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S M Chen, A van den Hoek, C G Shao, L Wang, D C Liu, S J Zhou, Y C Peng, C L Li, X F Yin

Reproductive tract infections (RTIs) including sexually transmitted infections (STIs) in women are a major public health problem in many developing countries. These infections in women are often asymptomatic and can cause a variety of complications and sequelae, if they are left untreated. In developing countries pregnant women or women attending antenatal and family planning clinics have often been investigated in many studies to determine the prevalence of and risk factors for STIs in order to set up screening criteria. However, only a few studies on the prevalence of STIs have been conducted in women seeking induced abortions.

The prevalence and incidence of STIs including HIV infection have significantly increased since 1980s in China, owing to a series of political, cultural, social, and economic factors. In order to control the growth of the population, induced abortion is one of the methods used for women who have an unwanted pregnancy for whatever reason. Condom use as a birth control method is low in China. At the same time, the proportion of women who engage in sexual activities before marriage has been increasing and the age at first intercourse has decreased. These factors together create dual risks for both unwanted pregnancy and STIs among women of reproductive age. The purpose of this study was to (1) determine the prevalence of STIs; (2) identify factors significantly associated with vaginal and cervical infections.

MATERIALS AND METHODS

This cross sectional study was conducted from November 1999 to September 2000 in two family planning clinics of Jinan, the capital of Shandong. All pregnant women who were seeking induced abortions in the two clinics during the study period were asked to participate in the study, independent of the reason for abortion. Each woman was interviewed with a standardised interviewer administered questionnaire after a written informed consent was obtained. After interviewing, vulval examination was performed by clinicians and any sign indicative of an STI was recorded and diagnosed clinically. Subsequently, saline wet mount smears from the posterior vaginal fornix were taken and examined immediately for mobile trichomonas and clue cells. Another smear from the posterior vaginal fornix was taken and examined for candida with microscopy. After withdrawal of the speculum from the vagina, pH was measured and the results of a whiff test were recorded.

During speculum examination, samples were taken from endocervical canal for the test of Chlamydia trachomatis (CT) and Neisseria gonorrhoeae (NG), with DNA-PCR using a pooling method. In addition, 5 ml venous blood was taken from each participant for the testing of HIV and syphilis. The test for HIV infection was performed with a commercial testing strip (Determine HIV 1⁄2, Abbott Laboratories, USA) according to the manufacturer’s instruction. Any blood sample, which was positive for HIV infection using the determine test, was confirmed by western blot test. For the test of syphilis, treponema passive particle agglutination assay (TPPA, SERODIA-TPPA, Flijirebio Inc, Japan) was used to determine the cumulative seroprevalence of syphilis infection. The same blood sample was tested with toluidine red unheated serum test (TRUST) to assess active syphilis.

RESULTS

The final analysis was based on the data from 2020 women out of 2056 women recruited. A total of 787 blood samples were tested for HIV infection and 503 blood samples were tested for syphilis. The average age of this population of women was 27.5 (SD 5.4) years. Ninety seven per cent of the women had received more than 6 years of schooling. Only 170 (8%) women were unemployed. Ninety four per cent of the women were from the city and 76.5% were married. The majority of women (98.1%) were in their first trimester. For 28% this was their first pregnancy. Sixty nine per cent reported at least one previous pregnancy. A total of 741 (36.7%) women did not have previous history of abortion. The reasons for abortion were family planning for 871 (43%); for being unmarried 460 (23%), and unwanted children for 383 (19%). Other reasons accounted for 15%. The mean age at first sexual intercourse was 23.1 (SD 2.4) years. Two hundred and forty six (12.2%) women had first sexual debut at an age younger than 20 years. Eighty eight (4.4%) women reported having more than one lifetime sexual partners and 64 (3.2%) women reported having a new sexual partner in the past 6 months. Seventy six (3.8%) women reported having previous RTIs (in the great majority this was trichomoniais or candidiatis). Two thousand and eight (99.4%) women denied that their sexual partner had an STI.

When asked, 239 (11.8%) out of 2020 women reported genital itching, 136 (6.7%) vaginal discharge, and 94 (4.7%) lower abdominal pain. On inspection four women had genital ulcers and 16 women had genital and/or vaginal warts. On speculum examination 343 (17%) women were found to have abnormal vaginal discharge, 188 (9.3%) abnormal mucopurulent cervical discharge, 478 (23.7%) cervical erosion, and only 25 (1.2%) women had lower abdominal tenderness on bimanual examination. The prevalence of RTIs in the population is presented in table 1.

The risk factors studied varied in importance between the different STIs. In multivariate analysis, trichomoniais was negatively associated with previous abortion (OR 0.50, 95% CI 0.28 to 0.90) and positively associated with never having used condoms (OR 3.36, 95% CI 1.25 to 2.98) and cervical erosion (OR 1.18 to 2.98). CT infection was not associated with previous history of pregnancy and abortion, nor with condom use, the use of contraceptives, or any sexual risk behaviours. However, abnormal vaginal discharge (OR 1.87, 95% CI 1.18 to 2.98) and cervical erosion (OR 1.92, 95% CI 1.25 to 2.94) on speculum examination were positively associated with an increased risk for the presence of CT. Women who had had a new sexual partner in the past 6 months were 3.8 times more likely to be infected with BV than women without a new sexual partner (OR 3.80, 95% CI 1.60 to 9.04).

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DISCUSSION
In assessing the prevalence of and risk factors for STIs very few studies have involved women seeking termination of pregnancy. In one study, a higher proportion of gynaecological symptoms found in the abortion group compared with the non-abortion group. We had two reasons for selecting this population of women for our study. The first one was that an unwanted pregnancy might be the result of unsafe sexual behaviour, which creates dual risks for both pregnancy and exposure to STIs. The second one was that the procedure during induced abortion might facilitate the result of unsafe sexual behaviour, especially for chlamydial infection detected, only 15 cases were elicited with genital pruritus, 12 with abnormal vaginal discharge, and seven with lower abdominal pain. The second reason is that none of these symptoms and signs is specific enough to indicate a particular STI. This means that the accuracy of the provider’s diagnosis based on symptoms and signs in many infected women, including our study population, is poor.

Some selective screening programmes aiming to reduce the prevalence of chlamydial infection in industrialised countries have been shown successful. Unfortunately, through this study we were unable to establish an algorithm or set of criteria as screening tool for STIs, especially for chlamydial infection. Apart from the low risk characteristic of this group of women, low prevalence of various STIs is another fundamental factor for the poor performance of screening tool in this study. Many recent studies, ours included, showed poor validity of algorithms, whether WHO recommended or modified locally. It should be emphasised that the main aim of screening and treating women seeking abortions is to prevent post-abortal pelvic inflammation apart from reducing the prevalence of the infections.

We conclude that continuous effort should be made to develop a simple diagnostic test to identify those asymptomatic women infected with cervicitis, owing to the serious complications and sequelae caused by these infections.

<table>
<thead>
<tr>
<th>Table 1 Prevalence of RTIs among 2020 women seeking induced abortions in two urban family planning clinics, Shandong Province, China</th>
</tr>
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<tbody>
<tr>
<td>Prevalence of STIs (%)</td>
</tr>
<tr>
<td>STIs</td>
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</tr>
<tr>
<td>T vaginalis (TV)**</td>
</tr>
<tr>
<td>C albicans (CA)**</td>
</tr>
<tr>
<td>Bacterial vaginosis (BV)**</td>
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<tr>
<td>Any vaginitis</td>
</tr>
<tr>
<td>C trachomatis (CT)</td>
</tr>
<tr>
<td>N gonorrhoeae (NG)**</td>
</tr>
<tr>
<td>Any cervicitis</td>
</tr>
<tr>
<td>Genital wart (GW)**</td>
</tr>
<tr>
<td>Syphilis (n=203)</td>
</tr>
<tr>
<td>TPPA only</td>
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<tr>
<td>TPPA + TRUST</td>
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<tr>
<td>HIV (n=787)</td>
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<tr>
<td>More than one infections**</td>
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<tr>
<td>Any infection**</td>
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</tbody>
</table>

*p<0.05; **p<0.01.

WCH = Women and Children Hospital; SPH = Shandong Provincial Hospital.
REFERENCES


