

# Prevalence, incidence, and risk of acquiring urogenital gonococcal or chlamydial infection in prostitutes working in brothels

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**SUMMARY** At two week intervals specimens were taken from 24 prostitutes working in two brothels and cultured for urogenital infection with *Chlamydia trachomatis* and *Neisseria gonorrhoeae*. Demographic and clinical data were also collected. *C trachomatis* was found initially in four and *N gonorrhoeae* in two of the 20 women at risk of infection. During the study period three new chlamydial and gonococcal infections were diagnosed, resulting from 949 unprotected contacts. Eight women (33%) had developed salpingitis, in contrast to 15% in the general female population. An attempt was made to estimate the infectivity of *C trachomatis* for the prostitutes. The epidemiological importance of the chlamydial and gonococcal reservoir in the prostitutes was also considered.

Prostitutes are thought to play an important part in the epidemiology of sexually transmitted disease (STD).<sup>1</sup> Data on the prevalence and incidence of urogenital gonococcal and (especially) chlamydial infections in female prostitutes are, however, scant. The prevalence of STD seems to depend on the type of prostitution.<sup>1</sup> The prevalence rates increase within the range of prostitutes from call girls and (registered) brothel prostitutes to street hookers addicted to heroin.<sup>1-3</sup> To establish prevalence and incidence rates in this specific group of women we studied at regular intervals 24 female prostitutes employed in two brothels. Demographic and clinical data of the women were collected, and urogenital specimens were obtained for culture for *Chlamydia trachomatis* and *Neisseria gonorrhoeae*.

## Patients and methods

The prostitutes working in two brothels were being checked regularly by one of us (IKS) for signs and symptoms of STD, mainly gonorrhoea and syphilis.

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Accepted for publication 20 May 1987

Before the study started in October 1985, we informed the women and the management about its objectives and methods. They agreed to participate.

On five occasions, separated by two week intervals, demographic and clinical data were collected and specimens were taken for culture for *C trachomatis* and *N gonorrhoeae*. If clinical symptoms suggested STD, a wet mount and Gram stain were also undertaken to test for clue cells, candidal pseudohyphae, and *Trichomonas vaginalis*. If the direct microscopy or cultures yielded positive results the prostitute was treated accordingly.

When clinical symptoms suggestive of STD appeared between the regular check-ups, a specimen was cultured for *N gonorrhoeae* only, a wet mount and Gram stain was made, and the woman was treated according to the findings. The results of the wet mounts and the Gram stains were not recorded and are not considered further in this article.

At the visits we recorded age of the prostitute, age at first intercourse, number of years of prostitution, number of contacts during the previous week, percentage of contacts using condoms (0, 25, 50, 75, or 100%), contraceptive use, history of STD, salpingitis, and recent use of antimicrobial agents. Complaints of urethritis, vaginal discharge, and lower abdominal pain were recorded as well as the results of the subsequent gynaecological examination, at the end of which the cultures were taken.

CULTURE OF *N GONORRHOEAE*

Material from the urethra and endocervix was collected in modified Stuarts transport medium and transported to the laboratory where it was inoculated within 12 hours on Thayer-Martin medium with and without antimicrobial agents (vancomycin 3 mg/l, colistin 7.5 mg/l, amphotericin B 1 mg/l, and trimethoprim 5 mg/l). The media were incubated for 48 hours at 37° C in a 3% carbon dioxide atmosphere. Isolates were identified by standard laboratory procedure.<sup>4</sup>

CULTURE OF *C TRACHOMATIS*

A cotton tipped swab was inserted into the endocervical canal, rotated firmly, and withdrawn. A second swab was introduced into the urethra and withdrawn while being rotated. The swabs were then placed in sucrose phosphate (2 SP) medium supplemented with gentamicin (50 mg/l) and amphotericin B (2.5 mg/l) and immediately snap frozen in liquid nitrogen for transport to the laboratory. *C trachomatis* was isolated in cycloheximide treated McCoy cell cultures on coverslips.<sup>5</sup> *C trachomatis* inclusions were detected after 48 hours using fluorescein conjugated monoclonal antibodies (MikroTrak culture confirmation, Syva, England).

## Results

Twenty four prostitutes participated in the investigation and thus attended 24 "first visits". They attended 56 follow up visits at two week intervals. The table shows demographic data of the women.

Seventeen women used oral contraceptives, four had undergone a hysterectomy, and three used other means of contraception (sterilization, condom, and intrauterine contraceptive device (IUCD)). All had a history of STD, except two who had entered prostitution only two weeks and six months previously. Eight out of the 24 women had a history of salpingitis that had necessitated admission to hospital. Salpingitis developed in two women before and in six after starting prostitution. Five out of the six cases of salpingitis associated with prostitution occurred in the first year of prostitution.

Of the 20 prostitutes at risk (who had not had hysterectomies), four yielded chlamydiae at the first visit. These 20 prostitutes attended 43 follow up visits, of which four were excluded from evaluation because of treatment of the chlamydial infection diagnosed at the previous visit. The three new chlamydial infections diagnosed at the remaining 39 follow up visits resulted from 949 sexual contacts without condom protection, which implies a risk of acquiring urogenital chlamydial infection of about 0.3% a contact.

Two of the 20 prostitutes at risk for cervical infections yielded *N gonorrhoeae* at the first visit.

Table Demographic and clinical data of 24 prostitutes

	Mean (range)
Age (yrs)	29 (18-52)
Age at first intercourse (yrs)	16 (12-19)
Duration of sexual activity (yrs)	14 (3-33)
Duration of prostitution (yrs)	5 (0-22)
No of sexual contacts during previous week	13 (0-40)
No without condom	9 (0-40)

During 39 follow up visits three new gonococcal infections were diagnosed, a risk per contact of about 0.3%, which was similar to that for chlamydial infection.

At some time during the study period 10 out of the 20 prostitutes at risk were diagnosed as having either a chlamydial or gonococcal urogenital infection.

The four prostitutes who had had hysterectomies neither had urogenital complaints nor did they acquire an STD during the study.

Symptoms of urethritis were mentioned by the 20 prostitutes at risk on three out of 63 occasions, of which two were associated with an STD (chlamydial infection or gonorrhoea, or both). Of eight complaints of vaginal discharge, six were associated with STD. Four out of five complaints of lower abdominal pain were associated with an STD. Of the 11 urogenital infections, all but three were associated with signs or symptoms.

## Discussion

Employment in the semi-illegal prostitution business cannot be compared with a regular occupation, as is shown by the high default rate during our study. Of 96 possible follow up visits, 56 (58%) were attended because not all women entered the study at our first visit and not all who entered the study at our first visit attended four follow up visits. All women present at the brothels during our visits, however, took part in the study.

The 20% prevalence of chlamydial urogenital infection compares well with that found in other studies.<sup>2-6-8</sup> The same applies to the 10% prevalence of gonococcal urogenital infection.<sup>6,8</sup>

We cannot exclude the possibility that the numbers of sexual contacts during the previous week by the prostitutes, was under-reported. Although the investigator (IKS) had established a confidential relationship with the women, they still felt a certain unease about what might happen to the data they supplied. They feared not so much a breach of their privacy as abuse of the data by tax officials. The possible under-reporting of the number of sexual contacts was,

however, compensated by the fact that some of them constituted regular clientèle.

The high incidence of chlamydial and gonococcal infections is illustrated by 10 of the 20 prostitutes at risk having had either a gonococcal or a chlamydial infection during the study period and by the fact that all but two of the prostitutes had a history of STD.

Treatment of infectious diseases should be guided by proper diagnostic procedures. This also applies to chlamydial and gonococcal infections in prostitutes. As the financial burden of (probably extensive) culture may preclude adequate diagnosis and subsequent treatment, however, it is perhaps more practicable to treat the prostitutes by asking them about urogenital complaints. In our group this would have meant that most STDs were treated. About 15% of women of reproductive age are estimated to have salpingitis at some time.<sup>9</sup> In our study group eight of 24 women had experienced salpingitis for which they required admission to hospital, which is about twice the number expected. Five out of six cases of salpingitis associated with prostitution occurred in the first year of prostitution. This high risk of acquiring salpingitis in the first year of prostitution resembles the relatively high risk of acquiring salpingitis in the year after first coitus in the general female population.<sup>9</sup> Exposure to sexually transmitted pathogens and their possible vectors seems an obvious explanation.<sup>10</sup>

To estimate the infectivity of *C trachomatis* for the prostitutes we need to establish the number of infected contacts from which urogenital infections resulted. We were not able to take specimens for culture for sexually transmitted pathogens from the male clientèle. If we consider the prevalence of *C trachomatis* in the symptomless man to be about 3-5%,<sup>11</sup> the number of exposures to chlamydiae resulting from 949 sexual contacts would have been 33. Three urogenital infections resulted from these 33 exposures, giving an infectivity of 9%, comparable with that found elsewhere.<sup>12-13</sup> Our numbers are too small, however, for firm statistical evaluation. Lack of data on the prevalence of symptomless gonococcal urethritis in men made it impossible to estimate the infectivity of *N gonorrhoeae*.

To assess the epidemiological importance of the reservoir of chlamydiae in the prostitutes at the two brothels if the infections diagnosed at their first visit had not been detected and treated, we assumed an infectivity of *C trachomatis* for the male contact of about 15%.<sup>13</sup> As the four women yielding chlamydiae each had about 10 unprotected sexual contacts a week, the 20 prostitutes would produce about six chlamydial infections a week in their male clientèle. Similarly, assuming an infectivity of *N gonorrhoeae* of about

35%,<sup>13</sup> with a prevalence of symptomless gonococcal infection of 10%, the 20 prostitutes would account for about seven cases of gonococcal urethritis a week.

The paucity of information on the epidemiology of STD in prostitutes is not surprising. Data on the prevalence of STD in prostitutes visiting an STD clinic are relatively easy to come by. Investigation of the epidemiology of STD, however, is more difficult. An established, confidential relationship with the prostitutes is needed to elicit the necessary information. The nature of prostitution, which is conducted in semi-illegal obscure circumstances, also impedes the collection of data. Nevertheless, we think that more data on the epidemiology of STDs in prostitutes, of any kind, must be collected to help control STDs in general.

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