

## Epidemiology and Etiology of Sexually Transmitted Infection among Hotel-Based Sex Workers in Dhaka, Bangladesh

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**The prevalence of sexually transmitted infections (STIs) and reproductive tract infections (RTIs) among hotel-based sex workers (HBSWs) in Dhaka, Bangladesh, was studied. A total of 400 HBSWs were enrolled in the study during April to July 2002. Endocervical swabs, high vaginal swabs, and blood samples from 400 HBSWs were examined for *Neisseria gonorrhoeae* (by culture), *Chlamydia trachomatis* (by PCR), *Trichomonas vaginalis* (by microscopy), antibody to *Treponema pallidum* (by both rapid plasma reagin and *Treponema pallidum* hemagglutination tests), and antibody to herpes simplex virus type 2 (HSV-2) (by enzyme-linked immunosorbent assay). Sociodemographic information as well as gynecological and obstetric information was collected. Among the HBSWs, 228 women (57%) were symptomatic and 172 (43%) were asymptomatic, 35.8% were positive for *N. gonorrhoeae*, 43.5% were positive for *C. trachomatis*, and 4.3% were positive for *T. vaginalis*. A total of 8.5% had syphilis, 34.5% were positive for HSV-2, and 86.8% were positive for at least one RTI or STI. There was no significant difference between the prevalences of STIs among the symptomatic and asymptomatic HBSWs. These data suggested a high prevalence of STIs, particularly gonorrhea and chlamydia, among HBSWs in Dhaka.**

As in other developing countries, sexually transmitted infections (STIs) and reproductive tract infections (RTIs) represent a major public health problem in Bangladesh (1). Control of ulcerative (syphilis, chancroid, and herpes simplex virus type 2 [HSV-2] infection) and nonulcerative (gonorrhea, chlamydia, and trichomoniasis) STIs and of RTIs (bacterial vaginosis and candidiasis) is important not only for preventing complications related to infection but also for preventing heterosexual transmission of human immunodeficiency virus (HIV). In a number of recent studies, it has been shown that bacterial and parasitic agents of STIs and RTIs, increase the release of virion particles in the semen and ulcers in the genital region and thus increase the risk of both acquisition and transmission of HIV in patients with STIs (15, 2, 4). Consistent with this observation, Grosskurth et al. have demonstrated that control of STIs through syndromic management in the general population in a rural area of Tanzania was able to reduce the serological incidence of HIV by 42% (8).

Female sex workers (FSWs) are particularly at risk for STIs and HIV (5). They often are infected by their clients and subsequently transmit the infection to other partners. It has earlier been demonstrated that in most parts of Asia and Africa, 60 to 70% of the STIs relate to clients of FSWs and sexual networks (14).

The number of FSWs in Bangladesh is unknown, but estimates range from 50,000 to 100,000. FSWs work in brothels,

streets, hotels, and residences (7). However, in recent years there has been remarkable change in the nature of the sex industry, possibly due to (i) eviction of brothels from major cities, (ii) increased demand for sex workers in nonstigmatized locations, (iii) demand for flexible working times by sex workers, and (iv) demands for more freedom and opportunity of income by FSWs. To cope with the changing demand, hotel-based sex work has flourished in major cities, including Dhaka. Working in hotels has advantages for sex workers, as their clients have easier access because the venue is nonstigmatized. Surveillance data show that hotel-based sex workers (HBSWs) have a higher client turnover than their peers on the streets and in brothels, while the payment per client is considerably higher than that in brothels or on the street. As a result, HBSWs have a much higher income than brothel- and street-based sex workers on average. Because of their high client turnover and low condom rate of use (a Family Health International situation assessment in 2001 showed a condom usage rate of 9%), the vulnerability of HBSWs to STIs and HIV was believed to be very high. Hotel-based sex work is common in many Southeast Asian countries, including Bangladesh. Although there is some information regarding the prevalence of STIs among street-based and brothel-based FSWs in Bangladesh, no information was available on the prevalence of RTIs and STIs among HBSWs in Bangladesh or in any other Southeast Asian country. However, baseline information on STI prevalence among HBSWs is essential for designing intervention.

Against this background, we conducted a cross-sectional study among HBSWs in Dhaka, the capital of Bangladesh, to estimate the prevalence of STIs as a baseline for planned interventions.

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## MATERIALS AND METHODS

Between April and July 2002, we conducted a study of the prevalence of RTIs and STIs among HBSWs working in the hotels under the intervention of SRISTI (a local nongovernmental organization working with HBSWs) in Dhaka, Bangladesh. Among 100 hotels targeted by SRISTI, 40 were selected randomly by using a computer-generated randomization chart. All sex workers working in a selected hotel in one shift were invited to participate in the study. Peer educators visited the hotel, informed the HBSWs about the study, and, for those willing to participate, escorted them to the study clinic. HBSWs were recruited irrespective of whether they had RTI- or STI-related symptoms or not. All HBSWs attending the clinic supplied written informed consent and were enrolled as long as they did not have one of the two exclusion criteria, i.e., current menstruation or use of an antibiotic in the preceding 2 weeks.

The participants were interviewed by a trained social worker to obtain socio-demographic information and a sexual and medical history. A physician interviewed the HBSWs about symptoms suggestive of an STI (abnormal vaginal discharge, dysuria, and lower abdominal pain) or RTI (vulvovaginal discharge, vulval itching, and thick curd-like vaginal discharge) and performed a gynecological examination, including a speculum examination. During the examination a high vaginal swab and two endocervical swabs were collected. In addition, 5 ml of venous blood was taken.

All enrolled women were requested to contact the clinic after 72 h to collect the results of laboratory tests. Treatment according to national guidelines was provided to all participants based on the results of the laboratory tests for gonorrhea, chlamydia, syphilis, trichomoniasis, and bacterial vaginosis (16).

At the study clinic, a wet mount of vaginal fluid was prepared and examined microscopically for the presence of motile *Trichomonas vaginalis*. A smear was also made from high vaginal fluid for Gram staining. The diagnosis of bacterial vaginosis was done by using Nugent's scoring (13). A score of 4 to 7 was considered intermediate, and a score of 7 to 10 was considered bacterial vaginosis.

One endocervical swab was immediately inoculated on prewarmed modified Thayer-Martin medium and incubated at 37°C in a candle extinction jar for 24 to 48 h. The plates were examined at 24 h, and a presumptive identification of *Neisseria gonorrhoeae* was made on the basis of colony morphology, Gram staining, and oxidase and superoxide tests of suspected gonococcal colonies.

A Roche Amplicor specimen collection kit was used for endocervical swab collection, and a Roche Amplicor CT PCR kit was used for diagnosis of *Chlamydia trachomatis*, according to the instructions of the manufacturer. Equivocal tests were repeated, and an internal control was used with each test as instructed by the manufacturer.

All sera were screened for antibodies to *Treponema pallidum* by the quantitative rapid plasma reagin (RPR) test (Becton Dickinson, Cockeysville, Md.) and by the *T. pallidum* hemagglutination (TPHA) test (Fujirrbio, Tokyo, Japan). A patient was considered to have syphilis if both the RPR and TPHA tests were positive. Persons who were found to be TPHA positive and had an RPR titer of  $\geq 1:8$  was considered to have active syphilis.

Antibody to HSV-2 in serum was detected with the Bioelisa HSV-2 immunoglobulin G enzyme immunoassay (Biokit, Barcelona, Spain) as instructed by the manufacturer.

## RESULTS

A total of 474 HBSWs from 40 hotels were enrolled in the study. Among the enrolled HBSWs, 61 refused speculum examination and 30 refused to provide blood. A complete questionnaire and all specimens were obtained from 400 women. The average number of sex workers varied between 8 and 15 per hotel. Based on RTI and STI symptoms, 228 women (57%) were symptomatic and 172 (43%) were asymptomatic.

The sociodemographic characteristics of the HBSWs are shown in Table 1. The majority (82%) of participating HBSWs were between the ages of 18 and 25 years. The minimum and mean ages of the sex workers surveyed were 13 and 22 years, respectively. Approximately half (42%) of them had no education. More than one-third (36.8%) of the HBSWs were unmarried, 31% were married, and the rest were divorced, separated, or widowed. More than half of them had become pregnant once or more, and only 39% had never been pregnant. Among the women reporting a history of pregnancy ( $n =$

TABLE 1. Sociodemographic characteristics and obstetric histories of 400 HBSWs with and without symptoms of RTIs in Dhaka, Bangladesh

Characteristic	No. of workers (%)		
	Total	Symptomatic ( $n = 228$ )	Asymptomatic ( $n = 172$ )
Age (yr)			
<18	26 (6.5)	15 (6.6)	11 (6.4)
18–25	327 (81.8)	188 (82.5)	139 (80.8)
>25	47 (11.8)	25 (11.0)	22 (12.8)
Marital status			
Unmarried	147 (36.8)	85 (37.3)	62 (36.0)
Married	140 (31.8)	70 (30.7)	51 (29.7)
Divorced	75 (17.0)	36 (15.8)	32 (18.6)
Separated	63 (15.8)	37 (16.2)	26 (15.1)
Widow	3 (0.7)		
Education			
None	176 (42.0)	100 (43.9)	76 (44.2)
1–5 yr	104 (26.0)	69 (30.3)	35 (20.3)
6–10 yr	107 (26.8)	56 (24.6)	51 (29.7)
>10 yr	13 (3.3)	3 (1.3)	10 (5.8)
No. of pregnancies			
0	155 (38.8)	89 (39.0)	66 (38.4)
1	146 (36.5)	85 (37.3)	61 (35.5)
2	56 (14.0)	56 (14.0)	29 (12.7)
3 or more	43 (10.8)	25 (11.0)	18 (10.8)
No. of spontaneous abortions			
0	228 (57.0)	134 (58.8)	94 (33.7)
1	13 (3.3)	4 (1.8)	9 (5.2)
2 or more	4 (1.0)	1 (0.4)	3 (1.7)
No. of menstrual regulations			
None	119 (29.8)	61 (26.8)	58 (33.7)
1	91 (22.8)	54 (23.7)	37 (21.5)
2 or more	35 (8.8)	24 (10.5)	11 (6.4)

245), 5.3% had a history of spontaneous abortion and more than half (51.4%) had a history of menstrual regulations.

Close to half of the enrolled HBSWs had a recent history of vaginal discharge (49.6%), lower abdominal pain (48.4%), and dyspareunia (46.5%). Twenty-eight percent experienced vulvar or vaginal itching, and 4.3% had genital ulcer. On physical examination 2.25% were found to have lower abdominal tenderness, and 3.75% had genital warts and/or genital ulcer. Speculum examination revealed that more than half of the HBSWs (51.4%) had an abnormal vaginal discharge, 4.1% had a vulvovaginal discharge, 28.0% had an abnormal cervical discharge, 33% had cervical friability, and 5.7% had cervical ulcer.

The overall prevalence of RTIs and STIs among the HBSWs with or without symptoms of RTIs was analyzed; the prevalences of *N. gonorrhoeae* and *C. trachomatis* were 36 and 43.5%, respectively (Table 2). The majority of women had vaginal infections caused by bacterial vaginosis (59.5%), *C. albicans* (19.0%), and *T. vaginalis* (4.3%). The prevalence of syphilis was 8.5%, including 4.2% with active syphilis (RPR titer of  $\geq 1:8$ ). The overall prevalence of HSV-2 was found to be 34.5%.

The prevalences of at least one, two, and three STIs (e.g., gonorrhea, chlamydial infection, trichomoniasis, and/or syphilis) among HBSWs were 63.3, 25.5, and 3.5%, respectively, and the prevalence of at least one RTI (bacterial vaginosis or

TABLE 2. Prevalence of RTIs and STIs among 400 HBSWs with and without symptoms in Dhaka, Bangladesh

Etiological diagnosis	No. (%) of positive samples	95% Confidence interval
Cervical infection		
<i>N. gonorrhoeae</i>	143 (35.8)	31.1–40.5
<i>C. trachomatis</i>	174 (43.5)	38.6–48.4
<i>N. gonorrhoeae</i> and <i>C. trachomatis</i>	86 (19.4)	15.5–23.3
<i>N. gonorrhoeae</i> and/or <i>C. trachomatis</i>	231 (57.8)	53.3–62.6
Vaginal infection		
<i>Trichomonas vaginalis</i>	17 (4.3)	2.3–6.3
Bacterial vaginosis	238 (59.5)	54.7–64.3
Candidiasis	76 (19.0)	15.2–22.8
Syphilis <sup>a</sup>	34 (8.5)	6.0–11.6
HSV-2	138 (34.5)	29.9–39.1
Any STI <sup>b</sup>	253 (63.3)	58.6–68.0
Any RTI	275 (68.8)	64.3–73.3
Any RTI or STI	344 (86.8)	83.5–90.1

<sup>a</sup> Both RPR and TPFA positive.

<sup>b</sup> *N. gonorrhoeae*, *C. trachomatis*, and *T. vaginalis*.

*Candida albicans*) was 68.8%. The prevalence of at least one STI or RTI was 86.8% (Table 1).

The prevalences of selected RTIs and STIs among the symptomatic and asymptomatic HBSWs are shown in Fig. 1. The prevalence of any or multiple RTIs or STIs is significantly higher among the symptomatic than among the asymptomatic HBSWs ( $P < 0.01$ ). However, there was no significant difference between the prevalence of STIs among the symptomatic and asymptomatic HBSWs.

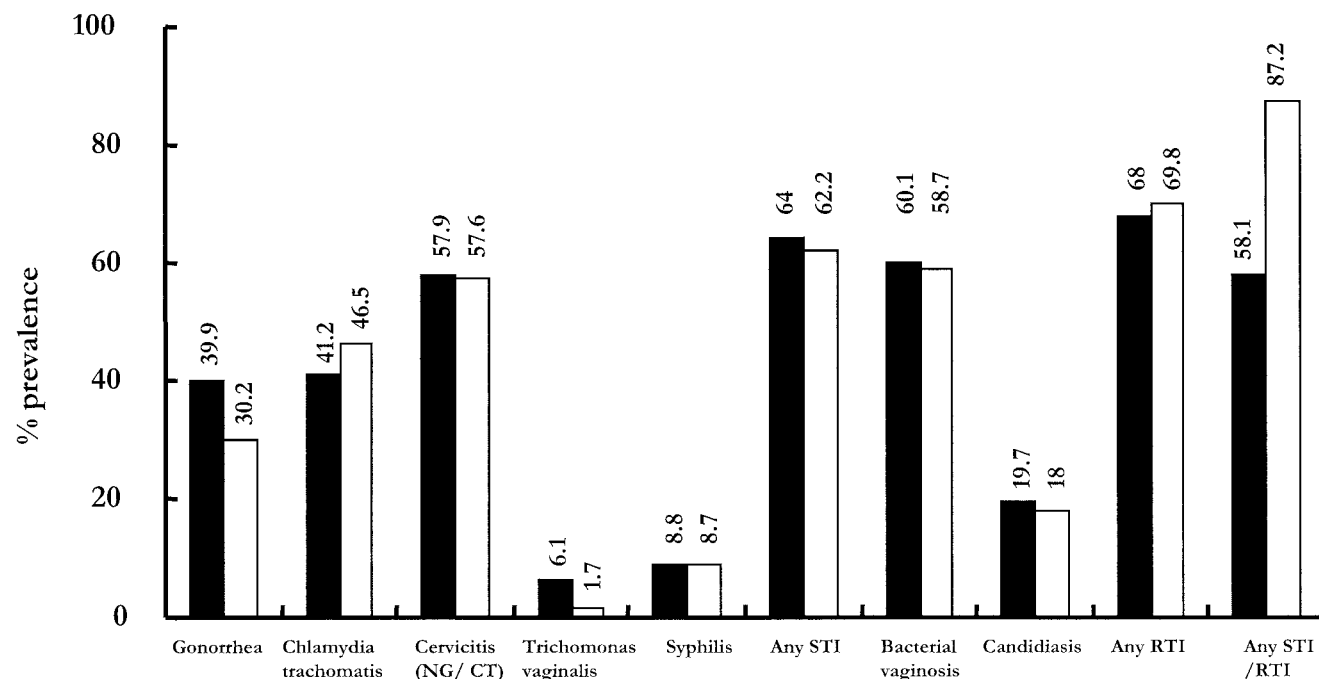


FIG. 1. Prevalence of symptomatic (■) and asymptomatic (□) RTIs and STIs among 400 HBSWs in Dhaka, Bangladesh. Ng, *N. gonorrhoeae*; CT, *C. trachomatis*.

## DISCUSSION

The threat of an HIV epidemic is looming over Bangladesh, as STIs and risk behavior levels have been found to be high (6, 7). It is well known that epidemics usually begin among people most vulnerable to HIV, such as sex workers and their clients, males having sex with males, and injecting drug users. Although national HIV surveillance data still show <1% HIV seroprevalence in FSWs in Bangladesh, the simultaneously conducted national behavioral surveillance shows higher client turnover and a lower condom usage level than in other Asian countries.

The mean age of the sex workers surveyed was 22 years. In the present study, 18% of the HBSWs were below 18 years of age, indicating that there is a demand for young girls in the sex trade, while this age group has an increased vulnerability to HIV and other STIs due to various factors. About one-third of the HBSWs surveyed were unmarried, and among the married HBSWs, approximately half were either divorced or living separately from their husbands. Living separately was found to be a risk factor for STIs (3).

The prevalence of STIs among the HBSWs studied was high, which is not surprising since the previously measured condom use level were found to be extremely low. In a behavioral baseline study among HBSWs undertaken by Family Health International in 2001, it was found that over 90% of the sex acts were not protected by a condom. Although condom promotion activities are now ongoing, activities that effectively address condom promotion among clients of sex workers need to be stepped up. Around 36% of the HBSWs were found to be positive for gonorrhoea, and 43% were positive for chlamydia.

This is in agreement with a previous study in Bangladesh, where 42% of street-based FSWs were positive for gonorrhoea (5, 6). The prevalence of syphilis in our study was 8.5%, which is lower than the 57% prevalence found in a brothel-based study in Bangladesh (11). This might be due to that fact that most HBSWs have been in the business for only a short time (0 to 12 months). The low prevalence of *T. vaginalis* infection among the HBSWs might be due to the fact that *T. vaginalis* infection is often treated in syndromic management due to its associated symptoms (foul-smelling discharge and vulvovaginal itching). There is now considerable evidence that the presence of bacterial vaginosis has a role in acquisition of HIV (12). The prevalence of bacterial vaginosis among the studied population was 57%, which might be due to disturbance of vaginal microflora due to frequent intercourse and subsequent douching. A similar prevalence of bacterial vaginosis has been observed in Senegal (10).

In poor countries, data on STIs and related complications are limited, which causes a substantial underestimation of the burden of these diseases. STIs are often asymptomatic and are technically difficult and often expensive to diagnose. This is particularly true in regions with limited access to health care facilities for diagnosis and treatment of STIs and where there is social stigma attached to STIs. A total of 43% of the women enrolled in the present study were asymptomatic. The lack of symptoms among women with STIs is a major constraint in using syndromic algorithms for screening for gonococcal and/or chlamydial cervicitis.

The present study showed that currently available syndromic management has had limited success in reducing the STI prevalence among HBSWs in Dhaka, Bangladesh. This might be true in similar settings in other countries in the region. STI intervention strategies using syndromic management in a population with a large number of asymptomatic infections may result substantial undertreatment. A large majority of people infected with STIs live in the developing world, where laboratory facilities for the etiological diagnosis of STIs and the detection of asymptomatic infections are largely nonexistent. In populations with a high STI prevalence, epidemiological treatment of the target population (also called mass treatment) should also be considered an option; it has maximum sensitivity (100%) and a positive predictive value equal to the prevalence of cervical STIs (9).

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