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# Prevalence and risk factors of sexually transmitted infections in female sex workers in Hong Kong

## Key Messages

1. The prevalence of hepatitis B surface antigen, syphilis, gonorrhoea, chlamydia, and HIV among the participating female sex workers (FSW) accounted for 8.5%, 1.8%, 1.8%, 4.6%, and 0.2%, respectively.
2. Alcohol consumption, place of origin, a history of termination of pregnancy, higher education level, having multiple partners, and being a non-smoker were risk factors of sexually transmitted infections (STIs) among asymptomatic FSWs.
3. Inconsistent use of condom when having sex with regular partners among FSWs may have a bridging effect in the spread of STIs to other population groups.
4. Continue surveillance of STIs in FSWs in Hong Kong is important. A coherent policy and holistic approach is required to control the spread of STIs in the community.

## Introduction

Sexually transmitted infections (STIs) remain a major public health problem in Hong Kong. Sex workers are reservoirs and vectors for the transmission of STIs in the community. To formulate prevention strategies, the prevalence and risk factors of STIs among asymptomatic female sex workers (FSW) should be determined.

In Hong Kong, STI (including HIV) testing, treatment, and other medical services are available for free to local residents, but non-Hong Kong residents are charged a minimum fee of HK\$1400. These high fees deter many non-local FSWs from seeking proper treatment, and may result in the potential spread of STIs to their clients and families.<sup>1</sup> An outreach well-women clinic for FSWs in Hong Kong was established by the non-governmental organisation—Ziteng—in February 2004. In the clinic, Pap smears, STI (including HIV) screening, and basic physical examinations were provided for free to all FSWs. We aimed to report on the prevalence and risk factors of STIs (including HIV) among FSWs in Hong Kong.

## Methods

This study was conducted from October 2005 to September 2007. A total of 511 FSWs aged 18 to 55 years were recruited in the clinic of Ziteng between December 2005 and April 2007. It coordinated the screening service including Pap smears and venipunctures for STI (including HIV) testing, provided health education and ensured continuity of care through re-tests and follow-up interviews, conducted outreach and screening services at places where FSWs work. A team of two to three volunteer doctors worked in the clinic to provide medical counselling and care 2 to 3 hours a day, twice monthly.

The subjects remained anonymous and their identification documents were not checked to ensure privacy and confidentiality. They had a face-to-face interview with a doctor or nurse, and HIV pre-test counselling and an opportunistic health education were given. They also underwent a physical examination, Pap smear, and blood tests for detection of gonorrhoea, chlamydia, hepatitis B, syphilis, and HIV infections. Demographics (age, place of origin, and marital status), lifestyle (smoking, drinking, and exercise habits), and sexual behaviour (use of condoms, number of sexual partners, and vaginal douching) were recorded using a multifaceted self-report questionnaire.

After 2 to 4 weeks, the results of these examinations were explained to the patients. If the results were positive, follow-up medical care was arranged and treatment was given based on the Department of Health's STI management guidelines (except for HIV). Follow-up services (prescriptions and referrals) were provided.

## Results

A total of 503 FSWs were classified into three groups according to their place of origin: 97 (19.3%) were local; 361 (71.8%) were new immigrants; and 45 (8.9%)

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were non-local illegal migrants on a temporary visitor visa (Table 1). Non-local FSWs were younger and less likely to be smoker, whereas local FSWs were less likely to be married and more likely to be smokers. New immigrant and non-local FSWs were more likely to have single child. The prevalence of STI among these FSWs was 43 (8.5%) for hepatitis B surface antigens, 9 (1.8%) for syphilis, 9 (1.8%) for gonorrhoea, 23 (4.6%) for chlamydia, and 1 (0.2%) for HIV infection.

Of these FSWs, 55 (10.9%) worked on the street, 361 (71.8%) in a single-woman brothel, 81 (16.1%) in a sauna or massage parlour, and 6 (1.2%) in a karaoke club or for an agency (Table 2). The street was the most popular place for non-local FSWs (91.1%), whereas single-woman brothels were the most popular place for locals (72.2% of FSWs born in HK and 79.8% of new immigrants). About 57.6%

of the FSWs had worked for <1 year. The average number of clients per day was 5.0; new immigrant FSWs received most clients per day.

Twenty (4.0%) of the FSWs had  $\geq 2$  regular sexual partners (Table 2); 97.5% and 77.0% of the FSWs reported to have always used condoms when they had vaginal sex and oral sex with their clients, respectively. However, only 23.0% insisted on using condoms when they had sex with their partners. In addition, 56.1% of them performed regular vaginal douching with over-the-counter medicines or water. About 89.5% of FSWs had gynaecological examinations in the past and 70.6% had undergone a cervical smear, with non-local FSWs being significantly less likely to do so. Around 13.1% of FSWs had a history of STIs; new immigrant FSWs were least likely to contract STIs.

**Table 1. Demographic and family characteristics of female sex workers**

Characteristics	No. (%) of female sex workers				P value
	Total	Local (born in Hong Kong, n=97)	Local (new immigrants, n=361)	Non-local (n=45)	
Age group (years)					<0.01 <sup>†</sup>
$\leq 25$	14 (2.8)	8 (8.2)	1 (0.3)	5 (11.1)	
26-30	57 (11.3)	9 (9.3)	38 (10.5)	10 (22.2)	
31-35	190 (37.8)	30 (30.9)	149 (41.3)	11 (24.4)	
36-40	102 (30.2)	26 (26.8)	115 (31.9)	11 (24.4)	
$\geq 41$	90 (17.9)	24 (24.7)	58 (16.1)	8 (17.8)	
Education level					0.32 <sup>‡</sup>
Primary school or below	46 (9.1)	9 (9.3)	32 (8.9)	5 (11.1)	
Low secondary school	344 (68.4)	75 (77.3)	240 (66.5)	29 (64.4)	
High secondary school	94 (18.7)	10 (10.3)	73 (20.2)	11 (24.4)	
University or above	19 (3.8)	3 (3.1)	16 (4.4)	0 (0.0)	
Marital status					<0.01 <sup>†</sup>
Married	265 (52.7)	38 (39.2)	201 (55.7)	26 (57.8)	
Co-habited	3 (0.6)	1 (1.0)	1 (0.3)	1 (2.2)	
Divorced	168 (33.4)	28 (28.9)	131 (36.3)	9 (20.0)	
Single	60 (11.9)	29 (29.9)	23 (6.4)	8 (17.8)	
Widow	7 (1.4)	1 (1.0)	5 (1.4)	1 (2.2)	
No. of children in family					<0.01 <sup>†</sup>
0	110 (21.9)	32 (31.4)	66 (18.5)	12 (26.7)	
1	276 (54.9)	37 (36.3)	216 (60.7)	23 (51.1)	
2	97 (19.3)	26 (25.5)	62 (17.4)	9 (20.0)	
>2	20 (4.0)	7 (6.9)	12 (3.4)	1 (2.2)	
Alcohol drinking					0.05 <sup>†</sup>
Yes	20 (4.0)	8 (9.2)	10 (2.8)	2 (4.4)	
No	483 (96.0)	89 (90.8)	351 (97.2)	43 (95.6)	
Smoking					<0.01 <sup>*</sup>
Yes	167 (33.2)	51 (52.6)	109 (30.2)	7 (15.6)	
No	336 (66.8)	46 (47.4)	252 (69.8)	38 (84.4)	
Hepatitis B					0.19 <sup>†</sup>
Yes	43 (8.5)	5 (5.2)	36 (10.0)	2 (4.4)	
No	460 (91.5)	92 (94.8)	325 (90.0)	43 (95.6)	
Syphilis					0.01 <sup>†</sup>
Yes	9 (1.8)	1 (1.0)	4 (1.1)	4 (8.9)	
No	494 (98.2)	96 (99.0)	357 (98.9)	41 (91.1)	
Gonorrhoea					0.02 <sup>†</sup>
Yes	9 (1.8)	3 (3.1)	3 (0.8)	3 (6.7)	
No	494 (98.2)	94 (96.9)	358 (99.2)	42 (93.3)	
Chlamydia infection					0.10 <sup>†</sup>
Yes	23 (4.6)	8 (8.2)	12 (3.3)	3 (6.7)	
No	480 (55.4)	89 (91.8)	349 (96.7)	42 (93.3)	
HIV infection					0.10 <sup>†</sup>
Yes	1 (0.2)	0 (0.0)	0 (0.0)	1 (2.2)	
No	502 (99.8)	97 (100.0)	361 (100.0)	44 (97.8)	

\* Chi squared test

† Chi square computed by Monte Carlo method for non-2x2 table, in which at least one cell has expected cell count of <5

‡ Chi squared linear-by-linear association test computed by Monte Carlo method, in which at least one cell has expected cell count of <5

**Table 2. Sexual behaviour and working conditions of female sex workers**

Characteristics	No. (%) of female sex workers				P value
	Total	Local (born in Hong Kong, n=97)	Local (new immigrants, n=361)	Non-local (n=45)	
Working place					<0.01 <sup>†</sup>
Street	55 (10.9)	4 (4.1)	10 (2.8)	41 (91.1)	
Single woman brothel	361 (71.8)	70 (72.2)	288 (79.8)	3 (6.7)	
Karaoke club	5 (1.0)	2 (2.1)	3 (0.8)	0 (0.0)	
Sauna or massage	1 (0.2)	21 (21.6)	60 (16.6)	0 (0.0)	
Call or hotel	81 (16.1)	0 (0.0)	0 (0.0)	1 (2.2)	
Time in sex work					<0.01 <sup>†</sup>
≤3 months	93 (18.5)	5 (5.2)	77 (21.3)	11 (24.4)	
3 months to <1 year	197 (39.1)	41 (42.3)	135 (37.4)	21 (46.7)	
1 to <2 years	122 (24.3)	19 (19.6)	94 (26.0)	9 (20.0)	
2 to <3 years	37 (7.4)	7 (7.2)	28 (7.8)	2 (4.4)	
≥3 years	54 (10.7)	25 (25.8)	27 (7.5)	2 (4.4)	
Average no. of clients per day	5.0	4.6	5.1	4.1	0.01 <sup>§</sup>
No. of sexual partners					0.02 <sup>†</sup>
0	122 (24.2)	30 (30.9)	87 (24.1)	5 (11.1)	
1	361 (71.8)	61 (62.9)	264 (73.1)	36 (81.8)	
≥2	20 (4.0)	6 (6.2)	10 (2.8)	4 (9.1)	
Condom use (vaginal sex)					0.13 <sup>†</sup>
Always	474 (97.5)	91 (97.8)	343 (98.0)	40 (93.0)	
Not always	12 (2.5)	2 (2.2)	7 (2.0)	3 (7.0)	
Condom use (oral sex)					<0.01 <sup>†</sup>
Always	362 (77.0)	61 (66.3)	266 (78.2)	35 (92.1)	
Not always	108 (23.0)	31 (33.7)	74 (21.8)	3 (7.9)	
Condom use with partner					0.25 <sup>*</sup>
Always	88 (23.0)	17 (25.4)	66 (17.6)	5 (12.5)	
Not always	294 (77.0)	50 (74.6)	208 (82.4)	35 (87.5)	
Vaginal douching					0.38 <sup>†</sup>
Everyday	72 (14.3)	11 (11.3)	52 (14.4)	9 (20.0)	
Weekly	76 (15.1)	10 (10.3)	57 (15.8)	9 (20.0)	
Monthly	129 (25.6)	28 (28.9)	94 (26.0)	7 (15.6)	
Occasionally	5 (1.1)	0 (0.0)	5 (1.4)	0 (0.0)	
No	221 (43.9)	48 (49.5)	153 (42.4)	20 (44.4)	
Knowledge on human papillomavirus and cervical cancer					0.75 <sup>†</sup>
Known	16 (3.2)	2 (2.1)	12 (3.3)	2 (4.4)	
Unknown	487 (96.8)	95 (97.9)	349 (96.7)	43 (95.6)	
Human papillomavirus vaccine					0.22 <sup>†</sup>
Income of one day	461 (91.7)	86 (88.7)	331 (91.7)	44 (97.8)	
Income of a week	42 (8.3)	11 (11.3)	30 (8.3)	1 (2.2)	
Previous gynaecological examination					<0.01 <sup>*</sup>
Yes	450 (89.5)	87 (89.7)	331 (91.7)	32 (71.1)	
No	53 (10.5)	10 (10.3)	30 (8.3)	13 (28.9)	
Previous Pap smear					<0.01 <sup>*</sup>
Yes	355 (70.6)	75 (77.3)	266 (73.7)	14 (31.1)	
No	148 (29.4)	22 (22.7)	95 (26.3)	31 (68.9)	
Previous sexually transmitted infection					0.01 <sup>*</sup>
Yes	66 (13.1)	21 (21.6)	37 (10.2)	5 (11.9)	
No	437 (86.9)	76 (78.4)	324 (89.8)	37 (88.1)	
Previous sexually transmitted infection in those with previous gynaecological examination					0.01 <sup>†</sup>
Yes	59 (13.1)	19 (21.8)	33 (10.0)	7 (21.9)	
No	391 (86.9)	68 (78.2)	298 (90.0)	25 (78.1)	
Age of first sex (years)					0.03 <sup>†</sup>
12-14	4 (0.8)	3 (3.1)	0 (0.0)	1 (2.2)	
15-17	130 (25.8)	34 (35.1)	82 (22.7)	14 (31.1)	
18-20	278 (55.3)	48 (49.5)	209 (57.9)	21 (46.7)	
21-23	69 (13.7)	9 (9.3)	53 (14.7)	7 (15.6)	
24-26	20 (4.0)	3 (3.1)	15 (4.2)	2 (4.4)	
>26	2 (0.4)	0 (0.0)	2 (0.6)	0 (0.0)	

\* Chi squared test

<sup>†</sup> Chi square computed by Monte Carlo method for non-2x2 table, in which at least one cell has expected cell count of <5<sup>‡</sup> Chi squared linear-by-linear association test computed by Monte Carlo method, in which at least one cell has expected cell count of <5<sup>§</sup> Kruskal Wallis test

Regarding risk factors for STIs, syphilis and gonorrhoea were more common in non-local FSWs (Table 3). The FSWs who had ≥2 sexual partners were more likely to have gonorrhoea infection, whereas those who had a higher level

of education had a higher risk of contracting chlamydia. Previous termination of pregnancy was associated with contracting syphilis. Hepatitis B infection was associated with being a non-smoker.

**Table 3. Demographic features significantly associated with specific sexually transmitted infections**

Demographic feature	Sexually transmitted infection		P value
	No	Yes	
<b>Hepatitis B</b>			
Smoking			0.02*
Yes	160 (95.8)	7 (4.2)	
No	300 (89.3)	36 (10.7)	
<b>Syphilis</b>			
No. of abortion			0.02†
0	91 (97.8)	2 (2.2)	
1	90 (94.7)	5 (5.3)	
2	139 (98.6)	2 (1.4)	
>2	174 (100.0)	0 (0.0)	
<b>Gonorrhoea</b>			
No. of sexual partners			<0.01†
0	121 (99.2)	1 (0.8)	
1	357 (98.9)	4 (1.1)	
≥2	16 (80.0)	4 (20.0)	
Place of origin			0.02*
Local	94 (96.9)	3 (3.1)	
Local (new immigrants)	358 (99.2)	3 (0.8)	
Non-local	42 (93.3)	3 (6.7)	
<b>Chlamydia Infection</b>			
Education level			0.04†
Primary or below	46 (100.0)	0 (0.0)	
Low secondary	328 (95.3)	16 (4.7)	
High secondary	90 (95.7)	4 (4.3)	
University or above	16 (84.2)	3 (15.8)	

\* Fisher's exact test for 2x2 table

† Chi squared linear-by-linear association test computed by Monte Carlo method, in which at least one cell has expected cell count of <5

‡ Chi square computed by Monte Carlo method for non-2x2 table, in which at least one cell has expected cell count of <5

## Discussion

Of 503 FSWs, 71.8% were from single-woman brothels. Only 19.3% were born in Hong Kong, whereas most street FSWs were non-local illegal migrants. They received an average of five clients per day; of whom 97.5% claimed to have used condoms consistently. Nonetheless, condom use with regular sexual partners remained low at 23.0%. Hepatitis B surface antigen, syphilis, gonorrhoea, chlamydia, and HIV infections were present in 8.5%, 1.8%, 1.8%, 4.6%, and 0.2% of our sample, respectively. The risk factors for STIs among asymptomatic FSWs were place of origin, a history of termination of pregnancy, higher education level, having multiple partners, and being a non-smoker.

One limitation of this study was that our sample included only those who were willing to engage with Ziteng and was not representative of all FSWs in Hong Kong. This group of FSWs was no doubt more health conscious; the actual STI rate in the general population FSWs is likely to be higher. Moreover, this cross-sectional study was unable to identify the specific timing and relationships of our participants' responses and their STIs. Causal relationships between STIs and various risk factors should be inferred carefully.

In comparison with FSWs who had attended the Social

Hygiene Service from 1999 to 2000,<sup>2</sup> the rate of chlamydia was significantly lower in our cohorts (41.7% vs 4.6% had non-specific urethritis). The rates of gonorrhoea were consistent (1.5% vs 1.8%), but those of HIV (0.1% vs 0.2%) and syphilis (0.1% vs 1.8%) were significantly higher in our sample. These increases could be due to the time gap between the two studies. Currently, hepatitis B and HIV are the only STIs that have to be reported according to the Quarantine and Prevention of Disease Ordinance. It is of public health interest to consider the inclusion of other STIs or to conduct a continuous serial surveillance other than the sentinel surveillance.

Condom use with regular sexual partners was infrequent (23.0%) among FSWs. This was consistent with a recent systematic review reporting a proportion of 8% to 30%.<sup>3</sup> The concept of a partner appeared rather unclear in this group. It could refer to a husband in a formal marriage, co-inhabitants, frequent customers, or whoever they feel attached to. In our sample, 4% of FSWs reported having ≥2 partners, but this figure may be an under-estimate. This may have a bridging effect for the spread of STI to other population groups, especially clients and their families.

Alcohol consumption and multiple partners are known risk factors. Unexpectedly, higher education level and not smoking were correlates of chlamydia and Hepatitis B infections, respectively. These may be due to an unrealistic optimism regarding their physical well being, and thus less concern about adopting various health protection measures. More research is necessary to explore this argument.

Medical professionals and public health specialists should address these misconceptions through education and prevention activities, which should focus on the promotion of consistent condom use and awareness of the risks of STIs. Nonetheless, education alone may not be sufficient, as FSWs already have good awareness and appropriate attitudes towards protective behaviours, but have difficulty translating them into action. Therefore, the World Health Organization's holistic approach to sexual health (the integration of the somatic, emotional, intellectual, and social aspects of sexual well-being in ways that are positively enriching and that enhance personality, communication, and love) should be adopted.<sup>4</sup>

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