routine HIV testing, important for the reduction of HIV transmission, and accessible HIV treatment are universally recommended to high-risk populations in areas severely affected by HIV; however, a large number of FSWs could not access HIV testing service or rejected such a service (Hong et al., 2012; Xu et al., 2011). A survey in Yunnan, China, showed that 17.7% of FSW had been previously tested for HIV (Xu et al., 2011).

Mental health problems are also prevalent among FSWs. Researchers have documented high incidence of substance use, depression, violence victimization, and suicidal intention and behavior among FSWs (Lau et al., 2010; Panchanadeswaran et al., 2008; Swain et al., 2011; Wang et al., 2007; Zhang et al., 2013). Based upon recent data collected in China, 10.3%–58.1% of FSWs had ever used drugs (Xu et al., 2013; Ruan et al., 2006), 50%–68.4% had ever been victimized by physical or sexual violence (el-Bassel et al., 1997; Choi et al., 2008), 30%–53.9% suffered from depression (Hong et al., 2010; Lau et al., 2010), and 14.3%–18% had suicidal ideation, and 8.4%–9% attempted suicide (Hong et al., 2010; Wang et al., 2007), far surpassing the prevalence among the general female population in China.

Although existing studies have revealed different HIV risks and mental health problems among FSWs of different ages, such differences have been relatively underemphasized in previous studies from China. First, little is known about whether HIV risks differ by age of FSWs in China. Researchers in India, Spain, and the UK have examined age-group differences in terms of HIV infection and suggested that younger FSWs (< 20 years) were at higher risk of HIV infection (Sarkar et al., 2006; Vioque et al., 1998; Ramesh et al., 2008).

Studies from China were insufficient and contained mixed findings regarding HIV-related risks in different age groups. Some studies from China showed that older age was associated with HIV testing (Hong et al., 2012); others showed no association between age and HIV risk (Wang et al., 2007), and still other studies from China suggested that older FSWs may be more likely to work in disadvantageous venues, where they may be exposed to more HIV risks (Huang et al., 2004; Tucker et al., 2012). In addition, data regarding the association between age and mental health problems are also limited. Few studies have specifically examined age group differences in terms of mental health problems among FSWs in China.

This research was designed to study age differences in HIV risk and mental health problems among FSWs to answer the following questions: (1) Do HIV risks (inconsistent condom use throughout lifetime and during three recent sex acts, ineffective condom use, STD history, and never having received HIV testing) and mental health problems (depression, suicide intention and experience, violence victimization and substance use) differ among younger FSWs (< 20 years), medium-aged FSWs (21–34 years), and older FSWs (≥ 35 years)? (2) Is age associated with HIV risks and mental health problems after controlling key demographic characteristics?

Method

Sampling and Participants

In the current study, participants were recruited from 60 entertainment establishments in two cities in southwestern China. Ethnographic mapping was used to identify the commercial sex entertainment venues, including night clubs, saunas, karaoke venues, bars, hair salons, massage parlors, mini hotels and restaurants, and the streets. Outreach strategies to contact the FSWs and collect data included the following: First, the research team contacted the owners or managers of each establishment for their permission to conduct the survey on their premises. Second, we invited FSWs in participating venues to take our survey. Third, interviewers introduced the survey to FSWs in detail and asked them to provide informed consent before completing it. Finally, participants completed a structured questionnaire in the local language in a private space at the establishment. During the survey, trained interviewers provided explanations to FSWs when necessary. The data were collected in 2009. About 20% of FSWs declined to participate. A final sample of 1,022 FSWs completed and provided valid responses to the survey. The study was approved by the Institutional Review Boards at Wayne State University in the USA and the Center for Disease Control and Prevention (CDC) in Guangxi, China.

Measures

Demographic Variables

Demographic variables, including age, ethnicity (Han or ethnic minority), residency (rural or urban household registration), education (no schooling, primary or middle school, high school or more), marital status (ever married or not), having one or more children (yes–no), type of venue (night club, sauna, karaoke venue, bar, hair salon, massage parlor, minihotel or restaurant, and the street), and monthly income in Chinese currency (Yuan), were analyzed to describe characteristics of the study sample. For the purpose of data analysis,

monthly income was categorized into four subcategories: 2,000 Yuan (approximately equal to 320 USD) or less, 2,001-3,000 Yuan (about 320 to 490 USD), 3,001-5,000 Yuan (about 490 to 820 USD), and 5,000 Yuan (about 820 USD) or more. Type of venue was categorized into three subtypes: high-paying venue (night club, sauna, karaoke venue, and bar), mid-paying venue (hair salon, massage parlor, mini hotel or restaurant), and low-paying venue (the street).

HIV Risks

HIV risks were measured with five indicators: lifetime condom use, condom use in three recent sex acts, effectiveness of condom use, STD history, and HIV-testing history. Lifetime condom use was measured by frequency of condom use with casual partners (never, occasionally, sometimes, often, and always). Condom use in three recent sexual encounters was measured by a single item: "How many times did you use condoms in your three most recent sex acts with your casual partners? (none, one, twice, three)"; the response options of lifetime condom use and condom use in three recent sex acts were categorized as 1=inconsistent condom use or 0=consistent condom use. Effectiveness of condom use was measured by a single question: "If you used a condom when you had sex with your partner, did you wear the condom before your partners' penetration? (never, occasionally, sometimes, often, and always)." The respondent options for effectiveness of condom use were categorized as 1=ineffectively or 0=effectively. Participants were also asked whether they had a history of STD (yes or no) and whether they had ever been tested for HIV (yes or no).

Mental Health Problems

Depression—Depression was measured by the Center for Epidemiologic Studies Depression scale (CES-D) with 20 items (Radloff, 1977). All items had four response options, ranging from 0 (never) to 3 (always). In the current analysis, a total score of these 20 items was calculated. Cronbach's alpha for the current study sample was 0.89.

Suicide—Two items regarding suicidal thoughts ("had seriously considered killing yourself") and attempts ("had tried to kill yourself") were used to measure suicidal behavior. Options for these two items were 0=no and 1=yes. In this study, the numbers and percentages of FSW who answered "yes" were used to indicate suicidal thoughts and attempts, respectively.

Partner violence—Partner violence scales, which measured casual-partner violence and regular-partner violence, were adapted from the WHO's Multi-Country Study on Women's Health and Domestic Violence (Garcia-Moreno et al., 2006). The casual-partner violence scale included 17 items that covered three dimensions: physical violence (e.g., pushed you or shoved you or pulled your hair), sexual violence (e.g., inserted something into your genitals), and psychological abuse (e.g., threatened to hurt you or someone you care about). The regular-partner violence scale measured three additional items: "ignoring you for a long time," "threat of separating you from your child or terminating your pregnancy," and "restriction of your freedom." These items had a 4-point response option, ranging from 0 (never) to 3 (frequently). We used a binary score ("never" or "ever" experienced partner

violence) in data analysis for skewed distributions of both variables. The total scores for these two scales were used in the current analysis. Cronbach's alpha of regular-partner violence and casual-partner violence scales in the current study were 0.84 and 0.85, respectively.

Substance use—Two items were used to measure smoking (“Have you ever used tobacco?”) and drug use (“Have you ever used illicit drugs?”). Alcohol use was measured by the Alcohol Use Disorders Identification Test (AUDIT), a 10-item instrument covering three conceptual domains: alcohol intake (3 items), alcohol dependence (3 items), and adverse alcohol-related consequences (4 items). We also computed the total score on AUDIT in the data analysis. Cronbach's alpha of AUDIT in the current study was 0.78.

Data Analysis

First, we used Chi-square to compare demographic characteristics among three age groups of FSW (20 years, 21–34 years, and 35 years). Second, Chi-square or ANOVA was employed to compare age group differences in HIV risks and mental health problems. In both Chi-square and ANOVA, we first analyzed the general differences among these three groups and then compared the difference between one age group with another for each age group. Third, multivariable General Linear Models (GLM), specifically Wilks' Lambda tests, were employed to assess differences in HIV risks and mental health problems simultaneously by age group, ethnicity, and residency after controlling for educational level and monthly income. Statistical analyses were performed using SPSS for Windows 10.0.

Results

Demographic Characteristics of FSW in Different Age Group

Table 1 shows that 299 (29.3%) FSW were 20 years old or younger, 611 (59.8%) were 21 to 34 years old, and 112 (11.0%) were 35 years old or older. Most of participants were Han (84.4%), more than half of them were from rural areas (54.6%), a majority of them were never married (71.5%), and 26.6% of them had children. Compared with younger FSWs (20 years) and medium-aged FSWs (21–34 years), a larger proportion of older FSWs (35 years) were Han, came from rural areas, attained only a low level of education, were married, had at least one child, solicited sexual business on streets, and earned less money monthly.

Age Difference and HIV Risk

According to Table 2, about 47.0% of FSWs never used condoms consistently, 33.4% did not use condoms consistently in three recent sex acts, 37.9% did not use condoms effectively, 16.0% had a history of STDs, and more than 50% had not been tested for HIV. Age was significantly associated with all measures of HIV risk. Older FSWs reported highest rates of lifetime inconsistent condom use, ineffective condom use, STD history and lack of HIV testing, followed by younger FSWs and medium-aged FSWs. Among the three age groups, younger FSWs reported the highest rate of inconsistent condom use in three recent sex acts, followed by older FSWs and medium-aged FSWs.

Table 3 reveals significant differences in HIV risks and mental health problems by age group, ethnicity, and residency after controlling for educational level and monthly income. Age group had main effects in terms of all HIV risks after controlling for individual characteristics. For the covariates, monthly income was associated with all HIV risks except STD history. No significant main effects of ethnicity and residency or interactions among age, ethnicity, and residency were demonstrated in the multivariate test.

Age Difference in Mental Health Problems

Table 4 shows that age was significantly associated with most measures of mental health problems. Compared with medium-aged FSWs, younger FSWs and older FSWs reported higher levels of depression. Younger FSWs were more likely to report suicidal thoughts (13.4%) and suicide attempts (6.7%) compared with older FSWs. Younger FSWs and older FSWs were more likely to be victims of violence from regular partners than medium-aged FSWs. Younger FSWs were at highest risk of substance use, followed by medium-aged FSWs and older FSWs. No differences were found among these three age groups in terms of casual-partner violence.

As shown in Table 5, age group, residency, interaction between age and residency, and interaction among age, ethnicity, and residency were significantly associated with mental health problems after controlling for educational level and monthly income. Educational level and monthly income were significant covariates in the multivariable General Linear Modeling GLM analysis. Age had main effects in all mental health problems except suicide attempts after controlling for considering educational level and monthly income as covariates. Residency had main effects in depression and casual-partner violence after controlling covariates. Significant interaction in regular-partner violence was found among age, ethnicity, and residency. For the covariates, educational level was associated with regular-partner violence and alcohol use; monthly income was associated with regular-partner violence.

Discussion

The current study was designed to compare HIV risks and mental health problems among younger, medium-aged, and older FSWs. Our results revealed that HIV risks and mental health problems were more prevalent among older and younger FSWs than among medium-aged FSWs; older FSWs had the highest prevalence of HIV risks, and younger FSWs reported the highest possibility of suffering mental health problems among these three age groups. These findings are inconsistent with previous studies, which revealed that age is negatively associated with HIV risks among FSWs (Sarkar et al., 2006; Vioque et al., 1998; Ramesh et al., 2008). Our findings indicate that older FSWs and younger FSWs were two special subgroups exposed to relatively higher risk of health difficulties and deserve more attention from health professionals.

In our study, older FSWs reported relatively lower socioeconomic status and higher prevalence of HIV risks compared with their younger peers. We offer several reasonable explanations for our findings. First, in the commercial sex industry, where beauty and youth are essential assets, older FSWs are less competitive than their younger counterparts; so they

may be more likely to work in venues where HIV risk is high. For instance, older FSWs may be more likely to accept clients with a higher risk of HIV infection or transmission (e.g., under influence of alcohol or other drugs, violent, or with known HIV, STD infection) or willing to engage in unprotected sex for more money. Second, the high mobility of street-based sex workers may hamper the dissemination of information about HIV and STD testing among older FSWs.

In addition, younger FSWs, who were threatened by multiple mental health problems and HIV risks, also deserve additional attention. Our findings suggest that even though younger FSWs were better off socioeconomically than older FSWs, younger FSWs confronted numerous health threats and difficulties. To the best of our knowledge, some FSWs in China are deceived or forced into commercial sex at an early age (Hong et al., 2010). Faced with violence and pressure from clients, younger FSWs are more likely to face psychological conflicts and difficulties in adapting to the lifestyle (e.g., depression and suicide) and experience a high incidence of substance use. Social stigmatization of FSWs is another important source of pressure that may cause mental health problems among FSWs (Hong et al., 2010), especially younger FSWs, who are psychologically immature and lack social experience. Under these multiple pressures, FSWs may engage in substance use (e.g., smoking, alcohol use, and drug use) to cope with their emotional stresses or to avoid pressure or harm from their clients (Wang et al., 2010; Ramesh et al., 2008). Beside mental health threats, younger FSWs are exposed to numerous HIV risks possibly because of lack of knowledge about HIV, high prevalence of psychosocial distress (Hong et al., 2013), and insufficient coping skills or experience dealing with violence and high-risk sexual behaviors. In addition, physical immaturity may increase vulnerability to HIV infection among younger FSWs (Sarkar et al., 2006).

Several potential limitations should be noted in the current study. First, our participants were recruited from entertainment venues in two cities, so our findings may not be generalized to elsewhere in China or other countries. Second, the cross-sectional data limit our ability to describe the developmental trajectory of HIV risk and mental health problems among FSW. Using longitudinal analysis, future researchers could study the way HIV risk and mental health problems develop as FSWs' age increases. Finally, self-report measures on sensitive topics like sex and HIV may limit the accuracy and reliability of our results.

Despite these potential limitations, our study has several significant implications for HIV and mental health intervention among FSWs in China. First, in addition to denunciation and periodic crackdowns on sex work, the Chinese government should generate effective health policies and measures to control and decrease sexually transmitted HIV infection by providing knowledge and skills related to protected sex and by extending health service coverage to those who work in commercial sex. Second, health researchers, health policy makers, and healthcare workers should pay specific attention to some subpopulations of FSWs, such as younger and older ones, who are at higher health risk. Given that HIV risk and mental health problems are prevalent among older and younger FSWs, we call for urgently needed solutions to promote health conditions among older and younger FSWs. Potential intervention programs may include knowledge of HIV and protective sexual

behaviors as well as the coping strategies and skills needed to overcome HIV risks and mental health problems among FSWs.

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References

- Choi SY, Chen KL, Jiang ZQ. Client-perpetuated violence and condom failure among female sex workers in southwestern China. *Sex Transm Dis*. 2008; 35:141–146. [PubMed: 17921913]
- Couture M-C, Evans JL, Sothy NS, et al. Correlates of amphetamine-type stimulant use and associations with HIV-related risks among young women engaged in sex work in Phnom Penh, Cambodia. *Drug and alcohol dependence*. 2012; 120:119–126. [PubMed: 21820251]
- el-Bassel N, Schilling RF, Irwin KL, et al. Sex trading and psychological distress among women recruited from the streets of Harlem. *Am J Public Health*. 1997; 87:66–70. [PubMed: 9065229]
- Garcia-Moreno C, Jansen HA, Ellsberg M, et al. Prevalence of intimate partner violence: findings from the WHO multi-country study on women's health and domestic violence. *Lancet*. 2006; 368:1260. [PubMed: 17027732]
- Hong Y, Fang X, Li X, et al. Self-perceived stigma, depressive symptoms, and suicidal behaviors among female sex workers in China. *Journal of Transcultural Nursing*. 2010; 21:29–34. [PubMed: 19820172]
- Hong Y, Li X. P2-S2. 15 Typology of female sex workers and association with HIV risks: evidence from China. *Sexually transmitted infections*. 2011; 87:A233–A233.
- Hong Y, Zhang C, Li X, et al. HIV testing behaviors among female sex workers in Southwest China. *AIDS and Behavior*. 2012; 16:44–52. [PubMed: 21538081]
- Hong Y, Zhang C, Li X, et al. Partner Violence and Psychosocial Distress among Female Sex Workers in China. *PloS one*. 2013; 8:e62290. [PubMed: 23626798]
- Huang Y, Henderson GE, Pan S, et al. HIV/AIDS risk among brothel-based female sex workers in China: assessing the terms, content, and knowledge of sex work. *Sexually transmitted diseases*. 2004; 31:695–700. [PubMed: 15502679]
- Lau JT, Tsui H, Ho SP, et al. Prevalence of psychological problems and relationships with condom use and HIV prevention behaviors among Chinese female sex workers in Hong Kong. *AIDS care*. 2010; 22:659–668. [PubMed: 20467945]
- Li Q, Li X, Stanton B, et al. A multilevel analysis of gatekeeper characteristics and consistent condom use among establishment-based female sex workers in Guangxi, China. *Sexually transmitted diseases*. 2010; 37:700. [PubMed: 20539262]
- Li Q, Li X, Stanton B, et al. Psychometric Properties of a Pictorial Scale Measuring Correct Condom Use. *AIDS and Behavior*. 2011; 15:432–440. [PubMed: 21046220]
- Magnani R, Riono P, Saputro E, et al. Sexual risk behaviours, HIV and other sexually transmitted infections among female sex workers in Indonesia. *Sexually transmitted infections*. 2010; 86:393–399. [PubMed: 20522622]
- MHPRC. 2012 China AIDS Response Progress Report. 2012. [http://www.unaids.org/en/dataanalysis/knowyourresponse/countryprogressreports/2012countries/ce_CN_Narrative_Report\[1\].pdf](http://www.unaids.org/en/dataanalysis/knowyourresponse/countryprogressreports/2012countries/ce_CN_Narrative_Report[1].pdf)
- Nemoto T, Iwamoto M, Sakata M, et al. Social and cultural contexts of HIV risk behaviors among Thai female sex workers in Bangkok, Thailand. *AIDS care*. 2012:1–6.
- Panchanadeswaran S, Johnson SC, Sivaram S, et al. Intimate partner violence is as important as client violence in increasing street-based female sex workers' vulnerability to HIV in India. *International Journal of Drug Policy*. 2008; 19:106–112. [PubMed: 18187314]
- Poon AN, Li Z, Wang N, et al. Review of HIV and other sexually transmitted infections among female sex workers in China. *AIDS care*. 2011; 23:5–25. [PubMed: 21660747]

- Radloff LS. The CES-D scale A self-report depression scale for research in the general population. *Applied psychological measurement*. 1977; 1:385–401.
- Ramesh BM, Moses S, Washington R, et al. Determinants of HIV prevalence among female sex workers in four south Indian states: analysis of cross-sectional surveys in twenty-three districts. *Aids*. 2008; 22:S35–S44. [PubMed: 19098478]
- Ruan Y, Cao X, Qian H-Z, et al. Syphilis among female sex workers in southwestern China: potential for HIV transmission. *Sexually transmitted diseases*. 2006; 33:719–723. [PubMed: 16708055]
- Rusch ML, Brouwer KC, Lozada R, et al. Distribution of sexually transmitted diseases and risk factors by work locations among female sex workers in Tijuana, Mexico. *Sexually transmitted diseases*. 2010; 37:608–614. [PubMed: 20585278]
- Sarkar K, Bal B, Mukherjee R, et al. Young age is a risk factor for HIV among female sex workers--an experience from India. *The Journal of infection*. 2006; 53:255. [PubMed: 16386307]
- Swain SN, Saggurti N, Battala M, et al. Experience of violence and adverse reproductive health outcomes, HIV risks among mobile female sex workers in India. *BMC Public Health*. 2011; 11:357. [PubMed: 21599984]
- Tucker JD, Wong FY, Nehl EJ, et al. HIV testing and care systems focused on sexually transmitted HIV in China. *Sex Transm Infect*. 2012; 88:116–119. [PubMed: 22345024]
- UNAIDS. Global report. UNAIDS Report on the Global AIDS Epidemic. 2012. http://www.unaids.org/en/media/unaids/contentassets/documents/epidemiology/2012/gr2012/20121120_UNAIDS_Global_Report_2012_with_annexes_en.pdf
- Vioque J, Hernández-Aguado I, García EF, et al. Prospective cohort study of female sex workers and the risk of HIV infection in Alicante, Spain (1986-96). *Sexually transmitted infections*. 1998; 74:284–288. [PubMed: 9924471]
- Wang B, Li X, Stanton B, et al. Sexual coercion, HIV-related risk, and mental health among female sex workers in China. *Health Care for Women International*. 2007; 28:745–762. [PubMed: 17729131]
- Wang B, Li X, Stanton B, et al. Alcohol use, unprotected sex, and sexually transmitted infections among female sex workers in China. *Sexually transmitted diseases*. 2010; 37:629. [PubMed: 20601927]
- Xu J, Brown K, Ding G, et al. Factors associated with HIV testing history and HIV-test result follow-up among female sex workers in two cities in Yunnan, China. *Sexually transmitted diseases*. 2011; 38:89–95. [PubMed: 20838364]
- Xu J, Smith MK, Ding G, et al. Drug Use and Sex Work: Competing Risk Factors for Newly Acquired HIV in Yunnan, China. *PloS one*. 2013; 8:e59050. [PubMed: 23555616]
- Yang H, Li X, Stanton B, et al. Condom use among female sex workers in China: role of gatekeepers. *Sexually transmitted diseases*. 2005; 32:572. [PubMed: 16118607]
- Zermiani M, Mengoli C, Rimondo C, et al. Prevalence of Sexually Transmitted Diseases and Hepatitis C in a Survey of Female Sex Workers in the North-East of Italy. *The Open AIDS Journal*. 2012; 6:60. [PubMed: 22833775]
- Zhang, C.; Li, X.; Chen, Y., et al. Alcohol and Other Drug Use, Partner Violence, and Mental Health Problems Among Female Sex Workers in Southwest China. *Health Care for Women International*; 2013.
- Zhang H, Liao M, Nie X, et al. Predictors of consistent condom use based on the Information-Motivation-Behavioral Skills (IMB) model among female sex workers in Jinan, China. *BMC Public Health*. 2011; 11:113. [PubMed: 21329512]

Table 1

Demographic Characteristics of the Sample

Demographic characteristics	overall	20 yrs	21~34 yrs	35 yrs	χ^2
N	1022(100%)	299(29.3%)	611(59.8%)	112(11.0%)	
Ethnic					12.23 **
Han	853(84.4%)	231(78.8%)	521(85.7%)	101(91.8%)	
Minority	158(15.6%)	62(21.2%)	87(14.3%)	9(8.2%)	
Residency					11.93 **
urban	445(43.5%)	121(41.4%)	289(48.2%)	35(31.5%)	
rural	558(54.6%)	171(58.6%)	311(51.8%)	76(68.5%)	
Educational level					102.99 ***
No schooling	95(9.4%)	4(1.3%)	54(9.0%)	37(33.9%)	
junior middle school	545(54.0%)	175(58.9%)	319(52.9%)	51(46.8%)	
High school or more	369(36.6%)	118(39.7%)	230(38.1%)	21(19.3%)	
Marital Status					371.52 ***
Never married	723(71.5%)	296(99.3%)	424(70.4%)	3(2.7%)	
Ever married	288(28.5%)	2(0.7%)	178(29.6%)	108(97.3%)	
Have child/children					371.18 ***
Type of Venue					652.21 ***
High-tier venue	553(54.1%)		328(53.7%)	11(9.8%)	
		214(71.6 %)			
Mid-tier venue	380(37.2%)	85 (22.4%)	274(44.8%)	21 (18.8%)	
Low-tier venue	89(8.7%)	0 (0%)	9(1.5%)	80(71.4%)	
Monthly income					102.28 ***
2000	601(59.5%)	153(51.9%)	346(57.4%)	102(91.1%)	
2001~3000	198(19.6%)	69(23.4%)	125(20.7%)	4(3.6%)	
3001~5000	128(12.7%)	42(14.2%)	82(13.6%)	4(3.6%)	
>5000	83(8.2%)	31(10.5%)	50(8.3%)	2(1.8%)	

Note:

+p<0.1

p<0.0001,**
p<0.001,*
p<0.05,

Table 2

Group differences of age in terms of HIV risk

Variables	Overall	20 yrs	21–34 yrs	35 yrs	χ^2
Lifetime inconsistent condom use	435(47.0%)	154(53.8%)	219(40.8%)	62(60.8%)	21.50***
Inconsistent condom use in three more recent sex acts	309(33.4%)	128(44.8%)	144(26.9%)	37(35.9%)	26.97***
Incorrect condom use	380(37.9%)	129(43.7%)	200(33.4%)	51(46.4%)	12.65**
STD history (Yes)	162(16.0%)	54(18.3%)	83(13.7%)	25(22.3%)	7.01*
HIV testing (No)	526(53.0%)	213(74.0%)	248(41.6%)	65(59.6%)	83.74***

Note:

p<0.0001,

**
p<0.001,

*
p<0.05

Table 3

General Linear Model Analysis of HIV risk

	Age	Main Effect		Interaction Age × Residency	Covariates	
		Ethnicity	Residency		Educational level	Monthly income
Multivariate test (Wilks' Lambda)	5.76***	1.75	0.72	1.52	1.98	3.55
Lifetime inconsistent condom use	4.86**	0.03	0.001	3.26*	1.90	11.50***
Inconsistent condom use in three more recent sex acts	8.33***	1.71	0.02	0.72	1.04	5.32*
Incorrect condom use	5.54**	1.59	1.22	1.00	0.03	6.12*
STD history	3.16*	4.88*	1.35	0.12	2.68	0.15
HIV testing	20.45***	0.04	0.21	0.82	4.30*	4.98*

Note:

*** $p < 0.0001$,

** $p < 0.001$,

* $p < 0.05$

Table 4

Group differences of age in terms of mental health

Variables	Overall	20 yrs	21-34 yrs	35 yrs	F/ χ^2
Depression	15.87±8.78	17.16±9.10	15.00±8.19	17.18±10.36	7.58***
Suicidal thoughts	83(8.1%)	40(13.4%)	39(6.4%)	5(3.6%)	16.74***
Suicidal attempts	49(4.8%)	20(6.7%)	27(4.4%)	2(1.8%)	4.74 ⁺
Regular-partner violence	22.69±4.44	23.50±5.19	22.27±3.76	22.86±6.73	5.57***
Casual-partner violence	18.82±3.31	18.67±2.86	18.85±3.32	19.08±4.30	0.66
Smoking	581(56.9%)	220(73.6%)	335(54.9%)	26(23.2%)	86.72***
Alcohol use(AUDIT)	9.45±6.77	11.71±6.75	9.04±6.50	4.56±5.46	43.97***
Drug use	185(18.3%)	107(36.8%)	78(11.7%)	0(0.0%)	103.66***

Note:

** $p<0.001$,* $p<0.05$,+ $p<0.1$ *** $p<0.0001$,

Table 5

General Linear Model Analysis of Mental Health problems

	Main Effect			Interaction		Covariates	
	Age ^a	Ethnicity ^b	Residence ^c	a × c	a × b × c	Educational level	Monthly income
Multivariate test (Wilks' Lambda)	6.66 ^{***}	0.85	2.05 [*]	1.61 ⁺	2.17 [*]	2.27 [*]	1.75 ⁺
Depression	1.34	0.40	5.31 [*]	3.78 [*]	3.17 ⁺	0.03	0.37
Suicidal thoughts	4.29 [*]	1.34	0.57	0.39	0.02	0.03	0.03
Suicidal attempts	1.41	3.09 ⁺	0.02	0.26	0.19	0.05	0.25
Regular-partner violence	2.74 ⁺	2.08	0.33	2.20	4.36 [*]	4.28 [*]	3.65 ⁺
Casual-partner violence	2.91 ⁺	0.14	3.04 ⁺	1.35	0.07	0.64	1.38
Smoking	14.72 ^{***}	0.12	2.37	.52	2.52	2.45	2.72
Alcohol use	16.94 ^{***}	0.01	2.16	1.00	2.46	11.63 ^{**}	1.56
Drug use	26.10 ^{***}	0.78	1.75	2.29	1.18	0.46	0.07

Note:

 $p < 0.0001$,**
 $p < 0.001$,*
 $p < 0.05$,+
 $p < 0.1$