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Full Length Research Paper

HIV and sexual risk behaviours amongst intravenous drug users at rehabilitation centre in rural China

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The study is aimed at investigating the sexual and HIV risk behaviours of intravenous drug users (IDUs) in rural Southwest China and the relationships between the demographics of the population, needle sharing and condom use. 993 IDUs at a drug rehabilitation centre in Dali, Yunnan Province completed an anonymous structured questionnaire between November and December 2006. IDUs were involved in multiple HIV risk behaviours. 37.5% admitted to sharing needles in the past and very few sterilised their needles using the correct technique. A third had engaged in multiple partnerships and 17.9% had a sexual partner who was also an IDU. Only 12.6% always used condoms during vaginal sex- this figure was even lower for oral (7.5 - 7.9%) and anal sex (14.3 - 16.1%). Males were less likely to use condoms compared to females ($p < 0.001$). 60.8% of the population had never had a HIV test. In the regression model, occupational status, marital status and daily dose of heroin were significant independent predictors of condom non-use. Sex, ethnicity, months and frequency of injecting were significant independent predictors of sharing needles in the past. A worrying number of IDUs in rural China are engaged in HIV risk behaviours despite recent government prevention programmes. Further educational interventions are required to target these behaviours.

Key words: HIV/AIDS, China, risk behaviours, intravenous drug use (IDU), rural.

INTRODUCTION

In 2007, 33.2 million people were estimated to be living with HIV worldwide (WHO, 2007). Many countries, in particular those in Sub-Saharan Africa, are at the height of an epidemic, others are believed to be on the brink of one: China is one of these countries (UN Theme Group, 2001). Recent figures indicate that the prevalence of HIV infection is less than 0.1% and the number of those infected only 650,000 (UNAIDS, 2006); however the number infected could potentially increase to 10 million by 2013 (UN Theme Group, 2001) where IUD would have a major role to play (Zhang et al., 2002).

Having the largest number of HIV cases of any province in China, Yunnan is located on the South-West frontier of the country sharing a common boundary line with Myanmar on the West and with Laos and Vietnam in

the South. Intravenous Drug Use (IDU) is at the forefront of the HIV epidemic in Yunnan: In 2006, just under half of all people diagnosed with HIV were infected whilst using contaminated needles (UNAIDS and WHO, 2007). Moreover, whilst HIV risk behaviours such as needle sharing and unprotected intercourse are on the rise, there has been increasing evidence to indicate HIV infection is spreading from high risk groups such as IDUs to the general population (UN Theme Group 2005).

In 2006, with the hope of investigating HIV and sexual risk behaviours, data were collected from a large sample of IDUs institutionalised at a drug rehabilitation centre in Dali for the prefecture of a population of 3.3 million, which is not only a frequented rural tourist destination but also known to be part of a major drug-trafficking route from neighbouring countries into China. As a result, it has suffered the significant burden of heroin abuse coupled with HIV infection in this social setting.

At present little is known about the HIV risk behaviours of IDUs within this rural setting. Previously several

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cross-sectional studies from other countries and cities in China have indicated that IDUs were exposed to many of the important risk factors for HIV transmission, including sharing needles with poor sterilisation technique and low condom use during sexual intercourse (Zhang et al., 2002; Parviz et al., 2006; Perngmark et al., 2004). Yet overall results in studies have been inconsistent, for example condom use ranged between 0 and 90% (Perngmark et al., 2004; Xinhau News, 2008). Variation in geographical and cultural settings consequently makes these studies difficult to generalise to the IDU population in rural China. Furthermore, the aforementioned studies do not take account for the recent implementation of Chinese government HIV prevention programmes such as needle exchange and condom promotion.

This study aimed to provide an up-to-date investigation of current HIV risk behaviours amongst heroin users undergoing rehabilitation therapy in rural China, with the hope of informing the development of future risk reduction interventions within this population.

METHODS

Setting and population

Once ethical approval from the Chinese University of Hong Kong and the University of Birmingham had been obtained, data collection took place at a rehabilitation centre in Dali, Yunnan Province between November and December 2006. The detoxification centre itself has over 2,000 beds and caters for the whole of Dali Prefecture. For the majority of drug users treatment is compulsory owing to China's "Zero Tolerance" Policy regarding the possession of heroin. Treatment at the centre largely consists of medical therapy, psychological counselling, physical exercise, manual labour and vocational training.

Procedures

As a cross sectional study, 1026 questionnaires were administered to heroin users who had a six month history of intravenous drug abuse prior to admission. Participants were recruited and briefed by one doctor. Individuals were excluded if they had mental illness or were deemed inappropriate to participate in the survey for any other reason by the doctor. If the participant was illiterate, the questionnaire was filled in by the doctor in the form of an interview. A self-reporting, structured, anonymous questionnaire was used in order to gather information on the demographics of the population, heroin addiction, needle sterilising and sharing behaviour and sexual health behaviours including condom use. Participants were asked to reflect upon their behaviours six months before their admission. The risk of psychological harm was minimal. Participation was voluntary and written informed consent was obtained.

Data handling and analysis

Data collected were inputted into a SPSS database by university students under the supervision of a research assistant at the Chinese University of Hong Kong.

Data were analysed using the SPSS 15.0. Initially data collected were cleaned and interrogated. Imputation was not used for missing

values as it was felt that they were small in number and potential biases could be avoided. Preliminary analysis was descriptive in nature and scrutinised the key demographic features including age, sex, ethnicity, marital, education and occupational status, heroin addiction and HIV risk factors including needle sharing, condom use, sexual activity, sex workers and knowledge about HIV.

The second stage of analysis involved a Chi-squared test of difference in the proportions and t-test of difference in means (as appropriate) to investigate demographic features of the population and the likelihood of using condoms during vaginal sex and needle sharing. These two key HIV risk factors were chosen as sexual transmission and needle sharing as they are the two primary modes of HIV transmission in China in 2007 (Xinhau news, 2008). In addition "ever sharing needle in the past" was used instead of "sharing a needle the last time you used drugs" as it was thought that this variable gives more indication of general behaviour as opposed to a one-off occurrence. A logistic regression model was performed to identify whether any of the significant demographic factors were independent predictors of having unprotected vaginal sex or sharing needles.

RESULTS

Demographic background of the population

Between November and December 2006, 1026 drug addicts were invited to take part in the survey at Dali Drug Rehabilitation Centre. Of the 993 (90.2%) who agreed to participate, 848 were male, 130 were female and 15 did not disclose their sex. The average age was 31.4 years (range 13 - 88 years). The non-response rate to individual questions was between 0 and 13.2%. Table 1 illustrates the demographic characteristics of the population stratified by sex.

Heroin addiction, treatment and intravenous status

The survey included drug addicts at all stages of treatment at the rehabilitation centre with their length of stay ranging from 1 - 24 months. All inmates were receiving treatment for heroin addiction and on average had been resident there for 5.7 months. Over 80% had been in addiction therapy before with the average respondent having received treatment twice previously. Treatment was mandatory for 56.5% of the population. The median age for participants to have their first contact with heroin was 22 years old (range 9 - 55 years old). Average daily consumption of heroin was 0.2 - 0.4 g. 81.2% admitted to injecting at least once a day and the majority (44.6%) injected 2 - 3 times per day. The mean length of time spent injecting heroin was 56 months or 4.7 years.

HIV and sexual risk factors

Needle sharing

It was found that 37.5% of inmates admitted to sharing needles in the past, with 21.4% of them sharing a needle the last time they took the drug ($p < 0.001$). However,

Table 1. Demographic characteristics of IUD in Dali.

Characteristic	Males (N = 848)	Females (N' = 130)	Total (%)	P value
Ethnic group (n = 831; n' = 129)				
Han Chinese	501 (60.3)	76 (58.9)	585 (60.9)	0.004*
Bai minority	171 (20.6)	25 (19.4)	197 (20.5)	
Muslim	115 (13.8)	10 (7.8)	129 (13.4)	
Thai	12 (1.4)	3 (2.3)	15 (1.6)	
Other	32 (3.9)	15 (11.6)	47 (4.9)	
Education (n = 845; n' = 129)				
Illiterate	76 (9.0)	20 (15.5)	97 (10.0)	0.065
Primary school	247 (29.2)	30 (23.3)	286 (29.4)	
Junior high school	422 (49.9)	61 (47.3)	488 (50.1)	
Senior high school	42 (5.0)	7 (5.4)	49 (5.0)	
College	58 (6.9)	11 (8.5)	69 (7.1)	
Occupation (n = 813; n' = 126)				
Full-time job	29 (3.6)	3 (2.4)	32 (3.4)	0.001*
Part time job	172 (21.2)	8 (6.3)	181 (19.3)	
Unemployed	612 (75.3)	115 (91.3)	738 (78.6)	
Marital status (n = 738; n' = 90)				
Married	257 (34.8)	41 (45.6)	304 (36.7)	<0.001*
Single	388 (52.6)	30 (33.3)	422 (51.0)	
Divorced	93 (12.6)	19 (21.1)	112 (13.5)	
Co-habiting	37 (4.4)	27 (20.8)	66 (6.6)	
Homosexual	4 (0.5)	0	5 (0.5)	
Number of children (n = 814; n' = 119)				
0	465 (57.1)	60 (50.4)	533 (57.1)	0.013*
1	235 (28.9)	49 (41.2)	286 (30.7)	
2	96 (11.8)	6 (5.0)	106 (11.4)	
> 3	18 (2.2)	4 (3.4)	22 (2.4)	

*Statistically significant at 0.05 level.

only 0.8% of the population admitted to sharing needles every time they used drugs. Furthermore, of those who shared needles, 2.9% never cleaned their needles after use by others whilst the remainder of the population used cold water (45.8%), hot water (45.1%), alcohol (5.1%) or soap (1.2%) as sterilisation tools.

Sexual activity and condom use

About 41.2% of drug users had only ever had one sexual relation; however 38.2% had engaged in multiple partnerships and two-thirds in extra-marital sex. 17.9% of respondents also had a sexual partner who was an IDU. In addition only 36.0% were in a long term relationship (that is > 12 months) with their current sexual partner.

Five males (0.5%) reported a same sex relationship

with 2 of them admitting to anal sex in the past.

Table 2 summarises sexual activity and condom use. Vaginal sex was reported by 86.3% of male and 95.3% of female drug addicts. Overall, 37.2% never used condoms and only 12.6% always used condoms during vaginal intercourse with their partner. Females were more likely to always use condoms compared to males ($p < 0.001$) during vaginal sex. Interestingly, condoms were even less likely to be used during oral and anal sex. The female response rate for questions on oral sex (33.1%), anal sex (21.5%) and sex with prostitutes (12.3%) was low compared to the males. About one-fifth of participants (18.5%) engaged in anal sex.

About 59.7% of males reported having had sex with a prostitute in the past of which only 23.2% always used a condom. About 11.7% of male and female inmates have had sex in order to get money for drugs in the past.

Table 2. Sexual activity and condom use of IUD in Dali.

		% Males (724/839)	% Females (123/129)
Vaginal sex		86.3	95.3
Condom use	Always	86 (11.9)	21 (17.1)
	Most of the time	120 (16.5)	21 (17.1)
	Sometimes	248 (34.3)	36 (29.3)
	Never	270 (37.3)	45 (36.5)
		% Males (305/819)	% Females (40/121)
Oral sex		37.2	33.1
Condom use	Always	24 (7.9)	3 (7.5)
	Most of the time	53 (17.4)	3 (7.5)
	Sometimes	79 (25.9)	10 (25.0)
	Never	149 (48.9)	24 (60.0)
		% Males (149/834)	% Females (28/123)
Anal sex		17.9	22.8
Condom use	Always	24 (16.1)	4 (14.3)
	Most of the time	26 (17.4)	4 (14.3)
	Sometimes	37 (24.8)	3 (10.7)
	Never	62 (41.6)	17 (60.7)
		% Males (496/831)	% Females (7/16)
Sex with prostitute		59.7	43.8
Condom use	Always	115 (23.2)	1 (14.3)
	Most of the time	128 (25.8)	3 (42.9)
	Sometimes	112 (22.6)	0
	Never	151 (30.4)	3 (42.9)

Knowledge about HIV/ AIDS and HIV testing

The study found that 81.6% of respondents said they knew what HIV and AIDS were at the time of interviewing. Older drug addicts were more likely to know about HIV compared to younger drug addicts ($p < 0.01$).

In terms of HIV education, 55.5% gained knowledge about HIV from the TV followed by 48.5% from magazines and books, 41.4% from HIV promotional leaflets, 30.2% from newspaper and 21.4% from peers. 62.4% were worried about getting AIDS in the future and 13.1% thought you could identify those infected with AIDS by their general appearance. 60.8% had never had a HIV test, 25.9% once in the past and only 13.3% have a test at least once a year.

Predictors of risk behaviours among drug users

Table 3 presents the results comparing individual demographic characteristics, intravenous use and heroin dose and HIV knowledge with condom use during vaginal sex and needle sharing. Drug addicts who were less likely to use condoms were significantly more likely to be

older, unemployed, married and not know what HIV was. Furthermore the population was significantly less likely to use condoms if they had been injecting heroin for a longer period of time, had a higher frequency of daily drug intravenous or had a higher daily dose of heroin. Drug users who shared needles were significantly more likely to be of Han Chinese ethnicity, had been injecting for a longer period of time, a higher daily frequency of drug intravenous and higher daily dose.

In ordinal regression, occupational status, marital status and daily dose of heroin were significant independent predictors of condom use during vaginal sex (Table 4). In binary logistic regression sex, ethnicity, months and frequency of injecting were significant predictors of ever needle sharing in the past (Table 4).

DISCUSSION

Results from this study have indicated that heroin abusers in Dali Rehabilitation Centre were predominantly male, of Han Chinese ethnicity, between 20 and 30 years of age, unemployed and educated to junior high school level, thus confirming findings from previous studies

Table 3. Association of HIV risk behaviours and demographic variables among IDU in Dali.

Independent variable	Condom use during vaginal sex				P Value*	Needle sharing		P Value*
	Always	Mostly	Sometimes	Never		Yes	No	
Age	29.94	31.24	31.31	32.31	0.045	31.83	31.02	0.101
Ethnicity								
Han Chinese	75 (14.7)	76 (14.9)	179 (35.2)	179 (35.2)	0.358	242 (42.1)	333 (57.9)	0.001*
Bai minority	12 (7.2)	37 (22.2)	37 (22.2)	61 (36.5)		71 (36.2)	125 (63.8)	
Muslim	13 (11.7)	15 (13.5)	31 (27.9)	52 (46.8)		29 (22.8)	98 (77.2)	
Thai	1 (7.5)	2 (15.4)	2 (15.4)	5 (38.5)		6 (40)	9 (60)	
Unknown	5 (11.9)	8 (19.0)	8 (19.0)	17 (40.5)		13 (27.7)	34 (72.3)	
Education								
Illiterate	10 (12.2)	14 (17.1)	25 (30.5)	33 (40.2)	0.392	28 (29.8)	66 (70.2)	0.359
Primary school	30 (12.4)	39 (16.2)	70 (29.0)	102 (42.3)		101 (35.8)	181 (64.2)	
Junior high school	56 (13.0)	66 (15.3)	150 (34.9)	158 (36.7)		193 (40.0)	289 (59.3)	
Senior high school	3 (6.3)	11 (23.4)	17 (36.2)	16 (34.0)		19 (18.8)	29 (60.4)	
College/University	9 (15.3)	11 (18.6)	23 (39.0)	16 (27.1)		24 (34.8)	45 (65.2)	
Occupation								
Full-time Job	9 (34.6)	4 (15.4)	10 (38.5)	3 (11.5)	0.003	9 (28.1)	23 (71.9)	0.201
Part-time Job	16 (10.1)	34 (21.4)	60 (37.7)	49 (30.8)		75 (42.1)	103 (57.9)	
Unemployed	80 (12.5)	97 (15.1)	206 (32.1)	259 (40.3)		265 (36.4)	464 (58.5)	
Marital status								
Married	28 (10.2)	37 (13.5)	77 (28.1)	132 (48.2)	< 0.001	100 (33.4)	199 (66.6)	0.121
Single	52 (14.4)	53 (14.7)	126 (35.0)	129 (35.8)		168 (40.2)	250 (59.8)	
Divorced	8 (8.1)	19 (19.2)	41 (41.1)	31 (31.3)		42 (38.9)	66 (61.1)	
Co-habiting	7 (11.1)	14 (22.2)	19 (30.2)	23 (39.5)		28 (43.1)	37 (56.9)	
Homosexual	0	4 (80)	0	1 (20)		0	5 (100)	
Mean length of time injecting (months)	45.11	52.93	57.86	61.38	0.025	70.85	46.39	< 0.001
Frequency injecting								
Does not inject	2 (18.2)	0	2 (18.2)	7 (63.6)	0.005	0	13 (100)	< 0.001
< 1 per Week	12 (26.1)	8 (17.4)	11 (23.9)	15 (32.6)		8 (14.3)	48 (85.7)	
1 - 3 per week	11 (16.2)	18 (26.5)	17 (25)	22 (32.4)		22 (27.8)	57 (71.2)	
4 - 6 per week	7 (29.2)	3 (12.5)	7(29.2)	7 (29.2)		9 (30)	21 (70)	
1 per day	19 (15.1)	17 (13.5)	46 (36.5)	44 (34.9)		30 (20.1)	119 (79.9)	
2 - 3 per day	40 (10.4)	60 (15.7)	136 (35.5)	147 (38.4)		194 (45.0)	237 (55.0)	
> 3 per day	15 (8.2)	31 (16.8)	63 (34.2)	75 (40.8)		103 (51.0)	99 (49.0)	
Daily dose of heroin								
<0.1	38 (19.0)	33 (16.5)	63 (31.5)	66 (33.0)	< 0.001	60 (24.3)	187 (75.7)	< 0.001
0.2 - 0.4	45 (12.0)	62 (16.6)	129 (34.5)	138 (36.9)		169 (40.2)	251 (59.8)	
0.5 - 0.7	18 (10.1)	24 (13.4)	63 (35.2)	74 (41.3)		91 (47.6)	100 (52.4)	
0.8 - 1.0	5 (4.9)	22 (21.4)	29 (28.2)	47 (45.6)		46 (40.4)	68 (59.6)	
HIV knowledge								
Yes	89 (12.8)	109 (15.6)	247 (35.4)	254 (36.4)	0.019	302 (38.7)	479 (61.3)	0.074
No	15 (9.4)	29 (18.2)	35 (22.0)	70 (44.0)		55 (31.4)	120 (68.6)	

*P value of Chi-squared tests or one way ANOVA as appropriate.

Table 4. Table identifying the significant independent predictors of condom use and needle sharing using logistic regression.

Condom use during vaginal sex			
Independent variable	Wald coefficient	Degrees of freedom	Significance level
Occupational status (job/no job)	6.331	1	0.012
Marital status (married/not married)	13.575	1	< 0.001
Daily dose of heroin (< 0.4 g/ > 0.4 g)	21.53	1	< 0.001
Ever needle share			
Independent variable	Wald coefficient	Degrees of freedom	Significance level
Sex	21.297	2	< 0.001
Ethnicity	15.679	4	0.003
Months injecting	31.006	1	< 0.001
Frequency injecting	29.279	6	< 0.001
Constant	2.280	1	0.131

(Zhengyen et al., 1998). The survey has indicated that many of this population are involved in multiple HIV and sexual risk behaviours including needle sharing and abstaining from condom use during regular and commercial sexual intercourse. Previous research suggested reasons for such risky behaviour including that heroin addicts do not use condoms as they find themselves too intoxicated to protect themselves during sexual intercourse (Prakash 2003). In reference to needle sharing, IDUs have been shown to lack the ability to perceive long-term outcomes (such as HIV infection) as a result of their current behaviour (Odum et al., 2000; Loxley and Davidson, 1998). Despite many having engaged in behaviours highly associated with the transmission of HIV and the majority of the population knowing what HIV was at the time, a large percentage of those surveyed have never had a HIV test before. Although the proportion of men who have sex with men, another sub-group who are known to be at a higher risk of HIV, was negligible (0.5%), condom use was inconsistent.

Preliminary analysis indicated that inconsistent condom use was associated with males, older age, those who have no knowledge about HIV, the unemployed and those that were married. Results from this study confirm existing evidence showing that a higher frequency of heroin injection is associated with sharing needles and inconsistent condom use (Perngmark et al., 2004; Lundgren et al., 2005). However, following logistic regression analysis, only occupational and marital status were significant independent predictors of condom use during vaginal sex. A possible reason for those unemployed failing to use condoms could be financial in nature which could suggest a need for widening the access of free condoms to this population.

Although this study has found that over a third of drug users have shared needles in the past with a quarter of them having done so recently, previous research carried out amongst Chinese drug addicts has suggested this figure to be higher (between 50 - 80%) (Hong-bo et al.,

2004, Youchan et al., 2002). Access to the needle exchange centre in Dali City could be one possible explanation to the lower needle sharing prevalence following the needle exchange program set up in China since 2004. This study also refutes previous evidence that being from an ethnic minority predisposes drug addicts to needle sharing as it was found that Han Chinese drug addicts were more likely to share needle (Yang et al., 2006).

Limitations of study

Although this study has given a detailed insight into the risky behaviours amongst heroin addicts in rural China, it was not possible to conclude whether those who were identified as having engaged in risk behaviours associated with HIV were actually at greater risk without knowing their HIV sero-prevalence. We could not offer such a service as HIV testing was not allowed by the rehabilitation centres. Furthermore as data from this study was largely self-reporting, the reliability answers from the questionnaire may come into question for three reasons. On average inmates had been receiving treatment at the centre for 6 months at the time of interviewing, commenting on their behaviours 6 months previously could have resulted in an element of recall bias. Secondly pre-admission opium intoxication may have also influenced their ability to remember past behaviours and lastly condom use remains highly stigmatised in China which could lead to a subsequent underreporting. Additionally this study only included heroin users enrolled in the Dali detoxification therefore omitting drug users in the community. As a result conclusions from this study may not be generalisable to the wider population of drug users in China. In light of these limitations, further research could be carried out in this field identifying drug users in treatment and in the community, their HIV risk behaviours and their HIV status

to determine a cause-and-effect relationship.

Another limitation of the questionnaire appears to be its adaptability to the female population as it was found that the response rate of females to both questions on use of prostitutes was low (approximately 12%). Finally, it was not possible to ascertain the reasons for the missing values for certain questions. It is believed that one reason for missing values could have been that respondents felt that the questions were too personal or stigmatising. Nevertheless, due to the large sample size of the study the missing values had no impact on the overall analysis.

IMPLICATIONS AND CONCLUSION

Results from this study have for the first time described the demographic profile and HIV risk behaviours amongst drug users undergoing detoxification treatment in Dali Prefecture, China. It has demonstrated that IDUs in this rural setting are still engaging in HIV risk behaviours, despite the government initiatives to increase HIV prevention awareness. HIV prevalence in drug users in Dali is estimated at over 40% (UN Theme Group, 2001); therefore risky behaviour is critical in terms of potential transmission of HIV to the wider population. This study has suggested a need for further educational interventions to target drug users' needle sharing behaviour and risky sexual behaviour.

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