Prevalence of Genital *Chlamydia trachomatis* Infections in College Students

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Læknaválid 1995; 8: 553-6

Sexually transmitted *Chlamydia* infection is the most common venereal disease in Iceland. Although considerable information is available on the epidemiology of these infections, the true prevalence of *C. trachomatis* infections in Iceland is unknown because all the studies have been conducted on selected populations. The purpose of the present study was twofold: To investigate the prevalence of *Chlamydia* infection in an unslected group of people in the age group at high risk, and to investigate the usefulness of collecting urine samples from college students as a screening method for *Chlamydia*. All students, aged 18-21, in the senior classes in a college in Reykjavík were requested to submit a first void urine (FVU) specimen taken in the morning and asked to fill out a short questionnaire. The urine samples were tested with a polymerase chain reaction assay, the Amplicor® PCR. One hundred eighty three students received urine collection kits. One hundred sixty (87.4%) delivered specimens. Seventy three males and 110 females received the containers. Sixty males (82%) and 100 (91%) females returned the samples. Three samples turned out to be positive (2%), all of them from females. For those who were sexually active (one or more partners for the last six months) the prevalence was 2.6% (117/100). In conclusion: The prevalence of asymptomatic *Chlamydia* infection in college students in this school was low, probably too low for screening to be cost effective. The procedure was not satisfactory because of the low percentage that enquired about their tests. It is therefore unsuitable in a screening program.

Introduction

Sexually transmitted *Chlamydia trachomatis* infection is the most common sexually transmitted disease (STD) in Iceland. In 1988 when the number of positive diagnostic tests peaked, 1411 cases were diagnosed, giving an infection rate of 570 per 100,000 inhabitants and in 1994, 1254 cases were diagnosed (1). Although considerable information is available on the epidemiology of these infections, the true prevalence of *Chlamydia* infection is unknown because all the studies that have been conducted in Iceland, have been done on selected populations.

The first indication that *Chlamydia trachomatis* was a considerable health care problem came with a study conducted in 1981 (2). In 1982 there were 249 gonorrhoea cases diagnosed in the Reykjavík STD clinic in comparison to 347 *C. trachomatis* infections (3). The prevalence of *Chlamydia* infections in Icelandic women requesting induced abortion in 1982–1984 was 13.5% (4).

In 1983–1984 all pregnant women in the first 20 weeks of pregnancy attending the maternity clinic at the National University Hospital in Reykjavík were screened for *Chlamydia* infection. This was done with culture from the cervical canal. The prevalence in pregnant women measured 3.9% (5).

A study conducted in Sauðárkrókur, a small town in the North of the country, in 1983–85,

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showed a prevalence of 30% in patients with symptoms of possible infection in the genital tract (6).

The prevalence figures in articles published from countries around the world have varied depending on the groups studied.

There are few studies done on the prevalence of Chlamydia infection in unselected populations. The obvious reason is the invasive way the samples have traditionally been collected from the genital tract in both men and women. The introduction of the polymerase chain reaction (PCR) method has made the diagnosis with a urine sample possible. The genitourinary clinic has used PCR from urine as a routine test for the detection of Chlamydia infection in males since January 1994.

The purpose of the present study was a) to investigate the prevalence of C. trachomatis infection in an unselected group of people in the age group at high risk, b) to investigate the usefulness of collecting urine samples from college students as a screening method for C. trachomatis.

Methods

A pilot study on the prevalence of Chlamydia infection in male college students was done late in the year 1994 by physicians from the Department of Dermato–Venerology and the Department of Microbiology. The urine from males aged 18–21 was tested for Chlamydia with the PCR method.

Two physicians along with an assistant visited a college in Reykjavik in January 1995. They informed the students in all senior classes of the purpose of the study and about Chlamydia infection. The students, aged 18–21, received a urine collection kit and were asked to fill out a short questionnaire. They also received a pamphlet about STD and a telephone number they were to call for the results a few days later. The urine container and the questionnaire were both marked with serial numbers to ensure anonymity.

The questionnaire had questions on the number of partners during the previous six months, on condom usage, if they had a steady partner, whether they had received antibiotics the last two months, about previous STDs. The men were asked questions about symptoms from the urethra, and the women about discharge, itching in the vagina, symptoms from the urethra and menstrual irregularities.

The students were requested to return the containers the following day with first void urine (FVU) taken in the morning. PCR kit from Roche laboratories was used. PCR was done on the urine according to recommendations by the manufacturers. Amplicor®. Values over 0.3 units were considered positive. All tests were run twice, and in case of discrepancy three times.

When the students called on the telephone a week later they were informed of the results.

Results

Of the 111 samples returned in the pilot study five were positive (4.5%).

One hundred eighty three students received urine collection kits, seventy three males and 110 females. One hundred sixty (87.4%) returned them, sixty males (82%) and 100 (91%) females, the majority the morning after, and a few the following morning.

Three samples were positive (2%), all from females. One of the infected girls contacted the clinic and subsequently came for examination and treatment. Culture and PCR from the cervix were positive for C. trachomatis. The other two girls did not enquire about the results. The PCR value was high in all three cases or over 3.0. Two of the positive girls did not have any symptoms, and one of them did not answer the questions on the questionnaire.

For those who were sexually active (one or more partners for the last six months) the prevalence was 2.6% (117/160). Of those who answered the question on partners, 76% (71/94) of the female students and 64% (35/55) of the male students had one or more partners during the six months prior to the study (figure 1). Five students had a history of condylomata and eight had a prior history of Chlamydia infection. Forty of 160 always used condoms, 55 sometimes and 36 never. Twenty nine did not answer the question on condoms (figure 2). Seven of the 60 boys had some symptoms from the urethra, burning sensation, irritation or itching. None complained of discharge. Eight of the females complained of vaginal discharge, eight of irregular menstruations, two of urethra discomfort and four of vaginal itching. In all 19 women reported symptoms.
Of the 160 students only 96 called about the results (60%). This is similar to the pilot study late 1994.

Discussion

A higher prevalence was expected in this group of young people in the main study in view of the fact that in the pilot part conducted a year before, the prevalence for the male students measured 4.5%, and the prevalence among boys of the same age in the same school was 3/60 or 5%. If this study and the pilot study are combined the prevalence is 8/271 (3%) for all three colleges. The most plausible explanation for this relatively low figure is coincidence because of the low number of individuals.

In a study done in Sweden of 751 adolescent female high school students with sexual debut, the prevalence of C trachomatis infection measured 2.1%. They screened first catch urine with an enzyme immunoassay (IDEEA III) and verified with fluorescein isothiocyanate–conjugated (FITC) monoclonal antibodies (7). This figure is similar to the one in the study presented here, but the methods differ and our method is more sensitive.

It is not certain that prevalence figures for these college students are representative for this age group in the whole country but there is no indication that the sexual behaviour of college students is different from other young people. It is therefore possible that the true prevalence of Chlamydia infection in young asymptomatic people in Iceland age 18–20 is somewhere between 2 and 3%.

The cost of Chlamydia infection in Iceland is not known. The morbidity in women is mainly from salpingitis, infertility and as extra uterine gravidity. In the USA the cost of Chlamydia infection was estimated to be over 1.4 billion dollars per year in 1987 (8). The equivalent figure for Iceland would be about 90 million Icelandic crowns per year.

For screening to be cost effective the prevalence must reach a certain figure. This figure is a function of the cost of the morbidity caused by the disease, the cost of screening and the prevalence of the disease. It has been calculated that for Chlamydia screening to be cost effective the prevalence must lie between 5 and 6% (9).

The use of urine samples for detecting Chlamydia has made it possible to screen populations and thus saving much money through reducing long term morbidity. Because of the well-structured health care system in Iceland and the small population it is tempting to assume that it would be possible to eradicate Chlamydia the same way as gonorrhoea.

To conclude: The prevalence of asymptomatic Chlamydia infection in college students in this school was low, probably too low for screening to be cost effective. The procedure was not satisfactory as a screening method because of the low percentage that enquired about their tests.

REFERENCES


