Pregnant Women as a Reservoir of Undetected Sexually Transmitted Diseases in Rural South Africa: Implications for Disease Control

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ABSTRACT

Objectives. This study was undertaken to determine the prevalence of sexually transmitted diseases (STDs) in pregnant women in rural South Africa and to determine the value of using abnormal urogenital symptoms to identify infected women.

Methods. This was a cross-sectional study of 327 patients attending prenatal clinics.

Results. Of the 271 women with complete data, 141 (52%) had at least 1 STD and 49 (18%) had more than 1. Abnormal symptoms were common (n = 225; 83%), but associations were weak, and the positive predictive value of different symptoms for infection ranged from 2% to 54%.

Conclusions. Most STDs in rural South African women remain undetected and untreated. As the scope for laboratory diagnosis in resource-poor settings is limited, presumptive treatment of pregnant women and their partners may be a cost-effective option to reduce transmission of STDs and HIV infection. (*Am J Public Health.* 1998;88:1243–1245)

Introduction

The World Health Organization estimates that there were 333 million new cases of curable sexually transmitted disease in adults in 1995.[1] Sexually transmitted diseases (STDs) commonly cause acute illness, but they are also important because of their serious sequelae[1] and because they facilitate the transmission of the human immunodeficiency virus (HIV).[2] In women aged 15 to 44 years, STDs are the second most frequent cause of healthy life lost, after maternal mortality and morbidity.[3–5] We report a high prevalence of undetected and untreated STDs among pregnant women in rural South Africa and consider the implications and opportunities for STD and HIV control.

Methods

Hlabisa health district in rural KwaZulu-Natal, South Africa, has a predominantly rural, Zulu-speaking population of 205 000 that is relatively resource poor. Approximately 95% of pregnant women attend the 10 village clinics in the district for prenatal care.[6] A cross-sectional study to determine the prevalence of abnormal urogenital symptoms and infection with *Neisseria gonorrhoeae, Chlamydia trachomatis, Trichomonas vaginalis*, *Treponema pallidum,* and HIV among 327 consecutive consenting women attending 4 selected prenatal clinics was done over a 3-month period in 1996. A hospital clinic serving a moderate-sized trading center, a clinic serving a periurban settlement, and 2 rural clinics were chosen. Ethical approval for the study was granted by the Ethics Committee of the University of Natal Medical School.

A questionnaire was confidentially administered in Zulu by a female doctor (N.N.) to obtain demographic data, reproductive history, and current urogenital symptomatology (lower abdominal pain, dysuria, abnormal vaginal discharge, dyspareunia, and genital itch). A speculum examination was done and a high vaginal swab was placed in Amies transport medium for culture of *T vaginalis* on Diamond medium. An endocervical swab was used to make a smear for *C trachomatis* direct immunofluorescence (Microtrak, Syva), and a second endocervical swab was placed in Amies transport medium for culture for *N gonorrhoeae*. A venous blood sample was taken for syphilis and HIV serology. Voluntary HIV testing and counseling was offered to all. Positive reactions to the rapid plasma reagin test were confirmed by *Treponema pallidum* hemaglutin assay, and by fluorescent treponemal antibody if the assay was inconclusive, to diagnose active syphilis. HIV infection was confirmed if serum reacted to 2 different ELISAs (MEIA, Abbott Diagnostics, and Vironostica, Organon Technica).

Associations were assessed by odds ratios (ORs) with exact 95% confidence intervals (CIs). Differences between proportions were tested by the chi-square test. Continuous data were tested by analysis of variance if normally distributed or the Kruskal-Wallis nonparametric test if not. To estimate the prevalence of STDs in the population from which the sample was drawn, clinic-specific prevalence rates were multiplied by the total number of women attending each prenatal clinic in a year and then divided by the total number attending all clinics.

Results

The mean age of the women was 25.2 years (SD = 6.6), 110 (34%) were primigravidas, and most (246; 75%) were unmarried. In all, 75 (23%) reported having had a

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TABLE 1—Associations Between Symptoms and Bacterial Sexually Transmitted Diseases (STDs), with Positive Predictive Values: Prenatal Clinic Patients (n = 271) in Rural South Africa, 1996

	Neisseria gonorrhoea		*Chlamydia trachomatis*		*Trichomonas vaginalis*		Any STD	
Symptom	OR (95% CI)	PPV, %	OR (95% CI)	PPV, %	OR (95% CI)	PPV, %	OR (95% CI)	PPV, %
Lower abdominal pain	1.0 (0.3, 3.0)	6	0.9 (0.4, 1.9)	13	0.8 (0.5, 1.3)	37	0.8 (0.5, 1.4)	46
Abnormal vaginal discharge	1.3 (0.4, 4.1)	7	1.3 (0.6, 2.7)	15	1.6 (0.9, 2.7)	46	1.5 (0.9, 2.6)	54
Dysuria	1.3 (0.4, 4.0)	7	1.2 (0.6, 2.6)	15	1.3 (0.8, 2.2)	43	1.2 (0.7, 2.0)	50
Genital itch	0.3 (0.1, 1.4)	2	1.6 (0.8, 3.6)	18	1.5 (0.8, 2.6)	15	1.3 (0.7, 2.3)	52
Dyspareunia	2.2 (0.7, 6.9)	10	0.8 (0.3, 2.0)	12	1.3 (0.7, 2.4)	44	1.3 (0.7, 2.3)	52
No symptoms	0.3 (0.01, 2.1)	2	0.5 (0.1, 1.6)	8	0.7 (0.3, 1.4)	33	0.5 (0.3, 1.0)	38

Note. OR = odds ratio; CI = confidence interval; PPV = positive predictive value of infection. "Any STD" refers to *N gonorrhoea* or *C trachomatis* or *T vaginalis* infection.

previously treated STD within the last year, and many women (153, 47%) described their partner as being a migrant (defined as spending most nights away from home).

Prevalence was 7.8% for gonorrhea, 8.4% for active syphilis, 12.9% for chlamydia, 15.6% for HIV infection, and 41.4% for trichomoniasis. In all, 271 women (83%) had microbiological results available for all 4 bacterial STDs: missing results were due to occasional samples' not being taken or to technical errors. Of these 271 women, 141 (52%) had at least 1 STD, 46 (17%) had 2 concurrent infections, and 3 (1%) had 3 infections, but no women had all 4.

No women volunteered abnormal urogenital symptoms during their routine consultation, but on direct questioning at least 1 urogenital symptom was elicited from 225 women (83%), and 180 (80%) of these had more than 1 symptom. Lower abdominal pain was most frequent (119; 53%), followed by abnormal vaginal discharge (99; 44%), dysuria (99; 44%), genital itch (72; 32%), and dyspareunia (54; 24%). No social or demographic variables were associated with these symptoms. Associations between *T vaginalis, N gonorrhoea,* and *C trachomatis* and elicited symptoms were studied in the 269 women with complete clinical and microbiological data available. Associations were weak and not statistically significant, and the positive predictive value of symptoms for infection ranged from 2% to 54% (Table 1).

We observed a strong association between current STD and HIV infection (Table 2). A strong positive association was also observed between 2 individual STDs and HIV infection: gonorrhea (OR = 3.0; 95% CI = 0.8, 10.2; $P = .06$) and current chlamydial infection (OR = 2.2; 95% CI = 0.8, 5.3; $P = .06$). The association with HIV was weaker for both trichomoniasis (OR = 1.7; 95% CI = 0.8, 3.5; $P = .7$) and active syphilis (OR = 1.4; 95% CI = 0.4, 4.6; $P = .4$).

HIV-infected and uninfected women were similar in age (26.1 vs 24.7 years; $P = .12$) and gravidity (3.0 vs 2.8; $P = .16$).

TABLE 2—Univariate Analysis of Selected Potential Risk Factors for Prevalent Sexually Transmitted Diseases (STDs) and HIV Infection: Prenatal Clinic Patients (n = 271) in Rural South Africa, 1996

	HIV Infection	Prevalent STD
Risk Factor	OR (95% CI)	OR (95% CI)
Marital status (married vs not)	0.9 (0.4, 2.2)	0.6 (0.3, 1.0)
Partner's residence status (migrant vs resident)	1.3 (0.6, 2.8)	1.2 (0.7, 2.0)
STD in last year	2.6 (1.2, 5.6)	1.0 (0.6, 1.9)
Number of partners in last year (1 vs >1)	0.5 (0.1, 2.1)	0.7 (0.2, 2.1)
Current STD	2.6 (1.9, 6.1)	. . .

Note. OR = odds ratio; CI = confidence interval.

Women with an STD and those without were similar in age (23.9 vs 26.0 years) and gravidity (2.5 vs 3.2) as well. Of other possible risk factors studied (see Table 2), only a history of an STD in the last year was significantly associated with HIV infection.

Discussion

The estimated prevalence of undetected STDs among pregnant women in this rural district is very high. More than half the women studied had at least 1 infection, and under service conditions most remain undetected, as only syphilis screening is offered; there are no facilities for microbiological diagnosis in settings such as this. Although abnormal urogenital symptoms were frequently elicited on direct questioning, no women volunteered that they had abnormal symptoms. This suggests that the women either did not recognize the symptoms as being important or did not feel the setting was appropriate for reporting them—further research is clearly warranted. Elicited symptoms were weakly associated with laboratory-confirmed infection and their positive predictive value was poor. Most STDs in pregnant women, and in their partners, will remain undetected and untreated in these settings unless novel approaches to diagnosis and treatment are developed.

There are several important implications of a high prevalence of untreated STDs among pregnant women. Optimal pregnancy outcome is less likely[7]; the woman and her partner both risk serious long-term sequelae, including death[1]; transmission of STDs within the broader community will continue unchecked, and an important opportunity for controlling HIV infection is lost.[2] Opportunities for disease control may exist in this context.

A large proportion of pregnant women present for prenatal care in resource-poor settings. The logistical difficulties of identifying and reaching groups to be screened for apparently asymptomatic infections are thereby overcome by targeting this population. Most pregnant women are highly motivated to achieve a positive pregnancy outcome, making them likely to be compliant with treatment. Pregnant women may also find it easier than nonpregnant women to inform their partners of the need to be treated,[8] and strong partner treatment strategies are critical to support any intervention directed at the pregnant woman. The large number of pregnant women with an STD provides an important opportunity to reduce the reservoir of infection in the broader community.

How can this reservoir be reduced? Syndromic management is not effective when screening pregnant women. Urogenital symptoms commonly associated with symptomatic STDs are also common symptoms of pregnancy, and the association between symptoms and infection is therefore weak.[9,10] Accurate laboratory diagnosis of most STDs is not possible in resource-poor settings. The cost-

effectiveness of presumptive treatment of all pregnant women for STDs (together with strong partner treatment strategies) in high-prevalence settings should therefore be studied.[4,5] Mass treatment with a single dose of ceftriaxone of women attending prenatal clinics in Nairobi reduced the carriage of selected STDs and improved birthweight.[11] A combination of a single dose of metronidazole and azithromycin has the potential to effectively treat all nonulcerative STDs and bacterial vaginosis.[12,13] Potential benefits include reducing the transmission of STDs and HIV infection and improving pregnancy outcomes. Risks include the creation of drug-resistant strains and unnecessary exposure of uninfected pregnant women to drugs. Although expensive, mass treatment might be an important component of the comprehensive strategy required to control STDs in rural Africa. □

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Hip Fracture Incidence Among Elderly Hispanics

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ABSTRACT

Objectives. This study estimated hip fracture incidence for elderly Hispanics in the United States.

Methods. A cohort of Spanish-surnamed 1992 Medicare enrollees was followed for 2 years. Hip fractures were identified by inpatient diagnostic code.

Results. For Hispanic women, the national age-adjusted hip fracture rate was 7.3 per 1000 person-years; for men, the rate was 3.3. Rates varied markedly, with higher rates for the predominantly Mexican-American southwestern states than for Puerto Ricans.

Conclusions. Nationally, the Hispanic population is at intermediate risk of hip fracture between Blacks and Whites, but geographic variation suggests that Mexican Americans are at higher risk than Puerto Ricans. (*Am J Public Health*. 1998;88:1245–1247)

Introduction

A striking feature of the epidemiology of hip fracture among the elderly is the wide variation in incidence by country, region, season, and race.[1–10] This variation is a potentially valuable tool in clarifying the etiologic contributions of genetic and specific environmental factors. Within the United States, much of the descriptive epidemiology of hip fracture is based on Medicare claims records from the Health Care Financing Administration (HCFA). Medicare data have shown that Blacks experience consistently lower rates of hip fracture than Whites.[8] However, the ethnicity coding available on Medicare records has not permitted the calculation of hip fracture rates for Hispanics. No Hispanic race/ethnicity code was available before 1994, and the initial enhancement of the race/ethnicity coding left a majority of Hispanics coded White or other.[11]

In the present study, we augmented Medicare enrollment files to identify a 1992 national cohort of Hispanic enrollees and link these enrollment records with Medicare hospital claims to estimate hip fracture incidence. Hispanic cohorts that were predominantly Mexican American, Cuban American, or Puerto Rican were derived, and hip fracture rates for these groups were compared.

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