ORIGINAL ARTICLE

Prevalence of sexually transmitted infections and performance of STI syndromes against aetiological diagnosis, in female sex workers of red light area in Surat, India

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Objectives: To measure prevalence of selected sexually transmitted infections (STI) and HIV among female sex workers (SWs) in the red light area of Surat, India, and to evaluate the performance of STI syndrome guidelines (for general population women in India) in this group against the standard aetiological diagnosis of STIs by laboratory methods.

Methods: In a cross sectional study, 124 out of an estimated total of 500 SWs were mobilised to a health camp near the red light area during 2000. After obtaining consent, a behavioural questionnaire was administered, followed by clinical examination and specimen collection for different STIs. 118 SWs completed all aspects of the survey. HIV testing was unlinked and anonymous.

Results: The mean number of different sexual partners of SWs per day was five. 94.9% reported consistent condom use with the clients. 58.5% of SWs had no symptoms related to STDs at the time of examination. Reported symptoms included lower abdominal pain (19.5%), abnormal vaginal discharge (12.7%), painful sexual intercourse (12.7%), painful micturition (11.0%), itching around the genital area (10.2%), and genital ulcer (5.9%). The prevalence of STI "syndromes" were vaginal discharge syndrome 51.7%, pain in lower abdomen 19.5%, enlarged inguinal lymph nodes 11.9%, and genital ulcer 5.9%. Based on the laboratory reports (excluding HIV tests), 62 (52.5%) SWs did not have any of the four tested STIs. Prevalence of laboratory confirmed STIs were syphilis 22.7% (based on reactive syphilis serology tests), gonorrhoea 16.9%, genital chlamydial infection 8.5%, and trichomoniasis 14.4%. HIV prevalence was 43.2%. The performance of Indian recommended treatment guidelines for vaginal discharge syndrome (VDS) and genital ulcer syndrome (GUS) against aetiological diagnosis was poor.

Conclusion: Prevalence of different STIs and HIV among the FSWs in the Surat red light area is high despite high reported condom use with clients. Syndromic case management is missing a large number of asymptomatic cases and providing treatment in the absence of disease. Therefore, it is necessary to explore alternative strategies for control of STIs in female sex workers. STI services need to be improved.

Sexually transmitted infections (STIs), including HIV, continue to present major health, social, and economic problems in the developing world, leading to considerable morbidity, mortality, and stigma.[1] The prevalence rates apparently are far higher in developing countries where STD treatment is less accessible.[2]

Association of HIV and STIs has led to common control strategies for both.[2–5] The change in the incidence and prevalence of HIV is extremely difficult to detect. However, the prevalence and incidence of some STIs, which are curable, changes quickly, and can be used as a proxy marker for changes in sexual behaviour and, ultimately, the HIV incidence.[6]

Sex workers are one of the core groups for transmission of STDs and HIV as a "bridge group" to the general population. Accordingly, highest priority is given to this group in targeted intervention for prevention of HIV/AIDS. A comprehensive baseline situational analysis of the STI problem in the programme area is required to monitor targeted intervention. It is necessary to know the prevalence of common STIs, such as gonococcal, chlamydial infection, and syphilis, and the proportions of asymptomatic infections to design effective STI services. To design locally appropriate syndromic treatment guidelines, knowledge about the aetiology of symptoms of STIs is essential, with the help of sensitivity analysis.

The World Health Organization (WHO) has placed the emphasis on a syndromic approach for case measurement and management, particularly in high prevalence areas having inadequate laboratory facilities, trained staff, and transport facilities.[2] While the risk assessment for the management of reproductive tract infection has many limitations, further work on risk assessment and prevalence based screening studies is necessary to evaluate the performance of syndromic management.[7]

Surat is an important commercial and industrial city in India. This study was conducted among the sex workers of a red light area (RLA) in Surat, where a DFID funded project—Partnership in Sexual Health—has been operational since 1998 by the community medicine department of Government Medical College, Surat. The present study is a baseline STD prevalence study that will help in situational analysis, future monitoring of intervention programmes for STI control, and evaluation of syndromic management.

The overall objective of the study was to find out point prevalence of selected STIs and HIV among female SWs of the Surat RLA. The specific objectives were to measure the prevalence of STI syndromes and other STIs clinically and selected STIs and HIV by laboratory investigations, and to evaluate the performance of syndromic case management (Indian guidelines) against the gold standard of aetiological diagnosis for STIs in this group.

METHODS

It was a cross sectional study. The protocol for implementation was developed and finalised after review by experts and stakeholders at a planning workshop.

Ethical review

Locally, an ethics committee reviewed the protocol and the recommendations of the committee were included in the final protocol. The protection of human subjects committee of Family Health International (FHI) approved the study protocol. Free and voluntary informed consent was obtained from all the participants, retaining their right to withdraw at any time. Personal privacy and confidentiality was respected at all the times.

The staff was trained appropriately before the implementation and a trial run was conducted. National and international experts on STD and microbiology were the resource people for the training workshop. Based on the experience of the trial run, some modifications were made for the final survey.

Sample size

The SWs live in different ethnic clusters. Based on factors such as place of origin, language spoken, etc, participants were recruited from each of these clusters. Baseline data on the prevalence of STIs among the SWs in Surat RLA were not available, so it was difficult to calculate the accurate sample size. It was also difficult to prepare their list, so out of 500–600 SWs working in this area, coverage of about 200 SWs (one third) was considered a sufficient representative sample. However, because of the temporary migration of sex workers, only 124 SWs could be enrolled in this study. Out of this number, 118 completed all aspects of the study and the rest were not recruited for various reasons like refusal to undergo clinical examination, refusal to provide specimen, etc.

Mobilisation of SWs for the survey

A health camp approach was taken to recruit the participants. Equal opportunity was offered to all of them to participate in the study. By group meetings conducted with mausis (madams) and peer educators, a consensus was developed for the needs and importance of the clinical health check up, laboratory investigations, and prompt treatment. This facilitated motivation for participation by SWs. The rapport of the social workers and social scientists in the project with the peer leaders of the area was instrumental in the mobilisation of the participants. Treatment for the symptomatic cases and a relief following the same was the additional motivation for those who were reluctant. A woman friendly service and hospitality were further incentives for participation. The survey was conducted from February to September 2000 at the STD clinic established for ongoing diagnostic and therapeutic services to the SWs and the community, under the PSH project in the RLA.

Clinic procedure

Forms for physical examination and for the laboratory investigation had the same identification (ID) number for a participant. After informed consent in the presence of a witness, general information about the consenting participant was recorded in the structured questionnaire designed by FHI. This was followed by clinical examination and specimen collection in an examination room, by a dermatovenereologist, gynaecologist, and pathologist.

STIs screened and laboratory tests employed

Syphilis testing was done using the rapid papain resin (RPR) test (Spinreact Reactivos. Spinreact, Spain) and confirmed by the *Treponema pallidum* haemagglutination assay (TPHA) test (Human, Human Gesellschaft fur Biochenica and Diagnostics mbH, Germany) following the instructions of the manufacturer. Sera positive for both RPR (at one in eight dilution) and TPHA test indicated the presence of active syphilis infection.

Gonorrhoea was diagnosed using a standard Gram stained smear of an endocervical swab culture and Pace2 GC assay. *Neisseria gonorrhoeae* (NG) was cultured in modified Thayer-Martin medium (Himedia, Himedia Laboratories Limited, Mumbai, India) from endocervical specimens and inoculated at the clinic. One part of the swab was subjected to inoculation on MH blood agar and another on MTM medium in "Z" pattern. Inoculated plates were transferred to an incubator at 36°C in an anaerobic jar containing a carbon dioxide gas pack (BBL, Difco). Plates were examined and colony characteristics of any growth looked for after 24 hours and 48 hours of incubation. An oxidase test was done on small pinpoint greyish colonies, characteristic of gonococci. Gram stain was done on all oxidase positive colonies and the carbohydrate degradation test was done for confirmation. Isolates fermenting glucose but not maltose and lactose were considered as confirmed *N gonorrhoeae* and were used for further sensitivity testing. For antibiotic sensitivity testing, the disc diffusion method was followed. In addition, Pace-2 GC and CT assays (Gen-probe Incorporated, 9880 Campus Point Drive, San Diego, CA, USA) for NG and genital chlamydial infection were performed on endocervical specimens at Biocare Diagnostics and Research Centre (BDBRC), Ahmedabad for the first time in India.

For diagnosing *Trichomonas vaginalis*, wet mount microscopy and culture in the Whittington media (Himedia HiMedia Laboratories Limited, Mumbai, India) were done on specimens collected from the posterior vaginal fornix. All these tests (except Pace 2 GC and CT assays) were done in the Khandwala clinical laboratory, a private laboratory in Surat.

Table 1 Age groups and prevalence of signs, symptom, and syndromes related to STI in sex workers

Syndromes/variables	No of SWs (n=118)	%
Age group (years):		
16–20	6	5.1
21–25	35	29.7
25–30	41	34.7
31–35	23	19.5
More than 36	8	6.8
Age not reported	5	4.2
Prevalence rate of present symptoms*		
No symptom	69	58.5
Pain in lower abdomen	23	19.5
Abnormal vaginal discharge	15	12.7
Painful sexual intercourse	15	12.7
Painful micturition	13	11.0
Itching around genital area	12	10.2
Genital ulcer	7	5.9
Swelling in groin	3	2.5
Prevalence rate of signs on external genital examination:		
Warts	13	11.0
Enlarged lymph nodes	14	11.9
Depigmentation	5	4.2
Ulcer	5	4.2
Scabies	3	2.5
Discharge	5	4.2
Inflammation of vulva	3	2.5
Signs as per speculum examination:		
Discharge from vagina	61	51.7
Abnormal ectocervix	32	27.1
Abnormal vaginal wall	16	13.6
Cervix bleeding on touch of	15	12.7
Ulcer on cervix/vaginal wall	3	2.5
Prevalence rate as per syndromic diagnosis:		
Genital discharge syndrome	61	51.7
Genital ulcer syndrome	7†	5.9
Lower abdominal pain	23	19.5
Enlarged inguinal lymph nodes	14	11.9

*Some had more than one symptom(s).
†One person had ulcer diagnosed on both external and PS examination.

Table 2 Laboratory findings: prevalence of STIs among SWs (N=118)

STI	Test performed	Results (positive/reactive) No	%	95% CI
Syphilis	1 RPR test	35	29.7	
	2 TPHA test	51	43.2	
	3 Both RPR and TPHA test	27	22.9	15 to 30
Gonorrhoea	1 Gram stain	18	15.3	
	2 Culture in MTM media	20	16.9	10 to 24
	3 Pace 2 GC assay	12	10.2	
Chlamydia	Pace 2 CT assay	10	8.5	3 to 14
Trichomoniasis	1 Wet mount microscopy	16	13.6	
	2 Culture in Whittington media	17	14.4	8 to 21
HIV	Double ELISA test (HIV 1 and 2)	51	43.2	34 to 52
NG/CT cervicitis	Culture for NG and/or Pace 2 CT	24	20.3	11 to 30
NG/CT cervicitis and/or trichomoniasis	Culture for NG/ TV and/or Pace 2 CT	38	32.2	21 to 43

For HIV double ELISA tests were done using kits from Biosign (Princeton BioMeditech Corp for Premier Medial Corp, USA) and Lab Systems (Lab Systems, Helsinki, Finland), at the microbiology department of BJ Medial College, Ahmedabad, which is the nodal centre for HIV testing in the state of Gujarat. Two positive ELISA tests were considered positive for HIV.

Additional specimens from 10 participants were sent to BDBRC for repeats of some of the laboratory tests (RPR test, TPHA test, Gram stain, and culture for gonorrhoea) for cross checking; there was good matching between the results of the two laboratories.

Data entry and analysis

The EPI-INFO package (software) was used to design the questionnaire and for data entry, record, and data analysis. The proportions were calculated for various syndrome and disease prevalence. Sensitivity, specificity, and PPV of various syndromes were calculated. Confidence intervals for STI prevalence were calculated for future monitoring.

RESULTS

Sociodemographic profile

The age of SWs ranged from 16 to 50 years, the mean age being 28.5 years. The majority of them (about two thirds) were below the age of 30 years, which included about 5.1% below the age of 20 years (table 1). In all, 80.5% of them had never attended a school. Except for three, all of the SWs reported migrating from other states and about 33.1% from another country (Nepal). Some 59.3% reported that they were married; however, only three were living with their husband; 94.9% of them reported the use of condom all the times; 90% had more than two sexual partners (clients) per day. The range in number of different partners per day varied from two to 25, the mean being five clients per day.

Prevalence of STD syndromes

Sixty nine (58.5%) SWs did not report genitourinary complaints spontaneously. Among the 49 who reported, 24 had one symptom, 13 had two symptoms, six had three symptoms, four had four symptoms, and two had five symptoms. Pain in the lower abdomen was the most common complaint (19.5%), followed by vaginal discharge (12.7%) (table 1); 46.7% gave no past history of symptoms suggestive of STD. Seventy two (61.0%) had a history of any of the specific symptoms mentioned in the table 1; 56(47.5%) had vaginal discharge, 35 (29.7%) had pain in lower abdomen, and 34 (28.8%) had had genital sore/ulcer in the past.

On external genital examination 52 (44.1%) SWs had one or more clinical sign suggestive of an STD. The most common syndromic diagnosis was abnormal vaginal discharge syndrome (VDS) (51.7%), followed by pain in the lower abdomen (19.5%), enlarged inguinal lymph nodes (11.9%), and genital ulcer syndrome (GUS) (5.9%) (table 1).

Prevalence of laboratory confirmed STIs

The prevalence of STIs and HIV based on the laboratory screening is shown in table 2. The prevalence of syphilis based on RPR and TPHA positive tests was 22.9%. The prevalence of other STIs was gonorrhoea (by GC culture) 16.9%; genital chlamydial infection 8.5%; and trichomoniasis 14.4%. In all, 47.5% had one or more of these four STIs. No strain was resistant to any of the antibiotics tested for sensitivity, yet the sensitivity was moderate in 10–25% of cases for various tested antibiotics. Cervicitis (presence of NG and/or CT) was found in 20.3%, while cervicitis and/or trichomoniasis was present in 32.2%. The seroprevalence of HIV was 43.2%.

Performance of "syndromes"

Table 3 shows the sensitivity, specificity, and PPV of Indian syndrome management guidelines for VDS and GUS. The sensitivity of VDS to detect trichomonal infection was 88.2%, chlamydial infection 70%, and gonococcal infection 60%. However, the specificity for all these infection was only around 50–55%. PPV was very low, ranging from 11.5% for chlamydia and 19.7% for gonococci to 24.6% for trichomonas. Sensitivity, specificity, and PPV of VDS for cervicitis (NG/CT) were 54.2%, 48.9%, and 21.3% respectively; while for the presence of both cervicitis and/or trichomoniasis they were 65.8%, 55.0%, and 41.0%, respectively. The sensitivity and specificity of VDS for cervicitis (NG/CT) was lower and PPV was higher than those for individual infections. When trichomoniasis is also combined with cervicitis, sensitivity and specificity of VDS is not changed significantly, but the PPV more than doubles. Conversely, the sensitivity of GUS to detect syphilis was 14.8% only, but the specificity was very high, 96.7%, and the PPV was 57.1%.

DISCUSSION

There is a dearth of information regarding the epidemiology of STDs in India for many reasons such as recent recognition of STDs as a major public health problem, stigma and discrimination associated with the STDs, lack of interdepartmental coordination for studies, poor attendance of STD patients at the public clinics and academic institutions, availability of limited diagnostic facilities, etc. This in-depth clinical research offers an important insight into the burden and pattern of STIs in this core group of SWs and on syndromic management of STIs.

Table 3 Performance of various syndromes and tests

Syndrome/infection/test	No of SWs	No of infected	No of cases detected by syndrome	Sensitivity (%)	Specificity (%)	PPV* (%)
Vaginal discharge syndrome for:						
Trichomonas	118	17	15	88.2	54.5	24.6
Chlamydia	118	10	7	70.0	50.0	11.5
Gonococci:						
Based on culture	118	20	12	60.0	50.0	19.7
Based on Pace2	118	12	7	58.3	49.1	11.5
Gonococcal and/or chlamydial cervicitis	118	24	13	54.2	48.9	21.3
Gonococcal and/or chlamydial cervicitis and/or trichomonas vaginitis	118	38	25	65.8	55.0	41.0
Genital ulcer syndrome for:						
Syphilis	118	27	4	14.8	96.7	57.1
Wet mount for:						
Trichomonas	118	17	13	76.5	97.0	81.3

*PPV = positive predictive value.

The majority of SWs are illiterate and from outside Gujarat. The proximity to Mumbai and history of migration for sex work (mostly to Mumbai) is important, as the reported HIV level in SWs in Mumbai is more than 50%.[8]

We found a very high level of STIs and HIV in a population of sex workers. Though only 12.7% complained of vaginal discharge, up to 51.7% were found to have abnormal vaginal discharge on examination. This implies that the awareness to recognise symptoms of STIs and health seeking behaviour of female SWs needs to be improved.

In the present study of SWs, 41.2% had one or more symptoms and 43.7% had one or more clinical signs suggestive of STD. In Calcutta, 59% of the SWs were found to have an STD.[9]

The most common syndromic diagnosis in the present study was VDS (51.7%), which is lower than that found (83%) in a similar study of SWs at Ahmedabad, done at the same time with the same methodology (unpublished report, Jyotisangh, Ahmedabad).

Active syphilis was the most common infection among SWs in the present study. It has risen from 18.5% in a 1992 study[10] done in 108 SWs in the same area (using VDRL test) to 29.7% based on RPR and 22.9% (based on RPR and TPHA test) in the present study. It is comparable with 24.2% prevalence found in the Ahmedabad study done by Jyotisangh. A 43% prevalence of TPHA positivity found in this study indicates the presence of past or present syphilis infection, which is a matter of concern in the context of HIV transmission.

The prevalence of gonorrhoea confirmed by the culture method was 16.9%, which is comparable with that found in study done by Jyotisangh at Ahmedabad (19%); while it is higher than in the Kolkata study[11] (9.1%), done among a high risk group from a red light area. The prevalence of gonorrhoea in SWs had varied from 4–31% in Latin America, 8.5–42% in Asia, and 20–50% in Africa.[12] As no resistant strain of gonococci against tested antibiotics was found in this study, any of the antibiotics in appropriate doses are useful to control the gonococci. Not using a condom with their regular/consistent partner may be one of the causes for the higher prevalence.

Genital chlamydial infection detected by the Pace 2 test was found in 8.5% here, while in Ahmedabad (Jyotisangh) it was almost double (17%). Gonococcal and/or chlamydial infection (cervicitis) was present in 20.3% SWs. It has been reported as 23.3% in Manila, 37.0% in Cebu (Philippines),[13] and 14% in Nicaragua.[14] In the present study prevalence of trichomoniasis (14.4%) is much lower than that found in Ahmedabad (Jyotisangh) (41%).

Seroprevalence of HIV has risen steeply from 18.5% in a study done in the same area in 1992[10] to 43.2% in the present study. In Mumbai, a similar rising trend among SWs is reported, which was 1% in 1987, 18% in 1990, 34% in 1992, 50% in 1995, and 62.8% in 1999.[8] Effective intervention among the SWs was instrumental in keeping the prevalence of HIV low among the SWs in Sonagachi.[2] A similar declining trend in STD is observed in studies done all over the world after different interventions in SWs.[2] Surat is one of the badly affected cities in India. HIV seroprevalence among attendees at an STI clinic was 26.0% and 13% and at an antenatal clinic was 0.83% and 2.69%, respectively during 1998 and 1999.[15]

On analysing specificity, sensitivity, and PPV of NACO recommended treatment guidelines for syndromic management against laboratory confirmed STI, it was observed that the high sensitivity of VDS to trichomoniasis can be effective in 88% of cases. However, another study[16] had found that syndromic management had a minimum effect on its endemicity even at a high level of coverage. Alternatively, screening had been found to be the most efficient method of control.[16] Use of the wet mount method in a case of VDS can increase the specificity and PPV for detecting a case of trichomonas infection (table 3).

Syndromic management based on VDS missed about 30–40% cases of genital chlamydia or gonococcal infection and it led to treatment in the absence of infection of chlamydia in about 90% and of gonococci in 80% cases of VDS (table 3). Among those having no infection, 45–50% were labelled as having infection and treated for VDS. Thus, syndromic management for individual cervicitis is not very useful, as is reported by others.[17–20]

Though the cardinal sign for NG and CT infection, according to syndromic case management guidelines,[21] is discharge from the cervix, if the risk assessment is positive (that is, if the sexual partner has urethral discharge or genital ulcer—a criterion which is rather difficult to follow in case of female SWs because of high rate of partner change), all women with vaginal discharge should be treated for NG and CT infections, as the sensitivity of VDS was 54% for laboratory confirmed cases of cervicitis, while syndromic diagnosis of cervicitis was a sensitivity of only 41.7%. Simultaneous treatment for trichomoniasis will cover 65.8% cases having any of these three STIs and in such cases the higher PPV will justify the cost of treatment, in spite of poor performance of syndromic management.

Though specificity of GUS is high, syndromic management based on GUS may miss about 85% of cases having active infection, and will lead to treatment of ulcers in 43% of cases in the absence of syphilis infection. Such a situation leads to an obvious financial burden of unindicated treatment and deprives asymptomatic cases of treatment.

Even though syndromic case management is recommended for all the groups including the female SWs in India, the present study reveals that it is of limited use in GUS and VDS

in the sex worker population. Quick and inexpensive diagnostic tests, which are being developed for primary healthcare providers can help to solve both of these problems.[1]

The control of STIs among the core group is crucial, as it has been estimated that cost per DALY (disability adjusted life years) saved by treating the classic STIs was very high in the non-core group compared to core group and that a policy of targeting the "core" averts many more new infections of STIs than would have been averted by a policy directed at the non-core group.[22] So investment in treatment of SWs (core group) is justified.

Despite the high level of reported condom use with clients and provision of centre based STI care for several months as a part of the intervention, the prevalence of STIs was high in this study group. The presence of a higher rate of asymptomatic infection adds to the risk. It is necessary to try to test alternative approaches such as periodic presumptive therapy of common STIs with DOT, because this will not only boost up the ongoing efforts of STI control in the target group but also help in HIV control. Such efforts have been found to be useful in reducing STD prevalence. In a study done in a rural African population, mass treatment combined with improved treatment services has been found to lead to a rapid and sustained fall in HIV incidence.[23] Alternatively, regular clinical and laboratory screening for different STIs may be tried. In the Abidijan study,[24] a South African mining community study,[25] and the Mwanza trial[26] it was observed that there was significant reduction of HIV incidence and other STIs among female SWs who received a comprehensive intervention of health education, condom distribution, and periodic screening and treatment. Also, a comparative study of cost effectiveness of syndromic management, screening based management, and mass treatment can be helpful to determine a more effective approach to reduce STI and HIV infection in the female SWs of Surat.

The limitations of this study are: (1) the participation of those having symptoms and expecting treatment and results may be higher leading to selection bias; (2) the healthy worker effect cannot be ruled out because of non-inclusion of the SWs who had already left the work because of ill health; and (3) the study did not include the FSWs operating outside the RLA. Little information is known on the behaviour and STI level in this category.

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CONTRIBUTORS

VKD, planning, implementation, analysis, and documentation of the study as an administrator and technician in charge of the project; JKK, implementation of the study in the field and recording of data as project co-investigator; HGT, analysis, documentation, literature search, and review; DNU, clinical examination and treatment of participants as a venereologist; BRK, laboratory investigations (collection, analysis, and interpretation); BKK, project planning, technical assistance.

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