INTRODUCTION

Reproductive Tract Infection (RTI) is a broad term that includes Sexually Transmitted Infections (STIs) as well as other infections of the reproductive tract that are not transmitted through sexual intercourse. Reproductive tract infections are infections of the genital tract and affect both men and women. Some 340 million cases of curable STIs are estimated to occur worldwide every year, the majority in developing countries. In many countries, STIs are among the top five conditions for which men and women seek care and thus constitute a considerable drain on resource-strapped health services.

In 2003, a national study of reproductive tract and sexually transmitted infections was envisaged to obtain estimates of the prevalence of selected RTIs/STIs from samples that can defensively be construed as nationally and provincially representative, using the most reliable epidemiological and laboratory techniques.

The national study had multiple objectives. However, the present paper deals only with the epidemiology of STIs/RTIs among the high-risk groups in Lahore and Karachi. The objective of the presently reported research was to estimate the prevalence of reproductive tract infections (RTIs) among the female sex workers (FSWs), male sex workers (MSWs), injecting drug users (IDUs) and truck drivers.

METHODOLOGY

The overall design of the national study was developed in active consultation between Ministry of Health and National AIDS Control Programme, in collaboration with the UK Department for International Development. In the design phase, a team comprising experts from national and international organisations/institutions participated in 6 design workshops. Besides others, London School of Hygiene and Tropical Medicine, the Population Council and the Aga Khan University participated in designing the study. After discussion, it was decided to focus attention on the following five high-risk groups: female sex workers (FSWs), male sex workers (MSWs), injecting drug users (IDUs) and truck drivers. The study was to be conducted in 2
National study of reproductive tract infections among high risk groups of Lahore and Karachi

stages: first in Lahore and Karachi and then in Peshawar and Quetta.

Pakistan Medical Research Council’s Centre at Fatima Jinnah Medical College, Lahore, in partnership with Family Health International (FHI), Shaukat Khanum Memorial Cancer Hospital, Lahore, and Sindh Institute of Urology and Transplantation, Karachi, conducted the study. The data collection for the study began in March, 2004 and ended in August, 2004.

Sample size for each population sub-group were calculated on the basis of the following assumptions; an expected baseline value of 50%, 10-15% desired change to detect, alpha level set at 0.05, corresponding to 95% confidence in the observed estimates, beta level set at 0.10, corresponding to 90% power, 1.7 for time-location sampling design effect and 1.5 for respondent driven sampling (RDS).

A sample size of 400 for each target group at each site was recommended by the design team. However, for eunuchs, the sample size at each site was set at 200 because local key informants believed that it would be difficult to recruit 400 eunuchs at each site.

The participation of all respondents in the study was strictly voluntary. Measures were taken to assure the respect, dignity and freedom of each individual participating. Emphasis was placed on the importance of obtaining oral informed consent during training of the field staff. Complete confidentiality of study subjects was emphasised. Names or addresses of respondents were not asked or recorded.

Study protocols, questionnaires and consent forms for the target groups were also approved by the FHI, Protection of Human Subjects Committee in USA, and the Institutional Review Board of a National Non-Governmental Organisation, HOPE, in Karachi.

A consent form, explaining all behavioural and biologic sampling and examination procedures, along with the risks and benefit was read out to each participant and his/her questions were answered.

The field staff as well as doctors were trained during a one-week training course. Consultants from the International Centre for Diarrhoeal Disease Research in Bangladesh (ICDDR) carried out quality assurance process and trained the laboratory staff of Shaukat Khanum Memorial Cancer Hospital, Lahore and SIUT Karachi.

Five centres were established for collection of biological and behavioural data, one for each target group, in each city. For FSWs, IDUs and truckers respectively, this meant renting rooms in the red-light areas, overlooking a major shooting-gallery and adjacent to the major truck-stop in each city. Centres for MSWs and eunuchs were more centrally placed, in areas where these populations would feel comfortable.

A systematic random sample was taken in the red-light district of Lahore, where small household brothels housing two or three FSWs were identified. Every sixth house in selected roads and alleys was sampled. The situation in Karachi was much more difficult, with a poorly defined red-light district. A sampling frame was developed, but it became clear that the sample could not be recruited in this manner and the project managers changed to RDS before the start of data collection. It must be noted, however, that the strict rules of RDS could not be sustained in this environment, and the resultant respondent group is best described as a snowball sample.

RDS was used for the MSWs in Lahore. Fifteen seeds or chain initiators were sampled. In Karachi, the same constraints applied as for the FSWs group, and a snowball sample was obtained.

Cluster sampling based on the random selection of Gurus (mentors) was used for eunuchs. A list of Gurus was drawn up and their associated eunuchs were enumerated. A systematic random sample of enlisted Gurus was taken for sampling purposes and all eunuchs under selected Guru were included in the sample.

For IDUs, the most frequent shooting galleries (parks, sections of streets) in Lahore and Karachi were selected and respondents chosen, using a time-location methodology, where repeated trips were made to each site at different times on different days, and a random selection of individuals at the site was invited to participate.

Lists of trucking companies in the major truck-stops in Lahore and Karachi were drawn. A random selection of these agents were informed of their selection before their turn for sampling, and the drivers and assistants on the two trucks, which arrived after an allotted time on a given date, were invited to participate.

The behavioural questionnaire was administered in a private setting by trained interviewers of the same gender. The questionnaire was developed in Bangladesh in 2002 and adopted for local use in Pakistan before being translated into Urdu. The questionnaire was back-translated and pre-tested to ensure clarity and understanding.

For male participants (MSWs, eunuchs, IDUs, truck drivers/assistants), the doctor took a brief STI and general health history. Each respondent was asked to stand up and lower his trousers to his knees. The penis, scrotum, perineum and inguinal area were examined for any discharge, ulcers, swellings, warts etc. If the man was uncircumcised, the foreskin was fully retracted. Finally, the buttocks were separated to visually inspect the anal area.

For FSWs, the doctor took a brief STI, menstrual and general health history. The respondent was asked to lie
down on the couch and disrobe below the waist. The external genitalia, perineum, inguinal and anal area were examined for any discharge, ulcers, swellings, warts etc. A speculum examination, with only water as lubricant, was carried out. One endocervical swab was introduced for 2 cm into the cervical os. It was gently rotated by rolling between the examiners index finger and thumb for 10 seconds and plated onto modified Thayer-Martin media, which was then placed in a candle jar. This process was repeated with a second endocervical swab, only this time the swab was placed in the PCR collection container. Finally, a gentle two fingered vaginal examination was carried out to identify any adnexal masses or tenderness and cervical excitation.

Treatment was administered for any symptomatic STIs or simple ailments. More complex problems were referred to a local public health facility for further management.

**RESULTS**

There were 423 FSWs inducted from Karachi and 404 from Lahore making a total of 827 FSWs. MSWs inducted from Karachi were 407 and 400 from Lahore making a total of 807. There were 403 eunuchs including 199 from Karachi and 204 from Lahore. Injectable drug users induced from Karachi and Lahore were 402 and 397 respectively making a total of 799. Truck drivers included from Karachi and Lahore were 402 and 400 respectively making a total of 802.

The prevalence of STIs/RTIs is detailed in Table I and II. The denominators slightly changed for each test, for reasons such as: haemolysis of blood sample, presence of inhibitor in PCR specimen, or illegible marking on specimens.

Serologically identified syphilis infection was found in 36% MSWs and 60% eunuchs in Karachi. The corresponding figures from Lahore, 12.9% in MSWs, and 35.9% in eunuchs, are significantly lower (p<0.001).

<table>
<thead>
<tr>
<th>Biological indicator</th>
<th>FSW</th>
<th>MSW</th>
<th>Eunuchs</th>
<th>Truckers</th>
<th>IDU</th>
</tr>
</thead>
<tbody>
<tr>
<td>Syphilis</td>
<td>16.0% (62/387)</td>
<td>12.9% (50/387)</td>
<td>35.9% (69/192)</td>
<td>6.8% (26/380)</td>
<td>13.95% (53/381)</td>
</tr>
<tr>
<td>Genital gonorrhoea</td>
<td>12.3% (47/383)</td>
<td>3.3% (13/395)</td>
<td>4.0% (8/198)</td>
<td>0.8% (3/397)</td>
<td>1.0% (4/397)</td>
</tr>
<tr>
<td>Anal gonorrhoea</td>
<td>-</td>
<td>0 (0/400)</td>
<td>n/a</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Genital chlamydia</td>
<td>11% (42/383)</td>
<td>1.5% (6/395)</td>
<td>1.5% (3/198)</td>
<td>0.8% (3/399)</td>
<td>0.2% (1/397)</td>
</tr>
<tr>
<td>Anal chlamydia</td>
<td>n/a</td>
<td>n/a</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Trichomonas</td>
<td>18.3% (74/384)</td>
<td>-</td>
<td>-</td>
<td>0.8% (3/399)</td>
<td>-</td>
</tr>
<tr>
<td>Bacterial vaginosis</td>
<td>47.6% (189/397)</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Hepatitis C</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>91.8% (349/380)</td>
</tr>
</tbody>
</table>

The prevalence of syphilis, genital chlamydia, trichomoniasis and bacterial vaginosis were significantly higher in FSWs of Lahore as compared to FSWs of Karachi (p<0.006), with no significant differences in gonorrhoea levels (p=0.338).

**DISCUSSION**

The greater prevalence of syphilis in eunuchs (transgenders) over other MSWs has been noted previously in Jakarta, where 22% of transgenders were syphilis-positive compared with 2% of MSWs. This may be partly explained by the fact that eunuchs would mostly engage in receptive anal intercourse, compared with MSWs, who have much greater heterogeneity of sexual activity. Eunuchs might have a more high-risk client base, but this issue is difficult to study or confirm. A previous study of eunuchs in Karachi, in 1998, reported 37% syphilis prevalence. The only other study, which has reported such a high prevalence of syphilis as in eunuchs of Karachi, is from Bangladesh, where 57% of brothel-based female sex workers had evidence of previous or current syphilis infection.

The prevalences of anal gonorrhoea and chlamydia among MSWs and eunuchs in Karachi, as measured by PCR, were also higher than figures reported in literature. Anal gonorrhoea was found in 17.5% MSWs and 29.4% eunuchs, while anal chlamydia was present in 10.4% MSWs and 18.3% eunuchs. Information on community-based samples is sparse in the scientific literature. Another study from Jakarta reported 12% anal gonorrhoea, 4% anal chlamydia and 43% syphilis among eunuchs.

Higher prevalence of RTI among the Lahore FSWs may be partly explained by higher number of reported client sexual contacts in Lahore (as evidenced from biological data not reported in this paper), but there is to be known about the epidemiology of STIs in different geographic and cultural contexts. FSWs results in this study are comparable to results from studies by ICDDR in Bangladesh, where 17.5% brothel-based FSWs of...
Dhaka were positive for neisseria (N.) gonorrhoeae; 15.5% for chlamydia (C.) trachomatis; 7.5% for trichomonas (T.) vaginalis, and 6.6% had active syphilis among hotel-based FSWs. The same researchers found 35.8% positive for N. gonorrhoeae, 43.5% for C. trachomatis, 4.3% for T. vaginalis, and 8.5% for syphilis. If the same researchers, using the same laboratory methodologies but sampling different FSW groups within the same city can obtain such different results, one can expect that two FSW groups, separated by one thousand kilometres may also yield different results, as in the present study. The prevalence of trichomonas infection seen in Dhaka (15.5%) during 2005 was closer to that in Karachi, however, another study of street-based FSWs in Dhaka reported a trichomonas prevalence of 45%. In the present study, the only non-sexually transmitted RTI examined was bacterial vaginosis, while its prevalence among FSWs in Lahore (47.6%) was much higher than in Karachi (27%). It should be noted that the Nugent score for bacterial vaginosis is a subjective diagnosis, which is prone to inter-observer bias. High levels of bacterial vaginosis to the tune of 60% have been reported previously among sex workers of South Asia.

In terms of STIs, the truckers had the lowest prevalences, as they were not principally involved in injecting drugs or selling sex. The STI results were consistent with a study carried out at the main truck stand in Dhaka, where the researchers found syphilis in 5.7%, gonorrhoeae in 2.1% and chlamydia in 0.8%.

The prevalence of hepatitis C antibodies was studied only among IDUs. The overall prevalence of 90% is consistent with previous studies carried out in both Karachi and Lahore. Incidence studies carried out in drug users in Southern China noted that 80% of injectors became hepatitis C positive within one year of start of injecting drug use. Given this information, it is suggested that hepatitis C should not be included in any follow-up studies as the infection levels rapidly reach saturation.

CONCLUSION

The prevalence of syphilis is very high among all high-risk groups; particularly so among eunuchs (60.2% in Karachi and 32.3% in Lahore). Such high levels of RTIs indicate a serious threat for HIV epidemic because of socially transmitted infection.