PREVALENCE SURVEY OF SEXUALLY TRANSMITTED INFECTIONS AMONG SEX WORKERS AND WOMEN ATTENDING ANTENATAL CLINICS

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PREVALENCE SURVEY OF SEXUALLY TRANSMITTED INFECTIONS AMONG SEX WORKERS AND WOMEN ATTENDING ANTENATAL CLINICS

Contents

Abreviations and acronyms  iii
Acknowledgements  iv
Executive Summary  1
Introduction  3
Methods  5
Findings  8
Discussion and conclusions  12
ABBREVIATIONS AND ACRONYMS

EIA  enzyme immunoassay

ELISA  enzyme-linked immunosorbent assay

HIV  human immunodeficiency virus

LIA  line immunoassay

PA  particle agglutination

PCR  polymerase chain reaction

RPR  rapid plasma reagin

STI  sexually transmitted infection(s)

TPHA  Treponema pallidum haemagglutination assay
ACKNOWLEDGEMENTS

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1. EXECUTIVE SUMMARY

There were few data on STI prevalence in recent years in Malaysia. A cross-sectional sexually transmitted infection (STI) prevalence survey was conducted by the Division of Disease Control, Ministry of Health of Malaysia, in conjunction with the University Hospital, Ministry of Education, Kuala Lumpur, Malaysia. This survey aimed to determine the prevalence rates of laboratory-confirmed gonorrhoea, chlamydiosis, trichomoniasis, treponemal seropositivity and HIV infection in selected populations in Kuala Lumpur. A total of 1070 antenatal mothers, recruited from August to October 1999, and 208 sex workers, enrolled from April to November 2000, participated in the survey.

All study participants were tested for the five STI, whether they had symptoms or not. Participants were treated with a syndromic management approach if they were diagnosed at the examination with an STI. Other information, including age and sex, was also gathered. Confidential linked testing for syphilis, gonorrhoea, chlamydial infection, trichomoniasis and unlinked anonymous testing for HIV were carried out. Urine and blood samples were collected. Urine was tested using the polymerase chain reaction (PCR) technique for *Chlamydia trachomatis*, *Neisseria gonorrhoeae* and *Trichomonas vaginalis*. Blood was tested using rapid plasmid reagin (RPR) and *Treponema pallidum* haemagglutination assay (TPHA) for treponemal antibodies, and two different enzyme-linked immunosorbent assays (ELISA) for HIV.

Among women attending antenatal clinics, the most prevalent STI was chlamydiosis (1.6%; CI: 0.8–2.3), followed by trichomoniasis (0.5%; CI 0.06–0.9) and treponemal seropositivity (0.3 %; CI: 0.00–0.6). A prevalence rate of 0.2 % was detected for HIV (CI: 0.00–0.45) and 0.2 % for gonorrhoea (CI 0.00–0.45).
About 30.8% of sex workers (CI 24.4 – 37.1) had positive treponemal antibody test results, 11.5% (CI 7.2 – 15.9) had positive HIV test results, 6.3% (CI 2.9 – 9.6) had chlamydiosis, 2.4% (CI 0.3 – 4.5) had gonorrhoea and close to 1% (CI: 0.0 – 2.3) had a trichomonal infection. By univariate analysis, the study indicated that being young was associated with a higher chance of having chlamydiosis among antenatal women, and transsexual sex workers were more likely to have syphilis seropositivity than female sex workers.

There is a high prevalence of HIV infection and syphilis among sex workers of both genders, considered as a group at high risk for HIV transmission. Interventions need to focus on this group.
2. INTRODUCTION

The first HIV case in Malaysia was detected in 1986. Although the HIV epidemic is focusing on injecting drug users, which account for 75% of HIV infections throughout the country, HIV transmission via sexual intercourse is increasing. The percentage of reactive samples among sexually related screened samples has shown an upward trend in recent years.

Prior to this survey, there were few data on risky sexual behaviours in Malaysia. Monitoring of STI helps to assess the potential exposure to HIV infection, because STI infection can facilitate HIV infection and can indicate groups with risky sexual behaviour. In developing countries, STI are a major public health concern. However, few countries in the Region have established high quality, sustainable systems of STI surveillance. STI prevalence surveys are considered an important component to complement existing STI case reporting in Malaysia.

OBJECTIVES

This STI prevalence survey was conducted with the following objectives:

- to epidemiologically determine the prevalence of syphilis, gonorrhoea, chlamydiosis, trichomoniasis, and HIV infection in specific populations (sex workers, antenatal mothers);

- to provide a basis to monitor trends and the impact of prevention and control programmes;

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• to strengthen the capacity for epidemiological assessment and potential surveillance for the above STI; and

• to strengthen the technical capacity of epidemiological, laboratory, and clinic-based study investigators.

Sex workers include those who are working in brothels, hotels, nightclubs, massage parlors or bars, or are casual freelance sex workers. They are considered one of the core (high-risk) transmission subgroups population. The prevalence rates of STI and HIV infection among sex workers are expected to be higher than the general population because they experience higher rates of partner change, a longer period of exposure to infection, poorer access to health care facilities and efficient transmission from sexual exposure.

Antenatal mothers are considered a low-risk population, characterized by relatively lower rates of sexual partners and concurrent relationships, smaller numbers of sexual linkages and relatively limited contact with other population subgroups. The prevalence of syphilis, gonorrhoea, chlamydiosis, trichomoniasis vaginalis and HIV infection among antenatal mothers is expected to represent STI prevalence among the low-risk sexually active population, equivalent to the general population, and, therefore, to give an indication of the level of disease burden in the general population.

The STI included in the survey were syphilis, gonorrhoea, chlamydiosis, trichomoniasis and HIV infection. They have all been classified as high priority because they are spread primarily by sexual transmission. Syphilis, gonorrhoea, chlamydiosis, trichomoniasis are curable and are often asymptomatic in women.
SURVEILLANCE TEAM

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3. METHODS

Study population, enrolment of participants

Sex workers attending three participating general practice clinics in Kuala Lumpur and antenatal mothers attending all six antenatal clinics provided by Kuala Lumpur City Hall participated in the survey. The recruitment period was from April to November 2000 for sex workers and from August to October 1999 for women attending antenatal clinics.

Confidential linked testing for syphilis, gonorrhoea, chlamydial infection and trichomoniasis, and unlinked anonymous testing for HIV were offered. The study participants were enrolled in the survey after informed consent was obtained. Study subjects were recruited consecutively from the study sites until the estimated sample size had been reached: 200 for sex workers and 1000 for antenatal women.
Among sex workers, other information collected via a direct interview was age, gender, number of sexual partners during the previous two weeks, condom usage and number of years involved in sex work. "Ethnic group" data was gathered as additional information for antenatal women.

Free treatment, using a syndromic management approach, was provided to study participants who were diagnosed at the examination with an STI.

**SPECIMEN COLLECTION**

At clinics, a first-void (catch) urine specimen of 10-50ml (no urination in previous two hours) was collected from study participants and placed in a sterile plastic urine collection tube with the lid closed. At the same time, 10ml of venous blood was obtained from each patient and 5ml of the blood was placed in one tube labeled only with the patient’s age and sex and the initials of the clinic. The remaining 5ml of blood was placed in another tube labeled with the subject’s study number, the date and the initials of the clinic. Labeled specimens were stored in the refrigerator at 2-4º C until they were transported to laboratories.

**LABORATORY TESTING**

Urine samples were tested by PCR for C. trachomatis, N. gonorrhoea and T. vaginalis at the STD Laboratory of the Department of Medical Microbiology, University Hospital. Blood samples were tested for syphilis using RPR and, if positive, TPHA as a confirmation test. HIV testing was performed with a commercially available EIA (two different ELISA) and supplementary particle agglutination. These techniques were carried out at the Microbiology Laboratory, Pathology Department, Kuala Lumpur Hospital.
DATA ANALYSIS

Data obtained from the interviews and the results of the laboratory tests were entered and analysed using EPI-INFO (CDC Atlanta, USA, version 6.0), in the Division of Disease Control, Ministry of Health. To minimize errors, a data entry template was developed and double data entry was carried out.

Initial frequency distribution for sociodemographic and behavioural information was performed to assess study population characteristics and facilitate interpretation of results of subsequent analyses.

Prevalence rates for syphilis, gonorrhoea, chlamydiosis, trichomoniasis and HIV infection were evaluated as the next step.

Among antenatal women, this was followed by univariate analysis to identify possible association between "age" and "ethnic group" factors and prevalence of chlamydial infection, using Odds ratios and 95% confidence intervals. There was no univariate analysis for the other STI among this group because the group’s prevalence rates were too small for meaningful findings.

Among sex workers, univariate analysis, with Odds ratios calculated and 95% confidence intervals, was also used to determine possible associations between syphilis, HIV infection and factors such as age, gender, number of sexual partners, condom use and number of years in sex work.
4. **FINDINGS**

**CHARACTERISTICS OF STUDY POPULATIONS (SOCIODEMOGRAPHIC STATUS, RISK BEHAVIOURS)**

A total of 1070 antenatal mothers and 208 sex workers were enrolled in the study. Study subjects recruited in the survey were mostly young, with a median age of 28 years (range: 16-46) among antenatal women, and 31 years (range: 17-60) among sex workers. The Malay ethnic group accounted for 73.4% of the women attending antenatal clinics, followed by Indians (11.4%), Chinese (10.6%) and others, mainly Indonesian (4.7%). Among sex workers, 65.4% (n=136) were transsexuals (males), 58% (n=121) had one or more partners per day and 47.6% (n=99) had been in sex work for less than five years. Among male sex workers, the percentage (42.6%) with a high number of sex partners (>28, in the last two weeks) and the percentage (50.7%) who had been involved in sex work for a long time (> 5 years) were higher than among female sex workers (high number of sex partners = 38.8%, long time in sex work = 37.5%). About 60.1% (n=125) of all study sex workers used condoms every time they served their clients, and close to 1% (n=2) had never used condoms.

<table>
<thead>
<tr>
<th>STI</th>
<th>No. Positive</th>
<th>Prevalence (%)</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chlamydiosis</td>
<td>17</td>
<td>1.6%</td>
<td>0.8 – 2.3</td>
</tr>
<tr>
<td>Trichomoniasis</td>
<td>5</td>
<td>0.5%</td>
<td>0.06 – 0.9</td>
</tr>
<tr>
<td>Syphilis</td>
<td>3</td>
<td>0.3%</td>
<td>0.0 – 0.06</td>
</tr>
<tr>
<td>Gonorrhoea</td>
<td>2</td>
<td>0.2%</td>
<td>0.0 – 0.4</td>
</tr>
<tr>
<td>HIV</td>
<td>2</td>
<td>0.2%</td>
<td>0.0 – 0.4</td>
</tr>
<tr>
<td>Any STI</td>
<td>28</td>
<td>2.7%</td>
<td>1.7 – 3.8</td>
</tr>
</tbody>
</table>

**TABLE 1 - Prevalence of syphilis, gonorrhoea, chlamydiosis, trichomoniasis and HIV infection among 1070 women attending antenatal clinics**

*Kuala Lumpur, Malaysia, 1999*
About 30.1% of sex workers had positive treponemal antibody test results (see Table 2), 11.5% had positive HIV test results, 6.3% had chlamydiosis, 2.4% gonorrhoea and close to 1% a trichomonal infection. About 41% had at least one STI.

**TABLE 2 - Prevalence rates of syphilis, gonorrhoea, chlamydiosis, trichomoniasis and HIV infection among 208 sex workers (136 transsexuals, 72 females), Kuala Lumpur, 2000**

<table>
<thead>
<tr>
<th>STI</th>
<th>No. Positive</th>
<th>Prevalence (%)</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Syphilis</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Transsexuals</td>
<td>32</td>
<td>38.2</td>
<td>30.0–47.0</td>
</tr>
<tr>
<td>Females</td>
<td>32</td>
<td>38.2</td>
<td>30.0–47.0</td>
</tr>
<tr>
<td>HIV infection</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Transsexuals</td>
<td>7</td>
<td>9.0</td>
<td>5.6–12.0</td>
</tr>
<tr>
<td>Females</td>
<td>17</td>
<td>21.9</td>
<td>16.3–27.5</td>
</tr>
<tr>
<td>Chlamydia</td>
<td>13</td>
<td>6.3</td>
<td>2.9–9.6</td>
</tr>
<tr>
<td>Gonorrhoea</td>
<td>5</td>
<td>2.4</td>
<td>0.3–4.5</td>
</tr>
<tr>
<td>Trichomonas</td>
<td>2</td>
<td>1</td>
<td>0.0–2.3</td>
</tr>
<tr>
<td>Any STI</td>
<td>85</td>
<td>40.9</td>
<td>34.1–47.9</td>
</tr>
</tbody>
</table>

**ASSOCIATION BETWEEN STI AND SOCIODEMOGRAPHIC AND BEHAVIOURAL FACTORS BY UNIVARIATE ANALYSIS**

Women attending antenatal clinics:

By univariate analysis, the study indicates that being younger (age 25 years or less) was significantly associated with a higher chance (OR 3.4; CI 1.2 –10.4, p<0.05) of being positive for chlamydiosis (see Table 3).

The prevalence of chlamydial infection decreases from 2.9% among 16-25 year-olds to 0.9 % among those aged 26 years and older. Chlamydial prevalence also varies among ethnic groups (see Table 3) and was highest among Indians (3.3%), followed by Malays (1.4%) and Chinese (0.9%).
SEX WORKERS:

Unlike the findings among women attending antenatal clinics, where high prevalence of chlamydial infection was associated with "young age", among sex workers, HIV infection and treponemal seropositivity were found more frequently in older age groups (Chi square test for trend, p< 0.05 and <0.01 respectively). Table 4 shows that the highest HIV seroprevalence (20%) and treponemal seropositivity (40%) were in women aged 46 years or older. However, "being old" (≥ 31 years), while not significantly associated with prevalence of HIV, was significantly related to treponemal seropositivity.

In Table 2, HIV prevalence and prevalence of treponemal seropositivity seems higher among transsexuals than female sex workers. However, significant difference was only found with treponemal seropositivity as is shown in Table 4.

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**TABLE 3: Prevalence of chlamydial infection by age and ethnic group, among 1070 women attending antenatal clinics, Kuala Lumpur, Malaysia, 1999**

<table>
<thead>
<tr>
<th>Variables</th>
<th>Total No.</th>
<th>Positive</th>
<th>Prevalence (%)</th>
<th>OR (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age Group</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>16 – 25</td>
<td>379</td>
<td>11</td>
<td>2.9 *</td>
<td>3.4 (1.2-10.4)</td>
</tr>
<tr>
<td>≥26 (ref)</td>
<td>691</td>
<td>6</td>
<td>0.9</td>
<td>1</td>
</tr>
<tr>
<td><strong>Ethnic group</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Malay</td>
<td>785</td>
<td>11</td>
<td>1.4</td>
<td></td>
</tr>
<tr>
<td>Indian</td>
<td>122</td>
<td>4</td>
<td>3.3</td>
<td></td>
</tr>
<tr>
<td>Chinese</td>
<td>113</td>
<td>1</td>
<td>0.9</td>
<td></td>
</tr>
<tr>
<td>Others</td>
<td>50</td>
<td>1</td>
<td>2.0</td>
<td></td>
</tr>
<tr>
<td>Non–Malay</td>
<td>285</td>
<td>6</td>
<td>2.1</td>
<td>1.5(0.5– 4.5)</td>
</tr>
<tr>
<td>Malay (ref)</td>
<td>785</td>
<td>11</td>
<td>1.4</td>
<td>1</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>1070</td>
<td>17</td>
<td>1.6</td>
<td></td>
</tr>
</tbody>
</table>

* Chi square test, p<0.05        (ref): reference group
There was no significant difference of age, duration of sex work, and number of sex partners between transsexuals and female sex workers.

The study also indicates that the factors “having a longer number of years involved in sex work” and “having a higher number of sex partners”, were not significantly associated with “being HIV-positive or syphilis-positive”.

Study subjects who had been involved in sex work for a shorter time (< 6 years) were more likely to use condoms inconsistently (OR = 2, CI 1.1–3.7).
5. **DISCUSSION AND CONCLUSIONS**

HIV seroprevalence among pregnant women in Kuala Lumpur was 0.2% (CI 0.00 – 0.45). A similar finding (0.32%, CI 1.92 – 5.16) was noted in a study carried out among women (4927) in 1995 at the time of delivery, using unlinked testing of newborn infants, and in the nationwide sentinel screening of antenatal mothers during 1996-1997 using EIA tests. However, it was much higher than the prevalence rate indicated by the routine screening system at nationwide level since 1998, around 0.03%, which can be explained by the fact that more confirmation tests have been added to the laboratory testing procedure in this system (EIA, PA and LIA).

The overall prevalence of chlamydial infection among pregnant women in Kuala Lumpur was 1.6%. The study indicated that antenatal women of young age (≤ 25 years) were more likely to be infected by chlamydiosis than those in the older age group (rate is about three times higher). A significantly higher rate of a current STI among younger women was also observed in surveys among antenatal women in Vanuatu and Samoa, and among sex workers in China. A study among 370 female

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3 Op cit. Ref. 1.


Prostitution among sex workers in Kuala Lumpur in 1990 noted similar findings, with women under 20 years of age having significantly higher rates of chlamydial infection than older women\(^7\). Regarding syphilis, gonorrhoea and trichomoniasis, the prevalence rates indicated by this study were lower than in previous studies\(^8\).

Among commercial sex workers, overall HIV seroprevalence was 11.5%, and 6.9% among female sex workers. These findings are consistent with those from sentinel surveillance for Kuala Lumpur in 1996, with 6.3% of the 1033 female prostitutes tested being EIA reactive\(^9\). HIV seroprevalence among transsexuals was about 14%, much higher than that in female sex workers. One possible reason is that transsexuals are more likely to practice anal intercourse, which is a known high transmission mode for HIV. The higher number of sexual partners and longer time involved in sex work observed in this group were not significantly associated with HIV infection by univariate analysis. HIV seroprevalence among transsexuals in this study (14.0%) was also higher compared to the 10.0% reported by WHO in 1999\(^10\), which may be due to the fact that study participants were recruited in specific high-risk areas of Kuala Lumpur.

Overall treponemal seropositivity among commercial sex workers was 30.8%. Among female sex workers, it was of 16.7%, similar to the rate found in a previous study in 1990 among 370 prostitutes in Kuala Lumpur, where 13.6% were treponemal-seropositive\(^6\). Among transsexuals, a higher rate of treponemal seropositivity (38.2%) was detected.

Treponemal seropositivity was significantly associated with increasing age and being transsexual by univariate analysis.

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\(^10\) Summary of Rates for Sexually Transmitted Diseases, WHO, 1999
As no significant difference in age, duration of sex work, and number of sex partners was found between transsexuals and female sex workers, anal intercourse among transsexuals could explain the higher syphilis rate in this group. However, the small sample size in this study could not lend support to the observed association. In addition, univariate analysis has its limitations in concluding significant associations. Therefore, results on “associations” must be considered with caution.

The high prevalence rates of HIV infection and other STI among sex workers found from this survey suggest the need for more active interventions focused on this group. Further studies on risk behaviours need to be developed to assess the potential transmission from this group to the general population.