

Prevalence of sexually transmitted infections in women attending antenatal care in Tete province, Mozambique

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Objective. To determine the prevalence of *Chlamydia trachomatis* (CT), *Neisseria gonorrhoeae* (NG) and syphilis in pregnant women.

Methods. A cross-sectional study was conducted among women attending antenatal care clinics (ANCs). Blood samples were tested for syphilis using the rapid plasma reagin (RPR) and treponemal haemagglutination (TPHA) tests; CT and NG were diagnosed using a manual polymerase chain reaction assay on first-void urine samples. A socio-demographic questionnaire was completed. Results were compared with previous published data on sexually transmitted infection (STI) prevalence in Mozambique.

Results. Blood and urine samples were collected from 1 119 and 835 women, respectively. The prevalence of CT was 4.1%, and that of NG 2.5%. The RPR test was positive in 5.2% of the women, and 7.1% had a positive TPHA test. Active syphilis

was found in 4.7%. In univariate analysis, CT was associated with having had any level of education ($p<0.05$), reactive RPR and TPHA were associated with illiteracy ($p<0.05$), and TPHA was associated with age >25 . Multivariate analysis did not show any significant association. In comparison with published data from 1993, a decline was observed for CT ($p<0.05$), NG and syphilis ($p<0.001$).

Conclusions. Compared with available data, a decline of STI prevalence was observed in our setting. This might be the result of community-based education programmes focusing on changes to sexual behaviour, as well as the widespread use of the syndromic approach to managing STIs and the expansion of syphilis screening in primary health care settings. However, STI rates are still high, and the problem needs more concrete and sustained efforts for its control.

S Afr Med J 2008; 98: 49-51.

There is little information about the prevalence of sexually transmitted infections (STIs) in pregnant women in Mozambique. In Tete, a province in the country's north-west, recent data are not available. However, the province's

Direcotorate of Health reported an antenatal clinic (ANC) attendance rate of nearly 100%. This study set out to assess the prevalence of *Chlamydia trachomatis* (CT), *Neisseria gonorrhoeae* (NG) and syphilis in pregnant women attending urban health

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January 2008, Vol. 98, No. 1 SAMJ





centres. It is important to detect these STIs in pregnancy as they are a significant cause of neonatal morbidity and adverse pregnancy outcomes.

Patients and methods

Design

A cross-sectional study on pregnant women attending ANCs at two health care centres (in the towns of Moatize and Tete) was conducted.

Study population and sampling

From March to July 2004, all women attending the above ANCs for the first time were invited to participate. After obtaining informed consent, a questionnaire including socio-demographic and medical details, as well as data on sexual behaviour, was administered.

Blood samples and first-void urine samples were collected. The samples were transported in cool-boxes to the provincial laboratory where they were frozen at -20°C and transported in dry ice to the Microbiology Department of the Faculty of Medicine of Eduardo Mondlane University in Maputo. Here, syphilis serology was performed using treponemal haemagglutination (TPHA) and rapid plasma reagent (RPR) tests (Abbott biokit). RPR-positive samples were titrated. Urine samples were tested for CT and NG using a polymerase chain reaction (PCR) assay (Amplicor CT/NG, Roche). An RPR test was also done on site, and all RPR-positive mothers were treated with benzathine penicillin according to national guidelines.

Data analysis

Data were entered using Epi-info (version 6.0). Analysis was made using SAS version 9.1.3 (SAS Institute, Cary, North Carolina, USA). Descriptive statistics, multivariate analysis and univariate logistic regression to infer trends in STI prevalence over time, were used.

A review of literature on STI prevalence was conducted via PubMed; also, the International AIDS Society and Health Alliance International-University of Washington websites were visited.

Results

Of the 1 237 eligible women, 1 203 accepted and enrolled consecutively. Blood samples were collected from 1 119 study participants and first-void urine samples from 835.

Socio-demographic data and sexual history

The mean age of the study population was 24.7 (range 14 - 45). Of the enrolled women, 1 057 (87.8%) had a stable marital status, 777 (64.6%) had some level of education, 306 (25.4%)

were employed, 808 (67.2%) were unemployed, and 48 (4.0%) were students.

The mean age at first sexual intercourse was 16.2 years (range 10 - 38). Only 20 (1.7%) of the women reported having had more than 1 partner in the last 6 months, while 221 (18.4%) reported that their partner had had other partners in the last 3 months. A history of STI was reported by 189 (15.7%), with 180 (15.5%) declaring to have been treated.

Prevalence of STI

Of the women, 311 (25.9%) reported STI-related symptoms at the time of the visit: 247 (20.5%) had vaginal discharge, 22 (1.8%) genital ulcers, and 86 (7.1%) dysuria.

Of the 1 117 women tested for syphilis, 58 (5.2%, 95% confidence interval (CI) 3.9 - 6.5) were RPR reactive, and 78 (7.0%, 95% CI 5.5 - 8.5) had a positive TPHA test. Fifty-three women (4.7%) tested positive on both tests and were considered to have active syphilis. Among 36 reactive RPR samples, only 7 had a titre $\geq 1:8$.

Of the 835 women who gave a urine sample, 34 (4.1%, 95% CI 2.76 - 5.44) tested positive for CT, and 21 (2.5%; 95% CI 1.44 - 3.6) for NG.

Risk factors for STI

In univariate analysis, first sexual intercourse before 18 years old was associated with a positive STI test result ($p<0.05$). Furthermore, CT was associated with having any level of education ($p<0.05$), and active syphilis with illiteracy ($p<0.05$). A positive TPHA test was associated with age >25 ($p<0.05$). None of the STIs tested for was associated with self-reported STI symptoms: 25.2% of women with an STI reported STI-related symptoms, compared with 23.4% of uninfected women. Stepwise multiple logistic regression analysis revealed that none of the following variables were independent predictors for having an STI: age, marital status, occupation, level of education, age of sexual debut, number of partners, STI-related symptoms, and STI-related symptoms in the partner.

Trend over time

Two previous studies in ANC settings in rural Mozambique demonstrated high prevalences of CT and NG. In 1993, a prevalence of 7.9% (95% CI 3.5 - 12.3) and 7.0% (95% CI 3.5 - 10.5), respectively, were reported, and in 2002 of 7.5% and 14%, respectively.^{1,2} In 1985, a nationwide survey showed high variations in syphilis prevalence from one province to another: 1.6 - 9.8% with TPHA or FTA-Abs, and 4.5 - 16.5% with VDRL;³ Tete province was not included in this study. High prevalence rates for syphilis were also reported in 1993 (15%),¹ 1994 (12.2%),⁴ 2002 (15%)² and 2006 (9.5%)⁵ (Table I).

Comparing the reported 1993 ANC data with our data, a decline in CT prevalence from 7.9% to 4.1% was observed ($p<0.05$); and in NG from 7.0% to 2.5% ($p<0.005$). Active

**Table I. Trends of STI prevalence in pregnant women, different studies, Mozambique, 1993 - 2006**

Sexually transmitted infection	Studies by authors by publication date					
	Liljestrand 1985 (nationwide) N=1 468	Vuylsteke 1993 (Inhambane province) N=201	Cossa 1994 (Zambezia) N=1 728	Loscertales 2002 (southern Mozambique) N=262	Montoya 2006 (Sofala province) N=4 487	ICRH 2004 (Tete province) N=1 203
<i>C. trachomatis</i>		7.9%		7.5%		4.1%
<i>N. gonorrhoeae</i>		7.0%		14%		2.5%
Syphilis (RPR/VDRL)	4.5 - 14.6% (VDRL)			15% (RPR)	9.5% (RPR)	5.2%
Syphilis (TPHA/MHA-TP/FTA-Abs)	1.6 - 9.8% (TPHA/FTA-Abs)		12.2% (MHA-TP)			7.0% (TPHA)
Active syphilis (RPR and TPHA pos.)		14.6%				4.7%

syphilis fell significantly from 14.6% (95% CI 9.7 - 19.5) to 4.7% ($p<0.001$).

Discussion

Our data are in line with the decreasing trend in STI prevalence reported in several sub-Saharan countries.⁶⁻⁸ This decrease shows that the increased efforts to combat STI are not fruitless.

In Mozambique, syphilis screening at ANCs was introduced in 1979 and made a key element of the national 5-year plan in 1995, with an increased number of women tested and treated. As a result, the syphilis prevalence among pregnant women in central Mozambique decreased from over 14% in 1998 to under 8% in 2004.⁹ Improved health care services since the civil war era, the introduction and scaling up of the syndromic approach to managing STIs, and antenatal screening for syphilis and adequate treatment with penicillin, might also have played an important role. Community-based prevention activities also resulted in an increased awareness of STI symptoms with a consequent modification of risky sexual behaviour and changes in health attitudes. Cates *et al.*¹⁰ showed that community education resulted in early recognition of symptoms and health-seeking behaviour, and was an important element in controlling syphilis.

In Mozambique, control of STIs is an important element of ongoing programmes to control the devastating HIV/AIDS epidemic. Our data show that the prevalence of STIs is indeed starting to decline. However, an effect on the HIV epidemic has not been observed; HIV prevalence in pregnant women (15 - 49 years) rose from 11% in 2000 to 16% in 2004.¹¹ This paradox may be explained by the mature HIV epidemic, with most HIV transmission occurring outside core groups with high STI rates.¹² Hence, in settings with a generalised HIV epidemic

like Mozambique, STI control should be complementary to other HIV prevention strategies, including condom promotion, reduction of risky sexual practices, and voluntary counselling and testing, among others.

The authors thank the staff of the health centres who participated in the study as well as the authorities from the Ministry of Health whose collaboration made this work possible. The study was implemented in terms of Grant ZEIN2002PR258 of the Flemish Interuniversity Council.

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Accepted 23 November 2007.