High prevalence of syphilis and other sexually transmitted diseases among sex workers in China: potential for fast spread of HIV

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Objectives: In China, in the early 1980s, sexually transmitted diseases (STD) started to increase steeply. Sex workers and their clients appeared to play an important role in the spread of STD. Prostitution is illegal in China, and therefore no specific services exist for sex workers unless they are arrested and detained in re-education centres. Staff of a maternal and neonatal hospital in Guangzhou felt the need for an STD care and prevention programme for sex workers outside detention, and started a programme within their hospital, which was unique in the Chinese context.

Methods: From March 1998 to mid-October 1999 sex workers were recruited through various outreach methods, and were interviewed, counselled and examined for the presence of STD/HIV.

Results: A total of 966 women, originating from all over China but working in Guangzhou, entered the programme. The median duration of prostitution was one year, and the median number of clients was seven per week. Antibodies to HIV were present in 1.4%. The prevalence of STD was very high: syphilis 14%, *Chlamydia trachomatis* 32%, gonorrhoea 8% and trichomoniasis 12.5%. Knowledge about STD/HIV transmission and condom use was poor.

Conclusion: Given the high prevalence of STD, the potential for the further spread of HIV is clearly present. STD care and prevention programmes for these women, outside detention, are urgently needed, and appear also to be feasible in China.

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Introduction

Sexually transmitted diseases (STD) were reportedly eliminated in China in 1964 [1–3], but since the early 1980s, a steep increase in STD has been seen [1,3]. Data from STD clinics suggest that the majority of male STD patients are infected through unprotected sexual contacts with sex workers [1,4,5].

Although all commercial sex in China is illegal, its recent rapid appearance throughout the country has been widely remarked. Women involved in commercial sex may be arrested by the police and assigned to reeducation centres. Some data are available on the prevalence of STD in women on arrival at these centres, which ranges from 10 to 60% [5]. Apart from these STD check-ups among sex workers in the re-education centres no specific STD services exist for sex workers.

Guangzhou is a large commercial city of approximately 7 million people situated in south-east China, near Hong Kong. It had benefited early from the economic reforms of the 1980s and 1990s. Staff of the Maternal and Neonatal Hospital in Guangzhou had been involved in the examination of women detained in the re-education centres. They realized that women often

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continue working as sex workers even after detention. They therefore started within their hospital a pilot/demonstration project (which includes a cohort study) for sex workers outside detention, in order to promote STD/HIV knowledge and condom use, and to study the occurrence of STD. In this article, we report on the prevalence of STD and HIV, sexual risk behaviour and knowledge with regard to STD and HIV transmission/prevention, diagnosed and reported at intake into this unique programme.

Methods

In the Maternal and Neonatal Hospital in Guangzhou a location was identified with an entrance separate from the main entrance to the hospital. A waiting room, examination room and a laboratory were established. The waiting room contained video equipment, information leaflets and condoms, and was also used as a lecture room.

Women were recruited through various outreach methods, such as presentations by the hospital staff on reproductive health and STD to the personnel of bars, hotels and hairdressing and beauty parlours.

The Provincial Health Bureau also gave women working in hotels and bars information about this project during their annual physical check-up. Cards with information about the project were distributed to recruited women with the request to hand them over to their colleagues.

After written informed consent was obtained, participants were interviewed by a nurse using a structured questionnaire. Questions concerned demographic/socioeconomic characteristics, medical history, mobility, (sexual) risk behaviour, and knowledge regarding the transmission of STD/HIV. After the interview, individual or group counselling was provided on reproductive health, STD/HIV, and the use of condoms. Oral information was complemented with written and video material.

A genital examination subsequently took place. After examination of the vulvae for the presence of genital ulcers and genital warts, a speculum was inserted. The quality and quantity of vaginal and cervical discharge was recorded. Vaginal samples, taken from the posterior fornix, were tested by wet mount for the presence of trichomoniasis and candidiasis. Cervical samples were tested for the presence of *Neisseria gonorrhoea* (culture) and *Chlamydia trachomatis* (LCX; Abbott Laboratories, North Chicago, IL, USA). A blood sample was tested for antibodies to syphilis [*Treponema pallidum* haemagglutination assay (TPHA); Biokit, Spain, SA] and rapid

plasma reagin (RPR; Rong Sheng Biostix Inc., Shanghai, China). All diagnostic procedures took place in the laboratory of the hospital. The diagnosis of genital warts and genital ulcers was performed clinically.

Women were asked to call for the results of the laboratory tests and, if necessary, to come to the clinic for treatment. Follow-up visits were scheduled to take place every 2 months.

In order to encourage attendance at the programme, including follow-up visits, physical examinations, laboratory tests and treatment were provided to the women free of charge.

At the end of the study period, stored blood samples were anonymously (by study number) tested in the laboratory of the Shanghai Hygiene and Anti-Epidemic Station for the presence of antibodies to HIV (HIV-1, HIV-2 3RD enzyme immunoassay; Abbott); positive results were confirmed by Western Immunoblot (Genelabs Diagnostics Pte Ltd., Singapore). Results of the HIV tests have been added to the data set and have not been provided to the staff of the hospital.

Univariate and multivariate odds ratios and 95% confidence intervals of risk factors for several STD (HIV, gonorrhoea, chlamydia and syphilis) were determined using logistic regression. Variables studied consisted of the following clusters: (i) general/socioeconomic variables (including age, educational level, injecting drug use, income, etc.); (ii) the presence of a concurrent STD; (iii) sexual behaviour (including several variables on sexual techniques, number of partners); (iv) knowledge with regard to STD transmission and the use of condoms, self-efficacy for condom use and actual condom use. The variables on knowledge about STD/ HIV transmission and condom use, and self-efficacy for condom use are score ranking variables, and are composed of nine, five and three statements respectively (see Appendix). The sum of individual correct answers (defined as reporting '(very) capable' on the statements on self-efficacy and 'agree' on the other statements), was used in the analyses as a continuous variable.

In multivariate modelling, all factors with a P value less than 0.10 in univariate analysis were entered in stepwise backward procedures. Only the adjusted odds ratios of independent risk factors (P < 0.05) obtained from multivariate modelling are presented.

Results

General characteristics

The general characteristics of the women are shown in

Table 1. A total of 966 women entered the study in the period between March 1998 and mid-October 1999. The mean age of the women was 25 years. Only 14% originated from Guangdong province (7% from Guangzhou Municipality, which is the capital of the province). The remainder came from all over China with a majority from Hunan (35%) and Sichuan province (16%). The median number of years that the women lived in Guangzhou was one year. The median duration of commercial sex work was also one year. For 92% of the women Guangzhou was the first and

only city where they had worked as a sex worker. The majority of the women (45%) solicited their clients in massage and sauna locations. Sixteen per cent of the women solicited their clients on the streets or in parks. Forty-six per cent of the women did not have an additional income from a regular job. A check-up for STD in the year preceding the intake was reported by 35% of respondents.

The main physical complaint at intake was vaginal discharge, which was reported by 66% of the women.

Table 1. Characteristics (general and sexual) and prevalence of sexually transmitted diseases among 966 sex workers at study intake, Guangzhou, China, March 1998–October 1999.

Characteristics	N (%) ^a
General	
Age; mean (SD)	25 (5)
Age leaving education, median (IQR)	15 (14–17)
Years lived in Guangzhou, median (IQR)	1 (1-3)
Injected drugs since 1990	66 (6.9)
Drinking beer with clients (past 2 months)	
Always	0
Frequently	57 (5.9)
Rarely	909 (94.1)
Never	0
Recruitment clients	
Street/park	16 (1.7)
Bar	41 (4.2)
Hotel	113 (11.7)
Massage/sauna	437 (45.2)
Entertainment	78 (8.1)
Personal advertisement/pimps	147 (15.2)
Other (e.g. barbershop)	134 (13.9)
No regular income	442 (45.8)
STD check-up (past 12 months)	335 (34.7)
Sexual activity/sexual techniques	333 (3)
Number of clients per week; median (IQR)	7 (5-8)
Steady partner (past 12 months)	399 (41.3)
Casual partner (past 12 months)	232 (24.0)
Duration of prostitution in years; median (IQR)	1 (0.5–2)
Ano-genital sex (past 2 months)	8 (0.8)
Oro–genital sex (past 2 months)	81 (8.4)
Vaginal sex (past 2 months)	966 (100)
Knowledge/self efficacy	300 (100)
Knowledge about AIDS; median score (IQR) (scale 0–9)	4 (3-6)
Knowledge about condom use; median score (IQR) (scale 0–5)	1 (0-4)
Self-efficacy to use condoms; median score (IQR) (scale 0–3)	0 (0-3)
Clients object to using condoms	219 (22.7)
Condom use during vaginal sex with clients (past 2 months)	213 (22.7)
Always	291 (30.1)
Frequently	455 (47.1)
Rarely	173 (17.9)
Never	47 (4.9)
Prevalence of	47 (4.9)
HIV	13 (1.4)
Gonorrhoea	85 (8.8)
Trichomoniasis	121 (12.5)
Chlamydia	311 (32.2)
Syphilis	311 (32.2)
TPHA positive	134 (13.9)
TPHA positive TPHA positive and RPR ≥ 1:8	
Genital warts	52 (5.4) 71 (7.4)
Genital warts Genital ulcers	1 (0.1)
Germai diceis	1 (0.1)

^aExcept for the variables age, age leaving education, years lived in Guangzhou, number of clients and knowledge for which either the SD or the interquartile range (IQR) is presented.

RPR, rapid plasma reagin; TPHA, *Treponema pallidum* haemagglutination assay.

Twenty-one percent of the women complained of abdominal pain. Seven per cent of the women had a history of injecting drug use since 1990.

Sexual behaviour

The median number of clients the women had in a typical working week was seven. In the past 2 months, vaginal sexual contact with their clients was reported by all women, whereas anal intercourse appeared to be rare (0.8%). Oral sex was reported by 8%. Consistent condom use (100% use) in vaginal sexual contact with clients was reported by 30% of the women.

Forty-one per cent of the women reported having a steady partner in the past 12 months, with whom condoms were always used by 8% and never by 53%.

The women were asked to state the main two methods they had used in the previous 2 months to prevent STD. Seventy-two percent of the women mentioned the use of condoms, 43% vaginal douching and 20% antibiotics. As current contraception, 47% used condoms, 25% intrauterine devices, and 11% oral contraceptives. Seven percent reported having been sterilized.

Prevalence of HIV and sexually transmitted diseases

Thirteen women (1.4%) had antibodies to HIV infection. Eight of the 13 women infected with HIV had a history of injecting drug use. None of them had previously been tested for the presence of antibodies to HIV.

The most predominant STD, diagnosed at study entry, was a genital infection with *C. trachomatis* (32%). Gonorrhoea was diagnosed in 8% and trichomoniasis in 12.5% of the women. Evidence of a syphilis infection by means of a positive TPHA test was found in 134 out of 966 women (14%). A RPR titre of 1:8 or more was found in 52 of the 134 TPHA-positive women (39%). Genital ulcers were rare.

Knowledge on (prevention of) sexually transmitted diseases/HIV and self-efficacy for condom use

The women were asked whether they agreed or disagreed with a number of statements regarding knowledge about AIDS and the use of condoms and on self-efficacy for condom use. Out of the nine statements regarding knowledge about AIDS, the median score of correct answers was four. The median score of correct answers on the five questions related to condom use was one. The self-efficacy of the women with regard to condom use appeared to be very low: the median score of the answers on the capability to use condoms was zero.

Risk factors for sexually transmitted diseases

In univariate analyses, a number of general, sexual, knowledge and condom use-related characteristics were associated with the various STD. All factors with P < 0.10 were included in the multivariate model using a stepwise backward procedure. The resulting models are presented in Table 2.

A history of injecting drugs was independently related to HIV infection: eight out of the 13 HIV-infected women reported to have been injecting drugs. A relatively large proportion of the HIV-infected women originated from Guangzhou (six out of 13) and were diagnosed with trichomoniasis (seven out of 13). HIVinfected women reported having fewer clients than HIV-uninfected women. In contrast, independent risk factors for gonorrhoea, trichomoniasis, chlamydial infection and syphilis included a number of markers for (unprotected) sexual activity. The presence of either gonorrhoea, chlamydial infection, or trichomoniasis predicted the presence of the other two remaining STD. Furthermore, it appeared that younger women had a higher risk of chlamydial infection compared with older women.

Trichomoniasis was related to all other evaluated STD (including HIV) with the exception of syphilis. Women with a good knowledge about the transmission of AIDS/HIV and of the preventative impact of condom use appeared to have a smaller risk of infection with syphilis, trichomoniasis or chlamydial infection.

Discussion

Although prostitution is illegal in China, and arrested sex workers may be put in re-education centres, this project proved that it is also feasible to start such an STD treatment and prevention centre in the Chinese context, and to gain the trust of the women for this project. Word of mouth advertisement alone about the existence of the project was not sufficient to recruit women, as in the first 6 months a mean number of only 20 women per month were recruited. Additional methods, such as lecturing on reproductive health to the staff of bars and beauty parlours, were then undertaken and appeared to be much more successful (a mean number of 69 women per month in the next 6 months recruitment period). During these lectures women often raised questions about the increased risk of infertility as a result of their profession as sex workers, particularly as most of them planned to do this kind of work for a short period and then to return to their family home, get married and start a family. Indeed, most women had only recently come to Guangzhou and started sex work.

Table 2. Multivariate analyses of the relationship between general and sexual characteristics, HIV/sexually transmitted disease knowledge and self-efficacy and sexually transmitted diseases among 966 sex workers at Guangzhou, China, March 1998–October 1999.

	HIV OR (95% CI)	Gonorrhoea OR (95% CI)	Trichomoniasis OR (95% CI)	Chlamydia OR (95% CI)	Syphilis ^a OR (95% CI)
General					
Age (years)					
< 21				2.0 (1.2-3.4)	
21–22				1.2 (0.7–2.2)	
23-25				1.4 (0.8–2.5)	NS (-)
26–30				1.0 (0.6–1.7)	
> 30				1	
Not always lived in Guangzhou	0.2 (0.0-0.8)			NS (+)	NS (-)
Injected drugs (since 1990)	8.0 (2.1-30.3)		2.5 (1.3-5.0)	0.2 (0.1 - 0.4)	NS (+)
Recruitment clients on street/via pimps	NS (+)	NS (+)	NS (+)		2.6 (1.7-4.0)
No regular salary	NS (+)	2.3 (1.3-4.1)	6.1 (3.5–10.4)		
STD check-up (past 12 months)		0.4(0.2-0.9)		NS (-)	NS (-)
sexual activity					
Number of clients (per week)					
< 6	1				1
6–7	0.1 (0.0-0.7)	NS (+)	NS (+)		1.7 (1.0-3.0)
>7	0.2 (0.0-1.2)				2.2 (1.3-3.7)
Duration of prostitution (years)					4
< 1				NG ()	1 5 (0 0 0 7)
1				NS (-)	1.5 (0.9–2.7)
3 > 3					2.5 (1.4–4.6)
					1.8 (0.9–3.4)
Steady partner (past 12 months) No steady partner					1
			NS (-)		2.1 (1.4–3.2)
1 steady partner > 1 steady partner			143 (-)		1.1 (0.6–2.3)
nowledge					1.1 (0.0-2.3)
Knowledge about AIDS		NS (-)	NS (-)	NS (-)	0.9 (0.8-1.0)
Knowledge about condom use		NS (-)	0.9 (0.7–1.0)	0.8 (0.8–0.9)	NS (-)
Condom use during vaginal sex (past 2 months)		143 ()	0.9 (0.7 1.0)	0.0 (0.0 0.9)	145 ()
Always		1		1	1
Frequently		3.1 (3.2–8.3)		2.1 (1.0–4.9)	1.5 (0.9–2.6)
Rarely		8.6 (3.2–23.3)	NS (+)	2.2 (0.7–2.2)	2.5 (1.3–4.6)
Never		9.6 (3.0–30.4)		2.7 (1.5–7.3)	3.8 (1.7–8.7)
Diagnostic evidence of:		5.5 (5.5 55.1)		(,	(···· /
HIV			5.0 (1.4–17.0)		5.7 (1.6-20.7)
Gonorhoea			2.3 (1.3–4.1)	2.9 (1.7-4.7)	, , , , , , , , , , , , , , , , , , , ,
Trichomoniasis	11.2 (2.9-42.7)	1.8 (1.0-3.3)		2.6 (1.6–4.1)	NS (+)
Chlamydia	,	3.0 (1.8-5.0)	2.8 (1.7-4.4)	•	,

CI, Confidence interval; OR, odds ratio; STD, sexually transmitted diseases.

In building multivariate models, all univariate predictors (with P value < 0.10) were included in a stepwise backward procedure. All overall P values included in the multivariate models and presented in the table are ≤ 0.05 .

A blank cell indicates that the variable was not included in the multivariate model (P < 0.10 in univariate analyses).

NS indicates that the variable after inclusion in the multivariate model was no longer statistically significant, although in univariate analyses the model P value was < 0.10. The (+) or (-) behind the 'NS' indicates the direction of the risk estimate in univariate analyses.

^a Treponema pallidum haemagglutination assay positive.

The women reported a low number of clients, a median of seven per week, which is low in comparison with the numbers reported by sex workers in European and Asian countries such as Thailand [6–8]. In Cambodia, indirect sex workers, who are non-brothel based, reported a similar low number of clients, whereas direct sex workers, who work in brothels in red light areas, reported a higher number [9]. Despite this short duration of prostitution and the low number of clients among the participants in our study, the prevalence of STD was high.

Syphilis has been one of the last STD to re-occur in China [1]. Therefore, a positive TPHA probably indicates an infection acquired in the previous 2-3 years. In this group of women infection may even have occurred primarily in the previous year, as most of them had only recently started sex work. Fourteen percent of the women had a positive TPHA marker and 5% a RPR titre of 1:8 or higher. Risk factors for syphilis were related to sexual activity and sexual risk behaviour, such as the number of clients, duration of prostitution, and unprotected sexual contacts. In addition, syphilis appeared to be more common in women soliciting clients in the streets, which is also the case in western countries [10,11]. In contrast to syphilis, HIV infection appeared to be strongly related to injecting drug use. However, approximately half of the infected women did not report such a history, which indicates that heterosexual transmission of HIV is taking place.

Chlamydial infection was the most prevalent STD, present in one third of the women. This high prevalence is in agreement with results from a study among Chinese sex workers detained in re-education centres [12], in which a prevalence of 38% was found. Younger women appeared to have an increased risk of *C. trachomatis* infection, which is also in accordance with the literature [13,14].

The high prevalence of *C. trachomatis* infection may be caused by the fact that the majority of the women had not sought previous STD care or treatment. However, even if they had been examined for the presence of STD, it is not likely that the examination would have included a test for *C. trachomatis* infection. Knowledge about *C. trachomatis* infection as an STD is still very poor among doctors in China, particularly among gynaecologists, and reliable diagnostics for chlamydial infection, even in STD clinics, are rarely available in China.

Gonorrhoea, trichomoniasis and *C. trachomatis* infection often appear to be concurrent infections. Women diagnosed with gonorrhoea or *C. trachomatis* infection were three times more likely of a concurrent *C. trachomatis* infection and gonorrhoea, respectively. When a woman is diagnosed with gonorrhoea and the

diagnostics for *C. trachomatis* are not available, concurrent treatment for *C. trachomatis* infection should be considered. The presence of trichomoniasis (relatively easy to diagnose in a wet mount) indicates an increased risk of both gonorrhoea and *C. trachomatis* infection.

Conclusion

STD were highly prevalent among this group of women, who in general had only recently started to work as sex workers. Knowledge about STD/HIV and their transmission was poor. The prevalence of HIV was still low, but given the high prevalence of STD and the fact that STD may facilitate the sexual transmission of HIV, the potential for the further spread of HIV is clearly present. Condom promotion campaigns and health education programmes are urgently needed. Considering the actual participation of sex workers in the project and the positive reactions of the women (verbal communication from the medical staff), we concluded that this project has shown that in China STD care and prevention programmes, specifically for women working as sex workers, are feasible, appreciated and will be utilized by this group of women.

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Appendix

Statements about AIDS (agree, disagree or not sure):

- 1. We can get AIDS from insect bites
- If a customer looks healthy you can not get AIDS from him
- 3. If your sexual partner withdraws before ejaculating, you can not get AIDS

- 4. You can get AIDS from using the same toilet that is used by somebody with AIDS
- 5. If you wash your vagina after your partner ejaculated, you can not get AIDS
- You can get AIDS from drinking from the glass used by somebody with AIDS
- 7. You can get AIDS from having sexual intercourse with somebody with AIDS
- 8. If you are pregnant you can give AIDS to the baby
- 9. If you take an AIDS test regularly you can avoid getting AIDS

Statements on condom use (agree, disagree, not sure):

- 1. Condoms are protective against AIDS from sex
- 2. If you use condoms correctly at all times you can not get AIDS from sex
- 3. Even if you use condoms you can get AIDS from sex
- 4. Condoms are necessary to avoid STD
- 5. Using a condom is good for your hygiene

Self-efficacy (scale categories: very capable, capable, sometimes capable, incapable, very incapable).

How capable are you:

- 1. To talk about condom use with your customers
- 2. To convince a customer to use condoms
- 3. To refuse a customer who does not want to use condoms