Gender and HIV Risk Behavior In China

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Abstract

Gender differences in prevalence of HIV risk behaviors are well established. Gender differences in major causes leading to HIV risk behaviors are much less researched in China. Using data from a large and population-based survey conducted in 2003 in southwestern China, this paper examined gender-specific correlates of HIV risky drug using and sexual behaviors in the general population. Both bivariate and multivariate analyses were conducted for males and females separately. The results suggest that men are more likely to inject drugs and share needles than women while women are more likely to exhibit HIV risk sexual behaviors than men. Socio-economic status is a significant predictor of injection drug use but not casual sex among males. Being married reduces the odds of risk behaviors for both males and females. Depression predicts significantly males' but not females' drug using behaviors. But it has more impacts on females regarding sexual behaviors. Finally, social influence of family and friends is a significant and positive indicator of HIV risk behaviors for both males and females. Prevention intervention needs to pay close attention to gender differences in prevalence and correlates of HIV risk behaviors.

INTRODUCTION

The global statistics provided by the Joint United Nations Program On HIV/AIDS (2002) estimated that 5 million people became infected with human immunodeficiency virus (HIV)

in 2002. Of those newly infected, 50 percent were women and 95 percent were living in developing countries (UNAIDS 2002). This is the first time the global statistics have indicated equal numbers of infected men and women. Women are becoming the fastest growing population newly infected with HIV (Exner, Seal, and Ehrhardt 1997; Bova 2001; UNAIDS 2002).

As the most populous country in the world, China has been experiencing an annual increase of about 30% in HIV infection in recent years. More than one million Chinese were estimated to be living with HIV at the end of 2002, and the number could reach 10 million by the end of the decade (UNAIDS 2002). While injection drug use remains the major mode of transmission in China, HIV infection resulting from sexual contacts has steadily increased (Zhang, Li, and Li, and Beck 1999; Qu et al. 2002; Grusky, Liu, and Johnston 2002;). Though men still outnumber women in HIV infection in the nation, the ratio of male to female among the recently infected has decreased from nine to one in 1990 to four to one in 2000 (United Nations Themes Group 2002). Despite more women are infected with the AIDS virus and increased recognition of the importance of gender in HIV research, few studies in China have looked at gender differences in prevalence and causes of HIV risk behaviors in the general population.

Women's vulnerability of HIV infection has been linked to not only their biological susceptibility, but also their subordinate social and economic status. There is growing attention in the HIV literature to the issue of gender and how gender affects socially defined roles, behavioral norms, and access to resources, which in turn leads to gender-related behaviors that have important HIV and other health consequences (Worth 1989; Farmer,

Lindenbaum and Good 1993; Campbell 1995; Exner et al. 1997; Kalichamn et al. 1998; Wingood and Diclemente 1998, 2000; Bova 2001; Mill and Anarfi 2002;). However, most studies of HIV risk that have integrated a gender perspective tend to focus on at-risk women only and seek to explain the at-risk women's heightened vulnerability in terms of their lack of social power and economic dependency without actually comparing them to socio-economically comparable men. Is it really gender or social and economic marginalization that explains at-risk women's vulnerability to HIV? Does gender become an issue only among women in marginalized status? Do men and women in general engage in HIV risky sexual and drug use behaviors for different reasons because of gender-related socio-economic roles and behavioral norms? This paper tries to answer these questions in order to better understand the gender and risk behavior dynamics.

BACKGROUND

Throughout the history, Confucian thinking had played a dominant role in directing people's social lives in China (Wong and Tang 2002). It sets social norms and moral standards for people to follow, stresses the cultivation of virtuous conduct, and favors individual's subordination for the good of community (Go et al. 2002). Generally, Confucian doctrine favors male domination in both social and family lives and accords a submissive status for women. Sexual purity of women is highly valued while men's sexual promiscuity is tolerated.

Women's social and economic statuses have witnessed great improvement since the found of the People's Republic of China in 1949. They are encouraged to go out of the home and participate in social life, receive education and find jobs to support themselves. However,

gender inequalities remain widespread, and the swift market transition since the late 1970s may have weakened the institutional guarantees of gender equality. Further, the market forces unleashed by the reforms have also brought about profound changes in social and behavioral norms. Views and beliefs about individual freedom, decision-making, and human rights have received more attention and respect. Sexual behavior is becoming freer than in the past, and premarital sex has become increasingly tolerated among young people (Zhang et al 1999). Many young people, both from urban and rural areas, now view sexual experience and cohabitation as an acceptable lifestyle (Grusky et al. 2000).

With the massive social and economic changes come unexpected social problems, such as illicit drugs and prostitution (Gil et al. 1996). The spread of illicit drugs and prostitution has posed a serious public health challenge as hundreds of thousands of people are infected with sexually transmitted diseases (STDs) annually in recent years. The arrival and consequent epidemic growth of HIV/AIDS in China is, too, closely related to the spread of drugs and prostitution.

The importance of intravenous drug use as the main mechanism of spreading HIV/AIDS among drug users in the early stages has been widely accepted (Yu et al. 1996) and is still playing an important role in spreading the disease (Grusky et al. 2002; UNAIDS 2002). There were reportedly 681,000 registered drug users in China in 1999, which is believed to be an underestimate of the true number (Grusky et al. 2002). A revival on a large-scale of female prostitution since the 1980s (Gil et al. 1996) and people's relaxed opinions on sexuality complicated the situation. Although there is no clear evidence in China that prostitution is to blame for the AIDS epidemic (Gil et al. 1996), high prevalence of STDs among female sex

workers has been reported and is an indication of widespread unprotected sex and potential for the rapid spread of the AIDS virus (Gil et al. 1996; Van den Hoek et al. 2001). Data from STD clinics have suggested that the majority of male STD patients are infected through unprotected sexual contact with sex workers (Van Den Hoek et al.2001). Condom failure among commercial sex workers has been indicated (Lau et al. 2002; Qu et al. 2002; Liao, Schensul, and Wolffers 2003), and officials, farm workers, teachers or health practitioners were all identified as clients of commercial sex workers (Liao et al.2003).

Gender and HIV Risk Behaviors

Research has suggested that compared with men, women are more likely to take protective measures during sexual intercourse and care more about their partner's safety (Jadack, Hyde, and Keller 1995). Even among injection drug users (IDUs), research has consistently indicated that female IDUs do not engage in risk behaviors as much as their male counterparts. Many female IDUs were infected by their only sexual partner who was also an injection drug users and had more than one sexual partner (Booth, Koester, and Pinto 1995; Tortu et al. 1998; Evans et al. 2003).

Despite women' greater care in protecting themselves, they are still the fastest growing group being infected with HIV. Biologically, women are more likely to be infected during unprotected heterosexual intercourse (Garciade de la Hera 2001; Wong and Tang 2002). But more importantly, vulnerabilities of women to HIV are mainly linked to socioeconomic factors, power imbalances within relationships, and gender-specific cultural norms. According to the theory of gender and power (Connell 1987; Wingwood and Diclement 1998). the sexual division of labor, the structure of power, and affective attachment are main

factors that contribute to women's specific vulnerability to the infection. The sexual division of labor limits women's equal access to the paid labor market and create economic inequalities between genders. This reinforces women's economic dependence on men and increases women's "economic exposure" to HIV risk. The sexual division of power explains issues, such as control, authority, and coercion by men, which leads to women's subordinate role and lack of power within social and sexual relationships. Generally men brings more assets to the relationship and the female partner becomes dependent on these resources. Women in this kind of relationship are more vulnerable to men's use and abuse of power and less able to negotiate safe sex or insist condom use on their partners, which contributes to women's "physical exposure" to HIV risk. The structure of social norms and affective attachment generates gender-specific cultural norms that limits women's sexual expressions and creates obstacles to condom use as it is often considered inappropriate for women to demand condom use, thus increasing women's "social exposure" to HIV risk.

Those socio-economic and cultural factors that render women vulnerable to HIV are of particular relevance to Chinese women (Tang, Wong, and Lee 2001). Despite positive changes that have been made to enhance women's status, Confucian thinking is still deeply rooted in people's minds and direct ordinary Chinese's behaviors. While premarital sex has been on the rise, cultural emphasis on premarital chastity and marital fidelity discourages Chinese, particularly Chinese women, from openly discussing safe sex. There also remain double standards in China whereby women's asexuality is highly valued and men's spontaneity is tolerated (Wong and Tong 2001).

Psychological Well-being, Social Influence, and Risk Behaviors

Depression has been implicated as a risk factor for needle sharing and may be an antecedent to needle sharing in both treatment (Schonfeld et al.1989) and non-treatment samples (Latkin and Mandell 1993). Similarly, Mandell and colleagues (1999) reported that depressed individuals were more likely to engage in needle sharing than less-depressed individuals. The lack of hope and sense of despair linked with depression may prevent people from adopting protective behaviors. It has been reported that in the United States, women were at a higher risk for developing depression compared to men because of socioeconomic, biological, and emotional factors. And there is a mean 2:1 female-male ratio of persons experiencing depression in developed countries. But the ratio varies in developing countries, with some reporting no differences between sexes. Gender differences may not only differ in frequencies of developing depression, but also in risk behaviors across nations and cultures (Culbertson 1997). However, it was found that among those who have been infected with HIV, men and women did not differ significantly in their reported level of depressive symptoms (Knowlton et al.2000). It is of intellectual curiosity how men and women differ in frequencies of developing depression and how the depression symptoms exert influences on their HIV risk behaviors in China as the country continues to undergo profound changes in social and economic lives. People caught in such dramatic social and economic transition may be more likely to develop symptoms of depression as a result of difficulties and frustrations in adjusting to the fast changing reality. With relatively easy access to drugs and commercial sex, depressed people may increasingly resort to drugs and/or prostitution as way to deal with personal frustrations and despair.

Further, social influence from personal networks of family and peers plays an important

role in shaping people's HIV risk behaviors (Latkin and Knowlton 2000). Structural aspects of social networks, such as network density and composition, have been found to be associated with HIV risk behaviors among injection drug users (Latkin 1995; Latkin et al. 1995a). Latkin and colleagues (1995b) reported that the presence of a partner (spouse, lover or sex partner) was inversely associated with frequencies of injecting drugs. However, few studies have examined gender differences in social influences of HIV risk behaviors. Limited research indicated that in comparison with men, women injection drug users had a greater overlap between drug and sex partners, and they were more likely than men to use drugs with their sexual partners (Latkin et al. 1998; Evans et al. 2003). Injection drug users tend to share needles with individuals who they know and have specific types of social relationships, such as sexual partners and drug buddies (Friedman et al.1997). Compared to men, women are more likely to share needles with individuals with whom there was some degree of an effective relationship, whether it be family, sexual partner, or close friend (Latkin et al.1998).

METHOD

Data

Data used in the analysis are from a large and population-based survey conducted in 2003 in China. The survey covered an entire province in southwestern China, bordering Vietnam, Laos, and Myanmar and near the "Golden Triangle." The province has at least 26 different ethnic groups. With its peculiar geographic, social, economic, historical, and multi-ethnic background, the province has become an important channel of illicit drug smuggling. As a result, the province has the largest drug trafficking network and illicit drug market as well as the highest concentration of HIV/AIDS cases in China.

Sample selection for the survey followed a three-stage stratified sampling procedure. First, eight counties were selected, considering HIV and drug use prevalence and geographic representation of the province. Second, all rural townships and urban neighborhoods in the selected eight counties were ranked according to estimates of HIV prevalence, number of drug users, and number of temporary migrants. Strata were then formed by grouping the townships and neighborhoods according to their rankings and over-sampled townships and neighborhoods with highest concentration of HIV, drug users, and temporary migrants via disproportionate sampling procedure. Five townships and neighborhoods were randomly selected from each of the eight counties, resulting in a total of 40 townships and neighborhoods primary sampling units (PSUs).

Finally, all individuals between the ages of 18 and 55 were classified by PSUs into one of four categories: HIV positive, drug users, temporary migrants, and general resident population; a disproportionate probability sample of about 150 individuals were selected for interview from each of the 40 PSUs according to the following distribution: 20 HIV positive, 30 drug users, 40 temporary migrants, and 60 general residents population. Because not every PSU had the target number of subjects in every category, the actual sample size in each category varies from one PSU to another. Of the total 5, 499 individuals who consented to participate in the study and constituted the final sample, 350 were known HIV positive, 1, 065 were drug users, 1,633 temporary migrants, and 2,451 general resident population.

MEASURES

Dependent variables

The dependent variables used in the analysis are HIV related risk behaviors, namely,

injection drug use, needle sharing while injecting, casual sex with non stable partners, and non-condom use in casual sexual encounters. All four dependent variables are dichotomous with 1 indicating the presence of the risk behavior and 0 without.

Out of 5, 499 participants who were interviewed, 389 have missing data on HIV related drug risk behaviors and they are consequently dropped, resulting in a sub-sample of 5,110 for the analysis of injection drug use. For sex risk behaviors, 976 have missing data and are removed from the analysis, resulting a sub-sample of 4,523 participants.

Independent Variables

Demographic characteristics of age and marital status are included in the analysis. Age is a continuous variable, while marital status a dichotomous variable, which takes the value of 1 if married and 0 not currently married.

Socio-economic status is measured by respondents' education and employment. Education is measured by the highest grade of school completed. The original 6-category variable is dichotomized in the analysis. Those with less than senior high school are coded 0 while those with a senior high school or higher education are coded 1. Employment is measured by a dichotomous variable, which takes the value of 1 if the respondent was employed at the time of survey and 0 of not.

Psychological status is measured by the Center for Epidemilogical Studies Depression Scale (CESD scale), which is a 20-item, 4-point scale developed for use in the general population. The scale has high validity and reliability (Radloff 1977). This scale has been used in previous studies of IDUs (Knowlton et al. 2000) and HIV-positive injection drug users (Mizuno 2003).

Social influence is measured by asking respondents whether they have any close friends, relatives, or siblings who are drug users; and whether any member in their network of the family and peers has causal and unprotected sex. Answer "Yes" was coded as 1 and "No" was coded as 0 in the analysis.

Data analysis

SPSS 10.0 was used to conduct the data analysis. The distribution of respondents' behavior regarding injection drug use, needle sharing, casual sex and condom use were first examined. Then bivariate analyses were conducted whereby the odds ratios are calculated with the 95% confidence intervals to assess the association between each independent variable and HIV risk behaviors. Finally at the multivariate level, adjusted odds ratios and their corresponding 95% confidence intervals (CI) were calculated to assess the significance and magnitude of the association between individual variables and HIV risk behaviors when other variables were controlled for. All analyses were conducted for men and women separately.

RESULTS

Study Sample Characteristics

Table 1 presents the differences in prevalence of risk behaviors between men and women and differences in the independent variables between risk takers and non risk takers. For injection drug use, 18% (598/3251) of male participants reported injecting drugs in the last 30 days while only 3% (58/1,859) of female participants reported the behavior. But regarding HIV risky sexual behaviors, a larger percentage (9%: 150/1660)of females in the sample report it compared to only 5% (177/2863) of that among males

The data show that compared to non risk takers, HIV risk behavior takers are more likely to be younger, less educated, unemployed, single, depressed, and having friends, relatives, and siblings who have engaged in risk behaviors. Among HIV risk behavior takers, females are more likely to be younger, single, more severely depressed, and have friends, relatives, siblings who have engaged in HIV risk behaviors. Education and employment show different characteristics among different risk populations. Among casual sex risk takers, females received less education compared to males, but this is not the case for IDUs. Male IDUs are more likely to be employed compared to female IDUs but among the casual sex risk takers, more females than males are employed.

(Table 1 about here)

Gender differences in predictors of HIV drug using behaviors

Almost 18% (598) of the 3,251 male participants reported injecting drugs in the prior 30 days. In the female sample, only 3% (58) of the 1,859 respondents reported injection drugs in the prior 30 days. As data in table 2 show, variables that are significant and positively associated with injection drug use among men are: having friends, relatives, and siblings who are drug users and the depression scale. Variables that are significant and negatively associated with injection drug use are: age; senior high school or more education; being employed; and being married. Unlike the male sub-sample, education has no significant association with injecting drugs among females. In bivariate analyses, variables that are significant and positively associated with injection drug use among women are: having friends, relatives, and siblings who are drug users and the depression scale. Variables that are significant and negatively associated with injection drug use are: age; being employed; and

being married.

In the multivariate analysis (adjusted odds ratios in Table 2), five variables remain significantly related to injection drug use among men after other variables were controlled for. The odds of injection drug use is almost 10 times (OR= 9.78, P< 0.001) higher for those who reported having friends who have used drugs than for those who reported having no drug using friends. A unit increase on the CES-D depression scale was associated with a 4% increase in the odds of injection drug use (OR= 1.04, P< 0.001). Having finished an education of senior high school or more is associated with a 43% decrease in the odds of injection drug use (OR= 0.57, P< 0.01). Being employed decreases the odds of injection drug use by 75% (OR= 0.25, P< 0.001), while being married decreases the odds of injection drug use by 68% (OR= 0.32, P< 0.001). Having friends who have used drugs is the strongest predictor of injection drug use while being employed is the strongest factor associated with a decreased odds of injection drug use among males. Among women, four variables remain significant in the multiple analyses. The odds of injecting drugs is 32 times higher (OR= 32.28, P< 0.001) for those who reported having drug using friends compared with those who did not. A year increase in age is associated with a 2% increase in the odds of injection drug use (OR = 1.02, P< 0.5). Being employed decreases the odds of injecting drugs by 93% (OR= 0.07, P< 0.001) while being married decreases the odds by 82% (OR= 0.18, P< 0.001). Similar to the male sub-sample, having friends who have used drugs is the strongest predictor of increased injection drug use among females, while being employed is the strongest factor associated with decreased odds of injection drug use after other correlates are controlled for in multiple analyses. But education has no impact on female's injection drug use.

For needle sharing, data in table 3 show that variables that are significant and positively associated with needle sharing among men in the bivariate analyses are: having friends, relatives, and siblings who are drug users and the depression scale. Variables that are significant and negatively associated with needle sharing are: age, senior high school or more education, being employed, and being married. Among women, because 17 female respondents who reported sharing needles in the prior 30 days all belonged to the category of having drug using friends, the independent variable of having friends who are drug users was dropped from the analyses. Variables that are significant and positively associated with needle sharing among women in the bivariate analyses are: having relatives and siblings who are drug users and the depression scale. Variables that are significant and negatively associated with needle sharing are: being employed and being married.

Once other variables were controlled for in the multivariate analyses (adjusted odds ratios in table 3), the impacts of age, education, and having drug using siblings on needle sharing all became not significant among men. Respondents having friends (OR= 9.39, P< 0.001) and relatives (OR= 1.38, P< 0.5) who are drug addicts are more likely to share needles. A unit increase on the CES-D scale increases the odds of needle sharing by 5% (OR = 1.05, P< 0.001). Being employed (OR = 0.69, P< 0.5) and married (OR= 0.36, P< 0.001) decreases the odds of needle sharing by 31% and 64%, respectively. Among women, once other variables were controlled for in the multivariate analyses, most associations appeared in the bivariate analyses become not significant. Only being married remains a significant predictor of the odds of needle sharing which decreases the odds of needle sharing by 94% (OR= 0.06, P<0.05) among females.

(Table 2 about here)

(Table 3 about here)

Gender differences in predictors of HIV risky sex behaviors

Almost 6% (177) of the 2,863 male participants and 9% (150) of the 1,660 female participants reported casual sex behaviors with someone other than their spouses/lovers in the prior 30 days. As seen in table 4, the bivariate analyses show that men are more likely to engage in casual sex behaviors if they: had friends, relatives, and siblings who have engaged in casual sexual behaviors; or if they had a higher score on the CES-D scale; but less likely to engage in casual sex behaviors if they are older, employed; and married. Unlike their impacts on men's sexual behaviors, employment and having siblings who have engaged in causal sex behavior have no significant impacts on female's casual sex behavior in the bivariate analyses. Women are more likely to engage in casual sex behaviors if they: had friends and relatives who have engaged in multiple sexual behaviors and have a higher score on the CES-D scale; but less likely to engage in casual sex behaviors if they are older, finished an education of senior high school or more, and married.

All variables in the bivariate analyses were entered into the multiple logistic regression model (adjusted odds ratios in table 4). In the multivariate model, four variables still predict significantly the odds of engaging in casual sex behaviors after other variables were controlled for in the male sample. The odds of engaging in causal sex is 2 times (OR= 2.35, P< 0.001) higher for those having friends or relatives (OR= 2.57, P< 0.01) who have engaged in casual sex than those who reported no such friends or relatives. A unit increase on the CES-D scale is associated with a 3% increase in the odds of having casual sex (OR= 1.03, P<

0.01). The impact of employment on casual sex behaviors became not significant when other variables were controlled for. Being married still has a buffering effect, it decreases the odds of having casual sex by 57% (OR= 0.43, P< 0.001). With respect to casual sex, having relatives who have engaged in similar behaviors is the strongest predictor of respondents' risk sex behaviors while being married is the strongest factor leading to decreased odds of having casual sex among males. In the female sample, five variables remain significant in the multiple analyses. The odds of engaging in casual sex is 6 times (OR= 6.44, P< 0.001) higher for those who have friends who have engaged in casual sex than those who have no such friends. A unit increase on the CES-D scale increase in the odds of causal sex by 5% (OR= 1.05, P< 0.01) while a year increase in age decreases the odds by 6% (OR= 0.94, P< 0.001). Completion of a senior high school or more education decreases the odds having casual sex by 59% (OR= 0.41, P< 0.01). Being married, too, decreases the odds of having casual sex by 85% (OR= 0.15, P< 0.001). Gender differences on causes of having casual sex emerged as results in table 4 show. Among the males sample, having siblings who have engaged in causal sex is the strongest correlate of respondents' causal sex behavior while having friend who have engaged in casual sex is the strongest factor leading to increased casual sex among females. Age and education both predict negatively the odds of having causal sex among females but they have no significant impacts on men.

For the likelihood of condom use in casual sex, results in table 5 show that men are more likely to not use condoms if they: had friends, relatives, and siblings who have risk sexual behaviors, and scored higher on the CES-D scale. They are more likely to use condoms if they are older, employed, and married. Among females, by contrast, employment and having

siblings who have risk sexual behavior have no impacts on their likelihood of condom use in casual sex relationships in the bivariate analyses. Women are less likely to use condoms if they: had friends and relatives who exhibit risk sexual behaviors and scored higher on the CES-D scale. They are more likely to use condoms if they are older and married.

Once other variables were controlled for in multivariate analyses (adjusted odds ratios in table 5), the impacts of age, having siblings, and having relatives who are promiscuous on the odds of consistent condom use became not significant among men. Male respondents who reported having friends (OR= 0.40, P< 0.001) who are promiscuous are 60% less likely to use condoms than those who have no such friends; a unit increase on the CES-D scale (OR = 0.97, P< 0.05) decreases the odds of consistent condom use by 3%. Being employed (OR = 1.76, P< 0.01) and married both increase the odds of consistent condom use by 76% (OR= 1.76, P< 0.01). In comparison, education and employment have no significant impacts on women's likelihood of consistent condom use in casual sexual relationships when other correlates are controlled for in the multiple analyses. Once other variables were controlled for, the impacts of age and having relatives who have engaged in risk sexual behaviors on the odds of consistent condom use became not significant. Respondents who reported having friends (OR= 0.17, P< 0.001) who have risk sexual behaviors are 83% less likely to use condoms consistently than those who have no such friends. A unit increase on the CES-D scale (OR = 0.96, P< 0.05) decreases the odds of consistent condom use by 4%, while being married (OR= 5.04, P< 0.001) increases the odds five times.

(Table 4 about here)

(Table 5 about here)

DISCUSSION

Consistent with previous findings more men than women were found to engage in HIV risk drug using behaviors (UNAIDS 2002), but the finding that more women than men have engaged in HIV risk sexual behaviors is not quite expected. As pointed out earlier, traditional social norms set stricter rules for women to follow and they are watched more closely in sexual purity and chastity compared to men. It seems unlikely that more women would engage in casual sex than men in such a social environment. But data show that females who reported casual sex behaviors are the youngest and have the lowest education level among all risk populations in the study. Yet a majority of them reported being employed when the survey was conducted. It is difficult for a young woman with an education level lower than senior high school to find a stable and respectable job in China. Therefore it is very likely that most of those young women worked in industries where casual sex behaviors were prevalent, such as clubs and bars. Trading sex maybe all or part of their sources of income. This could be the reason why more women than men reported casual sex in the study.

The results suggest gender specific causes of HIV risk behaviors. Socio-economic status as indicated by education and employment was a significant predictor of injection drug use among males. Both indicators predicts lower odds of injection drug use, suggesting that male injection drug users were more likely to be those who were poorly educated and not employed. However, the inverse association between education and injection drug use was not observed among females in this study though the data did suggest that being employed greatly decreased the odds of injection drug use among females as well. Previous research has documented that females injection drug users are more likely to be initiated by their

friends or sex partners (Doherty et al.2000; Diaz et al. 2002). In other words, compared to socioeconomic factors, involvement with people who are drug users has a greater impact on women's injection drug use. This is also supported by the present study, having friends who are drug users is the strongest predictor of women's odds of injection drug use.

On the contrary, socio-economic status does not have any significant impact on male's sex behavior in this study, neither education nor employment predicts the odds of having sex among males when other variables were controlled for. As pointed out earlier, men's sexual promiscuity is culturally tolerated in China which applies to people from all social strata. While an image of drug use is easily targeted as negative and stigmatized, the extent of social stigmatization related to sexual promiscuity, especially among men, is much less severe than that of drug use. This could partly explain why education and employment status do not seem to predict men's casual sex. By contrast, education has a strong buffering effect that prevents women from engaging in casual sex. A better education allows a woman to enter the paid job market and be economically independent, therefore their "economic exposure", which is caused by women's economic dependence on men, to HIV risk behavior such as trading sex for money could be greatly decreased. Educated and economically independent women generally have their own perspectives on their social and gender roles though they are still under the influences of traditions. With enhanced social esteem and new recognition of their social roles, women's "social exposure" to HIV risk behaviors could be consequently greatly decreased.

For condom use in casual sex, employment was a predictor of consistent condom use in casual sex among men. But among women, consistent condom use was not affected by either

education or employment, which suggests the importance of studying social and cultural factors that affect women's condom use in casual sex encounters.

The influence of depression also differs between men and women. For drug using behaviors, depression leads to increased injection drug use and needle sharing among men while it had no significant influence on women when other correlates were controlled for. While depression increases the likelihood of having casual sex and decreases condom use in casual sex relationships among both men and women, it has more influences for women than for men. It has been indicated that females are more likely to develop and get influenced by depressive symptoms due to their personalities, cognitive styles, and lack of problem-solving strategies (Culbertson 1997). The finding that depression affects women more compared to men reminds us the importance of studying psychological factors that linked with females' risk behaviors and the need to take those factors into consideration when developing prevention programs among female risk populations.

Being married offers a strong deterrence to odds of all HIV risk behaviors examined, while having friends who have HIV risk behaviors is the strongest predictor of similar risk behaviors among both men and women. Further, the impact of marriage and social influence of peers is greater on women's than men's HIV risk behaviors. The findings suggests that more studies that use measures of social networks are needed to explore how various social relationships affect people's risk behaviors and whether and how the impact of those social relationships may differ between men and women.

Data for this study was based on self-report, limitations of self-report include the possibility of a socially desirable response tendency (Latkin et al. 1993) and errors in recall.

There should exist other factors such as gender roles, attitude toward risk behaviors derived from other domains in explaining different causes to men and women's HIV risk behaviors besides those examined. It is beyond the scope of current study to explore these factors' influences on people's HIV risk behaviors in China and further research is recommended. Another limitation of the study is that the sequence of depression and HIV risk behaviors could be determined before they were analyzed because the study is not a prospective one. It is not clear whether men and women studied developed depression first which in turn lead to their HIV risk behaviors or they took risk behaviors first then developed depression with the impact of risk behaviors. Research ascertaining this sequence would be of significance for design of HIV prevention programs.

It is clear that gender-specific HIV interventions are a must in China due to different causes of men's and women exhibited regarding HIV risk behaviors. It is also obvious that HIV interventions need not only be gender-specific but also behavior-specific as the study showed that causes of drug using and sexual behaviors differ. The present study did not investigate the interaction of injection drug use and casual sex behaviors and the effect of it on different genders. Further study of these may add useful information to prevention programs.

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Tables:

Table 1: Characteristics of HIV risk behavior takers in comparison with non risk takers in regard to socio-economic status Depressive symptoms, and social networks

	Drug Using Behaviors			Sexual Behaviors		
	IDUS	Needle sharing	Non risk takers	Casual sex	Non condom use in casual sex	Non risk takers
Male Sample	N =598	N= 236	N= 2653	N= 177	N= 143	N= 2863
Age (mean)	29	28.5	31	28.9	29	31
Senior high school or more (%)	9.7	8.5	15.3	14.7	13.3	14
Employed (%)	42.3	50.4	88.5	62.7	59.4	80.4
Married (%)	26.4	23.7	69.7	34.5	38.5	62.7
Depression (mean)	18.8	19.8	15.8	18.65	18.64	16
Friend using drugs (%)	88.3	91.1	28.2			
Relatives using drugs (%)	46	53	19.3			
Siblings using drugs (%)	15.9	18.2	5.8			
Friend casual sex behavior (%)				49.2	50.3	21.9
Relatives casual sex behavior (%)				10.2	9.1	2.6
Siblings casual sex behavior (%)				2.3	2.8	0.4
Female Sample	N= 58	N= 17	N= 1801	N= 150	N= 83	N= 1510
Age (mean)	27.5	27.5	30	23	24.3	31
Senior high school or more (%)	15.5	23.5	15.5	8.7	9.6	15.8
Employed (%)	13.8	23.5	88.9	81.3	79.5	86.6
Married (%)	13.8	5.9	71.9	18	22.9	76.1
Depression (mean)	21.8	23.5	16.2	19.04	19.2	16.06
Friend using drugs (%)	93.1	100	9.9			
Relatives using drugs (%)	39.7	35.3	11.7			
Siblings using drugs (%)	22.4	17.6	3.6			
Friend casual sex behavior (%)				60	62.7	11.4
Relatives casual sex behavior (%)				9.3	9.6	2.0
Siblings casual sex behavior (%)				0.7	1.2	0.3

Table 2: Associations between socio-economic status, depressive symptoms, and social networks and Injection drug use among males (N= 3251)and females (N= 1859)

	Males		Females	
	Unadjusted odds ratios	Adjusted odds ratios	Unadjusted odds ratios	Adjusted odds ratios
Age [a]	0.95***	1.00	0.97*	1.02*
Senior high school or more	0.6**	0.57**	1.002	1.22
Employed	0.10***	0.25***	0.02***	0.07***
Married	0.16***	0.32***	0.06***	0.18***
Depression [a]	1.08***	1.04***	1.14***	1.04
Friend using drugs	19.2***	9.78***	122.04***	32.28***
Relative using drugs	3.56***	1.02	4.98***	0.98
Siblings using drugs	3.04***	1.13	7.71***	1.50

[a] continuous variable

- P < .05, ** P < .01, *** P < .001

Table 3: Associations between socio-economic status, depressive symptoms, and social networks and Needle sharing among males (N= 3251)and females (N= 1859)

	Males		Females	
	Unadjusted odds ratios	Adjusted odds ratios	Unadjusted odds ratios	Adjusted odds ratios
Age [a]	0.95***	0.99	0.97	1.09
Senior high school or more	0.54*	0.62	1.69	2.31
Employed	0.22***	0.69*	0.05***	0.43
Married	0.17***	0.36***	0.03***	0.06*
Depression [a]	1.09***	1.05***	1.16***	1.07
Friend using drugs	18.85***	9.39***		
Relative using drugs	3.99***	1.38*	3.89***	0.55
Siblings using drugs	3.02***	1.12	5.05*	1.12

[a] continuous variable

* P < .05, ** P < .01, *** P < .001

Table 4: Associations between socio-economic status, depressive symptoms, and social networks and casual sex among males(N= 2863) and females (N= 1660)

	Males		Females	
	Unadjusted odds ratios	Adjusted odds ratios	Unadjusted odds ratios	Adjusted odds ratios
Age [a]	0.96***	0.99	0.87***	0.94***
Senior high school or more	1.05	1.06	0.51*	0.41**
Employed	0.41***	0.71	0.67	1.54
Married	0.31***	0.43***	0.07***	0.15**
Depression [a]	1.06***	1.03**	1.08***	1.05**
Friend casual sex behavior	3.44***	2.35***	11.66***	6.44***
Relative casual sex behavior	4.23***	2.57***	5.07***	1.5
Siblings casual sex behavior	5.62**	1.47	2.02	0.36

[a] continuous variable

* P < .05, ** P < .01, *** P < .001

Table 5: Associations between socio-economic status, depressive symptoms, and social networks and condom use among males (N= 2863) and females (N=1660)

	Males		Females	
	Unadjusted odds ratios	Adjusted odds ratios	Unadjusted odds ratios	Adjusted odds ratios
Age [a]	1.033***	1.003	1.10***	1.02
Senior high school or more	1.07	1.06	1.70	1.81
Employed	2.79***	1.76**	1.64	0.78
Married	2.62***	1.76**	9.28***	5.04***
Depression [a]	0.94***	0.97***	0.92***	0.96*
Friend casual sex behavior	0.28***	0.40***	0.09***	0.17***
Relative casual sex behavior	0.28***	0.53	0.22***	0.77
Siblings casual sex behavior	0.14***	0.46	0.26	1.14

[a] continuous variable

* P < .05, ** P < .01, *** P < .001