Chlamydia trachomatis Infection in Native American Women in a Southwestern Tribe

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Infection with *Chlamydia trachomatis* may be the most common sexually transmitted disease in the United States, causing an estimated 4.6 million infections each year.[1,2] Many diseases have been associated with *C trachomatis* infection including cervicitis, salpingitis, endometritis, and perihepatitis, with subsequent infertility and ectopic pregnancy.[3–6] *C trachomatis* infection in pregnancy has been associated with preterm rupture of membranes, preterm labor, and low birthweight.[7,8] Perinatally acquired *C trachomatis* infections can cause inclusion conjunctivitis and pneumonia[9,10] in neonates.

C trachomatis infection rates are variable, and range from 2% to 26%.[1,3,11–15] Perinatal transmission of *C trachomatis* can occur as the result of an asymptomatic maternal infection.[1,8,9] The recent development of an inexpensive rapid enzyme immunoassay test with acceptable sensitive and specificity ranges has made screening for *C trachomatis* more efficient and cost-effective.[16,17]

To determine the prevalence of *C trachomatis* infection and clinical findings associated with infection in prenatal patients in a specific Native American population, all prenatal patients for a 6-month period were screened at their first prenatal visit.

METHODS

The Tohono O'odham Reservation is located in southwestern Arizona and has 60,000 outpatient visits per year. All Native American women who came to the Tohono O'odham Indian Health Service clinics for initial prenatal evaluation of their pregnancy during the period of July 1 to December 31, 1987, were screened. Each evaluation consisted of routine history taking and a physical examination, including a gynecological examination, prenatal blood tests including a serologic test for syphilis, a Papanicolaou smear, an endocervical culture for *Neisseria gonorrhoeae*, and a chlamydia enzyme immunoassay test of the endocervical specimen. Microscopic examination was done on all vaginal discharges: if present, candidiasis, trichomoniasis, and bacterial vaginosis were noted.

The patient's usual residence was determined from the Indian Health Service automated data system. Residence areas were aggregated into three categories: the main reservation, the San Xavier reservation, and urban areas. Patients were identified as either Tohono O'odham or other. Although the clinics serve some women who are not Native Americans, these patients were not included in this study.

Standard statistical tests, including the chi-square and Fisher's exact tests, were used.

RESULTS

All 183 Native American patients who sought initial prenatal care during the study period were screened and included in this study. They ranged in age from 13 to 39 years (mean, 23 years). Forty-eight percent lived on the main reservation, 9% on the San Xavier reservation, and 43% lived off the reservation; 84% of these patients were Tohono O'odham Indians.

Forty-four (24%) of the women studied had a positive enzyme immunoassay test (Chlamydiazyme) result. The prevalence of *C trachomatis* infection was greater for women under 20 years of age than for older women; 34% (18/53) of women under 20 years of age had reactive specimens, whereas 21% (16/75), 20% (6/30), and 16% (4/25) of women aged 20 to 25, 26 to 30, and more than 30 years, respectively, had reactive specimens. This differ-

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ence, however, did not reach the conventional level of statistical significance ($P = .07$ for the younger than 20-year-old compared with the older than 20-year-old group). No significant differences were noted between women with *C trachomatis* infection and those without with regard to tribal affiliation, place of residence, gravida status, or presence of clinical symptoms.

The prevalence of *C trachomatis* infection was greater in women with class II Papanicolaou smears than in women with class I Papanicolaou smears (32%, 16/50 compared with 22%, 29/134); however, this difference was not statistically significant ($P = .21$).

Less than 2% (2/183) of women screened for *C trachomatis* had positive cultures for *N gonorrhoeae*. Neither of these two women had reactive specimens for *C trachomatis*. Likewise, only two of the women had a reactive serologic test for syphilis; one of these women was positive for *C trachomatis*. Women with *Trichomonas* infection were more likely than those without to have a reactive specimen for *C trachomatis*. This difference, however, did not reach the conventional level of statistical significance ($P = .06$, Fisher's exact test).

DISCUSSION

The following several limitations may have affected the study results: small sample size, the possibility of inconsistent recording of symptoms on medical records, the possibility that information on place of residence was inaccurate as a result of patient mobility, and the sensitivity and specificity of the *C trachomatis* test.

Nevertheless, these findings are consistent with those of one other published study of *C trachomatis* incidence in pregnant Native American women.[11] In that study, an unexpected *C trachomatis* infection rate of 24% to 30% was reported. No predictive factors except for younger age were identified. A study of geographically isolated Alaskan Native women found a similar *C trachomatis* infection rate of 23%.[12] These high prevalences have been reported infrequently and usually only in inner-city populations that attend sexually transmitted disease clinics.[2–4]

Factors that have been associated with some, but not all, asymptomatic *C trachomatis* infections include younger age, cervical friability, nonwhite ethnicity, and increased number of sexual partners.[13–15] Information about age of onset of sexual activity, number of sexual partners, previous history of sexually transmitted diseases, or contraception use was not obtained in this study. These factors may have been relevant in this study population.

No significant association was detected between Papanicolaou smear classification and the presence of *C trachomatis* despite a relatively high rate of koilocytotic atypia (24%, 35/144). A possible association between koilocytotic atypia and chlamydial infection has been reported elsewhere[18] but was not confirmed by this study.

A possible relationship between *C trachomatis* infection and urban place of residence has been previously noted. It is possible that patients with *C trachomatis* infection were more mobile and may have lived more often in urban areas than the uninfected women. If this was so, than a misclassification bias may have masked this relationship.

The sensitivity and specificity of the enzyme immunoassay test (Chlamydiazyme) compared with culture for *C trachomatis* has been well documented.[16] Chlamydiazyme has been shown to have a sensitivity range of 81% to 86% and a specificity of 90% to 98%.[17] Consequently, the true prevalence of *C trachomatis* in this population may have been from 26% to 28%, and even assuming the lowest specificity level (90%), the prevalence would range from 18% to 20%.

Recently published cost-analysis studies indicate that screening in nonpregnant populations is economically feasible if the prevalence of infection is greater than 7%.[19,20] The prevalence in this study, 24%, is 3.4 times greater than this minimal rate.

No consensus currently exists, however, on whom and when to screen for *C trachomatis* infection. This present study confirms the unexpectedly high rates of *C trachomatis* found in previous studies in Native American women. Until results of further epidemiological studies are available, it is prudent to recommend *C trachomatis* screening for Native American prenatal patients.

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