Syphilis Infection Among Drug Users in Different Regions in China: Develop Targeted Intervention Strategy

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Abstract

Aim: To understand the sex behaviours and demographic characteristics associated with syphilis infection among drug users in China, to provide useful information for HIV/AIDS prevention and intetrvention strategy.

Methods: convenience sampling method or snowball sampling method was used to recruit drug users. Logistic regression was used to analyse independent association between syphilis and risk behaviours.

Results: Syphilis prevalence in Guangxi Nanning, Xinjiang Kashi and Guangdong Dongguan were 17.5%, 10.4%, and 9.6%, perspectively. factors significantly associated with syphilis in Guangxi Nanning was: female vs. male (OR 8.50; p=0.001); factors significantly associated with syphilis in Xinjiang Kashi were: female vs. male (OR 7.44; p9 years (OR 3.12; p

Conclusion: Now, the major mode of HIV transmission in China is sexual transmission, targeted prevention and intervention should focus on at-risk groups.

Introduction

Injecting drug use (IDU) was the major mode of HIV transmission in China [1]. Current estimation showed sexual contact is the major mode of HIV transmission in China today. It is estimated that approximately 700,000 people were living with HIV/AIDS in China in 2007, 40.6% were infected through heterosexual transmission, and 11.0 % through homosexual transmission, IDU accounted for 38.1% of the total number of estimated HIV cases [2].

Drug use is illegal in China, all identified drug users are registered by Public Security Bureau. By the end of 2004, there were cumulative 1.14 million registered drug users in China [3]. However, the real number of drug users in China could be much higher, since drug users may try to avoid registration which is potentially associated with being arrested. Drug users are likely to engage in high risk behaviours such as needle-sharing and unprotected sex [4]. Unprotected sex is common and the increasing of HIV prevalence among commercial sex workers, many of whom inject drugs, may lead to spread of HIV into the general population [5]. This behavior, combined with poor awareness of HIV/AIDS preventive practices, further compounds the situation. Outbreaks of HIV infections have been reported among IDUs in Yunnan, Xinjiang, Guangxi, Sichuan, and Guangdong provinces and autonomous regions [6].

In 2006, a cross-sectional survey was conducted among drug users in Guangdong Dongguan, Guangxi Nanning and Xinjiang Kashi and intended to document the sexual and behavioral practices among the drug users in China.

The aims of our analysis are to describe the sex behaviours and demographic characteristics associated with syphilis infection among drug users in China, to provide useful information for STD HIV/AIDS prevention and intervention strategy.

Methods

Study sample

In 2006, according to the HIV prevalence obtained from HIV/AIDS case reporting system and other epidemiological studies in every province associated local resource in different regions, A cross-sectional survey was conducted in 3 cities from 3 provinces which HIV/AIDS prevalence among sentinel surveillance sites for drug users was over 5%. Each site was requested to provide between 300 and 400 participants. Persons to be included were drug users who smoke or intravenously or intramuscularly use heroin, cocaine, opium, marijuana, morphine, methamphetamine hydrochloride, Pethidine, K powder (Ketamine), or Methylenedioxymethamphetamine (MDMA, also known as Ecstasy). In order to avoid prosecution by law and increase participation, anonymity and confidentiality were guaranteed to the drug users when they participated in the surveillance. Under the approval of the protocol "HIV Surveillance Protocol at National Comprehensive HIV Sentinel Sites"by the national ethical committee of China, informed consent from participants in behavioural

surveillanc was required during survey. [7]The participants can be recruited from community where most drug users reside and use drugs, from detoxification centres and from other places like bars, street outreach which different from drug user communities etc. The sampling methods that used for recruiting drug users could be convenience sampling method and snowball sampling method. Convenience sampling method means investigators interview with key informants, local surveillance department, Public Security Bureau and community members that who know the places where local drug users reside and use drugs. If the drug user found by this way rejects to be investigated, next drug user could be recruited and so on until the expected sample size is reached. Snowball method is that investigators should find a key informant or a drug user recognized by local surveillance department and this informant or drug user gives the names, address, and other contact information of second drug user (or second group of drug users) for investigation, who provides the names, address, and other contact information of third drug user [or third group of drug users] in the same way, and so on to increase samples through snowball sampling process until the expected number of sample size is reached. The blood specimen was collected on-site and tested in provincial CDC.

Data collection period was from July to September 2006, but could be prolonged in the case sites were not able to collect the requested number of cases. If so, the needed size of samples was still not reached, then local investigators could contact China CDC who decided to end the sampling process. During the surveillance period, questionnaire survey was conducted and serum specimens were collected from all samples who participated survey. Syphilis antibody status was obtained from blood tests; demographic and behavioural data were collected through standardized interviews.Rapid plasma reagent test [RPR] was used for testing syphilis antibody.

Syphilis RPR reagent: (Kehua Biotech, Shanghai; Lizhu Biotech, Zhuhai China) Variables used in this study included sample source, gender, age, marital status, resident place, nation, education background, profession, monthly income, age at first drug use age, use of injecting drug and needles sharing, number of commercial sex partners in last 12 months, and STD symptoms in last 12 months.

Data analysis:

There were totally 995 samples from 3 sites which conducted survey, one site in Kunming, Yunnan province was excluded for lack of information about risk behaviour. SPSS software (version 14.0 for Windows; SPSS Inc., Chicago, IL) is used to analyse

the dataset, Logistic regression was used to analyse independent association between syphilis status and risk behaviours.

Results

Characteristics of the sample

All 3 sites recruited about 300-400 samples, there were totally 995 samples. T The almost all samples in Xinjiang Kashi (99.3%) and in Guangdong Dongguan (99.8%) were from detoxification center, in Guangxi Nanning over half of samples were from community (60.8%). Male accounted an enormously big part of samples in Guangdong Dongguan and Xinjiang Kashi, 89.2% and 96.6% respectively; whereas in Guangxi Nanning, male to female ratio is almost 1:1. More drug users in Guangdong Dongguan and Xinjiang Kashi were younger than 30, on the contrary, most drug users in Guangxi Nanning were elder than 30. Over 98% of drug users in Guangxi Nanning were local resident, in Xinjiang Kashi all samples were local resident; whereas, transient drug seurs in Guangdong Dongguan were 71.5%. Over 90% of drug users in Xinjiang Kashi were minorities, however, the proportion of Han-Chinese in Guangxi Nanning and Guangdong Dongguan were over 80%. Over 70% samples got more than 9 years education in Guangxi Nanning, whereas, Over 50% samples got less than 9 years education in Xinjiang Kashi. Most drug users use drug at younger than 30, 97.6% drug users in Guangxi Nanning were IDUs, 66.6% drug users in Guangdong Dongguan were IDUs, only 17.6% samples were IDUs in Xinjiang Kashi. Most samples have had no commercial sex in last 12 months, and have had no STD symptoms in last 12 months. See Table 1.

In this study, the syphilis prevalence in all 3 sites was over 5%, were Guangxi Nanning 17.5% (51/291), Xinjiang Kashi 10.4% (31/297), Guangdong Dongguan 9.6% (39/407), respectively.

Based on logistic regression analysis, demographic and behavioral factors significantly associated with syphilis in Guangdong Dongguan were shown in Table 2: female versus male (OR 4.52; 95% CI 1.81-11.28; p=0.001), married versus single (OR 3.96; 95% CI 1.71-9.17; p=0.001), ≤ 9 years education versus > 9 years (OR 3.12; 95% CI 1.41-6.89; p

Based on logistic regression analysis, demographic and behavioral factors significantly associated with syphilis in Guangxi Nanning were shown in Table 3: female versus male (OR 8.50; 95% CI 2.51-28.78; p=0.001). See table 3.

Based on logistic regression analysis, demographic and behavioral factors significantly associated with syphilis in Xinjiang Kashi were shown in Table 4: female versus male (OR 7.44; 95% CI 1.40-39.57; p9 years (OR 3.06; 95% CI 1.12-8.39; p

Discussion

This study showed the syphilis prevalence among drug users was high in these 3 cities, there were Guangxi Nanning 17.5% (51/291), Xinjiang Kashi 10.4% (31/297), Guangdong Dongguan 9.6% (39/407), respectively. The prevalence rate of HIV among IDUs is quite higher in the south-western and north-western areas which border Laos, Myanmar, and Afghanistan. In some regions of Xinjiang, Yunan and Sichuan even over 50% [8].The major mode of HIV infection in the above four provinces with the highest reported cases of HIV/AIDS, including Yunnan, Xinjiang, Guangxi and Sichuan, is attributed to injecting drug use [1,8]. In these regions, the proportion of minority population is much higher than overall 8.4% minority of the entire population [9].

Risk factors demonstrated in this study were low educated female drug users. There is limited information on sex behaviors among drug users in China. As a result, it is hard to track trends in risk behaviors and syphilis prevalence without high quality data [10, 11]. Drug users from community have the better representativeness, because drug users in community are random distributed, but there are difficulties to recruit enough subjects because of their hidden behaviours. Drug users at detoxification centers are easily to recruit and cooperate but have a problem in representativeness. It should be paid attention for increasing the quality of data. Better integration of various sources of data could provide more accurate picture of the dynamics of sexual infections including syphilis and HIV/AIDS among drug users in China [12-14].

Most data on drug users are from surveillance results, which provide limited useful information to evaluate causes of the HIV epidemic inclusive STD and the effects of current intervention programs in this population group [15, 16]. The issue of sample representativeness is decisive in cross sectional survey. Biases can arise when drug users selected in this study do not represent the general drug users in these regions, however, it is really difficult to reach the representativeness among drug users in China which is the most populous country in the world and big geographical and socio-economical disparity between different regions. The representativeness criterion is best satisfied by making certain that sampling settings are selected properly and a sufficient number of samples are collected. Selection bias is most important bias in surveillance. Selection bias can cause if the HIV-related behaviors in surveyed subjects are different from those who do not participate in the survey. Rejection to be surveyed among subjects is an important potential resource of selective bias. HIV-related behavioral surveillance usually involves in the subject's privacy or even the illegal behaviours, and the rejection-related bias can easily cause if the behaviours are different between subjects who reject survey and those who accept survey. Rejection bias may cause under-estimation of risk behaviours.

A majority of drug users in China, engaging in unsafe sex behaviors which might serve as an agent of transmission of HIV from high risk population to the lower risk populations [11, 13, 17]. In this study, over the past 12 months, the prevalence of commercial sex behavior and STD symptoms were not so high, even the female drug users were more likly engaging unprotected sex behavior and act as a risk facotr in this study, the proportion of female participants was very low, which provide limited information for this group, any conclusions regarding to sexual risk behaviours among female drug users should be viewed with caution based on the outcome of this study. The epidemic is characerised by a wide disparity between high and low prevalence regions among drug users in China. Multiple risk behaviour factors exist in the drug users for transmission of HIV and STIs, including multiple sexual partners, unprotected sex, commercial sexual behaviour, injecting drug use, needle sharing, etc. Male drug users can contact more sexual partners through commercials ex behaviors, increasing opportunities for the spread of HIV [18-21]. A number of studies suggest that HIV infection spread from high risk groups into the general population mainly due to sexual transmission [22-25]. Close attention should be paid to carrying out educational activities in this group through per education. The Chinese government has conducted comprehensive prevention and intervention measures for drug users in 61 cities in 31 provinces since 2008. This campaign included community intervention for drug users and peer investigation for hiding behaviors, methadone therapy, health behavior promotion, clean needle, and condom promotion. Peer volunteer working groups and networks were built in these cities to overtake community intervention activities. These projects were conducted in accordance with practices designed to protect

individual privacy and rights.

The Chinese government has launched massive prevention and intervention measures for the HIV epidemic [1,2]. Chinese society is now becoming more tolerant for marginized population groups. Targeted intervention measures should consider the behavioral characteristics among all drug users in China who are extremely vulnerable to HIV transmission in view of a high level of unprotected sex and needle scharing. Effective prevention measures should be implemented and strengthened to match the characteristics of the potential HIV transmission among drug users in China. These measures should include strategies to recruit drug users volunteers to build peer networks, to train volunteer drug users to conduct education and intervention activities among this group, and to encourage drug users with HIV/AIDS to seek medical treatment and care.

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Illustrations

Illustration 1

Table 1 Characteristics of samples in Guangxi Nanning, Guangdong Dongguan, and Xinjiang Kashi

Variables		Guangxi Nanning (N=291) %	Guangdong Dongguan (N=407) %	Xinjiang Kashi (N=297) %
Recruit settings	Detocification center	39.2	99.8	99.3
	Community	60.8	0.2	0.7
Gender	Male	50.9	89.2	96.6
	Female	49.1	9.8	3.4
Age	≤ 30	43.6	70.3	71.7
	>30	56.4	29.7	28.3
Marital status	Single	63.6	63.6	52.2
	Married	36.4	35.4	47.8
Residence	Local	98.6	28.5	100
	Transient	1.4	71.5	0.0
Ethnic group	Han-Chinese	82.7	86.5	1.7
	Minority	17.3	11.5	98.3
Education	≤ 9 years	25.1	35.6	55.4
	> 9 years	74.9	64.4	44.6

Monthly income	≤ 600	40.5	13.5	85.2
	601-2000	9.6	36.4	9.1
	>2000	3.5	27.8	1.3
	N/A	46.4	22.3	4.4
Age at first drug use	≤ 30	90.6	88.5	83.7
	>30	9.4	11.5	16.3
Injecting drug	No	2.4	33.4	82.4
	Yes	97.6	66.6	17.6
Commercial sex behaviour in last 12 months	No	90.0	76.9	94.9
	Yes	10.0	23.1	5.1
STD symptoms in last 12 months	No	86.6	78.6	93.5
	Yes	13.4	21.4	6.5

Illustration 2

Table 2 Logistic regression analysis of sample characteristics associated with syphilis in Guangdong Dongguan (syphilis prevalence 9.6%)

		P	OR	95% C.I.	
				Lower	Upper
Gender	female vs. male	0.001	4.52	1.81	11.28
Age	≤30 vs. >30	0.052	2.72	0.99	7.46
Marital status	Married vs. single	0.001	3.96	1.71	9.17
Nation	Han vs. Minority	0.122	5.21	0.64	42.12
Resident place	local vs. transient	0.418	0.67	0.26	1.75
Education	≤9 years vs. >9 years	0.005	3.12	1.41	6.89
	601-2000 vs. ≤600	0.420	1.82	0.42	7.86
Monthly income	>2000 vs. ≤600	0.208	2.61	0.59	11.58
	missing[1] vs. ≤600	0.155	2.93	0.67	12.93
IDU	yes vs. no	0.033	2.81	1.09	7.24
Commercial sex in last 12 months	yes vs. no	0.943	1.04	0.40	2.66
STD symptoms in last 12 months	yes vs. no	0.219	1.73	0.72	4.15

Illustration 3

Table 3 Logistic regression analysis of sample characteristics associated with syphilis in Guangxi Nanning (syphilis prevalence 17.5%)

		P	OR	95% C.I.	
				Lower	Upper
Sample source	detoxification center vs. community	0.502	1.41	0.52	3.88
Gender	female vs. male	0.001	8.50	2.51	28.78
Age	≤30 vs. >30	0.717	0.88	0.44	1.77
Marital status	Married vs. single	0.892	1.05	0.50	2.20
Nation	Han vs. Minority	0.926	0.96	0.42	2.19
Education	≤9 years vs. >9 years	0.073	2.12	0.93	4.82
	601-2000 vs. ≤600	0.994	1.01	0.32	3.18
Monthly income	>2000 vs. ≤600	0.575	0.60	0.10	3.53
	Missing[1] vs. ≤600	0.855	0.93	0.41	2.08
IDU	yes vs. no	0.230	0.33	0.05	2.02
Commercial sex in last 12 months	yes vs. no	0.697	1.20	0.48	2.98
STD symptoms in last 12 months	yes vs. no	0.115	2.30	0.82	6.50

Illustration 4

Table 4 Logistic regression analysis of sample characteristics associated with syphilis in Xinjiang Kashi (syphilis prevalence 10.4%)

		P	OR	95% C.I.	
				Lower	Upper
Sample source	detoxification center vs. community	0.095	0.09	0.01	1.53
Gender	female vs. male	0.019	7.44	1.40	39.57
Age	≤30 vs. >30	0.131	2.19	0.79	6.02
Marital status	Married vs. single	0.038	2.51	1.05	6.00
Education	≤9 years vs. >9 years	0.030	3.06	1.12	8.39
IDU	yes vs. no	0.323	1.73	0.58	5.10
STD symptoms in last 12 months	yes vs. no	0.601	0.61	0.10	3.91

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