SHORT REPORT

Serological Evidence of Gonorrhoea among Infertile and Fertile Women in Rural Mozambique

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ABSTRACT

One hundred infertile and 200 referent fertile women in Cabo Delgado Province, northern Mozambique, were examined for the demonstration of intracellular diplococci in intracervical smears and tested for gonococcal antibody (GAT). GAT was positive in 76% of infertile and 40% of fertile women (OR 3.1; 95% CI 1.9–5.0). Among infertile women 30% had GAT titres ≥ 640, whilst among fertile women the corresponding proportion was 7% ($p < 0.001$). Among women with ≥ 2 lifetime spouses 51% of infertile women were GAT seropositive, whilst the proportion was 20% (OR 5.2; 95% CI 2.7–9.8) among fertile women. It is concluded that infertile women constitute a group at high risk of having serologically demonstrable current or previous gonococcal infection. (*Afr J Reprod Health* 1999; 3(2):102-105)

RÉSUMÉ

Evidence sérologique de la gonorrhée parmi les femmes fertiles et infertiles dans les agglomerations rurales au Mozambique. Cent femmes infertiles et deux cents femmes fertiles on été enquêtées dans la province de Cabo Delgado au Mozambique du nord, pour mettre en évidence les diplocoques intracellulaires dans les frottis intracervicaux. Nous avons aussi recherché l'anticorps gonococcique (AG). AG était confirmé positif chez 76% des femmes infertiles et 40% chez les femmes fertiles (OR 3,1; 95% CI 1, 9-5,0) Parmi les femmes infertiles, 30% avaient des titres AG > 640, alors que pour les femmes fertiles la proportion correspondante était 7% (P < 0, 001). Parmi les femmes qui avaient ≥ 2 époux à vie 51% des femmes infertiles se révélaient séropositives. Chez les femmes fertiles, la proportion était 20% (OR 5,2:95% CI 2,7-9,8). L'étude tire la conclusion que les femmes infertiles constituent un groupe à haut risque d'être atteintes par l'infection gonococcique courante ou antérieure qui est sérologiquement démontrable. (*Rev Afr Santé Reprod* 1999:3(2):102-105)

KEY WORDS: *Gonorrhoea, infertility, serology, Mozambique*

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Introduction

Childlessness is dreaded in societies where children are highly valued for economic and traditional reasons. Various studies on African women at menopause reveal that up to 40–50% may not have any surviving child.[1] The magnitude of this problem in third world countries has gradually been clarified[2] and a number of research efforts have been launched to address the problem of reproductive failure.[3]

Childlessness is often confused with infertility. The former includes not only infertility, but also pregnancy wastage and child loss.[1] Miscarriage in the second trimester[4] and foetal death in the third trimester[5] can be caused by syphilis, and this can contribute to childlessness. Various sexually transmitted diseases (STDs) are often acquired simultaneously and tubal blockage (infertility) by infection with *Neisseria gonorrhoea* or *Chlamydia trachomatis* may co-exist with pregnancy wastage due to *Treponema pallidum* infection.[6]

Childlessness often implies stigmatisation, divorce and ostracism. Women's vulnerability and implicit economic insecurity may lead to prostitution or other forms of commercial sex. To regain respect, recognition and value, one of the few means a woman has is to prove her fertility. To achieve this, she may need to have unprotected sexual intercourse with several partners. The risk of acquiring more STDs, potentially worsening any pre-existent sub-fertility due to previous tubal disease, is obvious.

This study was conducted to elucidate the extent to which women seeking treatment for infertility are at risk of having had previous gonorrhoea as recognised serologically by gonococcal antibody test (GAT).

Subjects and Methods

In Montepuez, Cabo Delgado Province, northern Mozambique, 100 women (cases) seeking help at the rural hospital for alleged inability to conceive were enrolled in the study. All of them lived in rural areas. At the time of the study (1992–93), Montepuez had approximately 52,000 inhabitants, of whom 15,000–20,000 were refugees coming from neighbouring areas to the province as a result of war. The Makonde and Macua tribes are predominant in the study area; Macua being the majority group, almost exclusively of Muslim faith. The Makonde and Macua ethnic groups have a matrilineal tradition.

Three criteria were used for inclusion:

1. Infertility reported as the main subjective problem
2. At least one year of residence in current household
3. No pregnancy during the last 2 years in spite of reported regular sexual activity

Two hundred proven fertile women (referents) were enrolled from neighbouring areas in the province. They were randomly selected from the antenatal clinics during early pregnancy, and they came from the same rural area as the cases. For each infertile woman, two referent women, matched for age, parity and area of residence were enrolled. There was no other way to recruit "fertile" women at the community level, since there would be no way to ethically justify a study of STDs utilising invasive techniques, except at outpatient and antenatal clinics in the area. Two inclusion criteria were used for the referents:

1. Ongoing early pregnancy
2. No prior problem of infertility

Cases and referents were interviewed regarding current marital status and total number of lifetime spouses. Both their ethnicity and religion were noted. Intra-cervical smears were taken from 96 of the cases and from 196 of referents and gram-stained. The slides were screened for intracellular diplococci. Blood samples were obtained from each woman and centrifuged. Serum aliquots were prepared and frozen for subsequent detection of gonococcal antibodies (GAT) as described previously.[7] These antibodies reflect the load of previously acquired gonococcal disease. The GAT uses gonococcal pilus antigens and has been found to be more useful than gonococcal complement fixation test. It was therefore used. The highest serum concentration was 1/20. Sera aliquots were diluted twofold to form a dilution of 1/20. Titres of 1/40 were considered to show positive test results. Cases and referents were compared as case-control data, as outlined by Schlesselman.[8] Odds ratios (OR) with 95% confidence interval (CI) were calculated and chi-square analysis, when appropriate, was carried out. The project was accepted by the Ethics Committee of the Central Hospital, Maputo.

Results

As can be seen in Table 1, 76% of infertile women and 40% of the fertile referent group had gonococcal antibodies (OR 3.1; 95% CI 1.9–5.0). The distribution of GAT-positive women was found to be related to the number of lifetime spouses. Of infertile women 51% had ≥ 2 lifetime spouses and were GAT-positive. The corresponding figure among fertile women was 20% (OR 4.2; 95% CI 2.4–7.3). GAT titres were high (≥ 640) in 30% infertile women and in 7% of fertile women ($p < 0.001$).

Ethnicity was not significantly associated with gonorrhoea seropositivity. Among Macua infertile women 63/86 (73%) were GAT-positive. Among the remaining ethnic groups (Maconde, Jana and Muani) 7/15 (47%) infertile women were GAT-positive (OR 3.1; 95% CI 0.9–11.0). A similar non-significant association was shown among fertile women regarding ethnicity and gonorrhoea seropositivity. Among Macua referent women 60/168 (36%) were GAT-positive, whilst among the remaining ethnic origins (Maconde, Jana, and Muani) 10/34 (29%) were GAT-positive (OR 1.3; 95% CI 0.6–3.2). Neither of the two predominant religious faiths in the area — Catholicism and Islam — showed any association to GAT positivity among cases or referent women.

Discussion

In this study the main finding was that 76% of infertile women were GAT-seropositive and that 30% had high GAT titres. These results confirm the hypothesis that infertile women in the study setting are at an extremely high risk of acquiring or having acquired STDs. It may be argued that the low prevalence (7%) of fertile women with high GAT titres (≥ 640) might be explained by immunosupression among pregnant women. The difference is, however, highly significant ($p<0.001$), and this difference cannot be explained only by immunosuppression among pregnant women.[7]

In the area studied, we have previously found 55% syphilis seropositivity among infertile women, versus 19% among fertile women, whilst the prevalence of HIV-1 and HIV-2 seropositivity was found to be around 1%.[9] The STD pattern in the study setting implies that infertile women at present constitute a potential high risk group for HIV-1 and HIV-2 transmission. With elevated overall seropositivity prevalence of gonorrhoea (76%) and of syphilis (55%) among infertile women, it can be assumed that HIV infection, once introduced in this society, may reach high prevalence rates.[10]

In several settings where childlessness is common, high prevalence figures of various STDs have been reported.[1] In northern Mozambique, the markedly elevated prevalence of gonorrhoea and syphilis seropositivity among infertile women may either reflect that tubal blockage (and thus infertility) occurs frequently as a consequence of STD infection, or that the need to engage in risky sexual behaviour is increased for infertile women in order to achieve a much desired pregnancy, or both.

Table 1 **Lifetime Spouses, Gonorrhoea Seropositivity (GAT) and Intracellular Diplococci in Intracervical Smears among Infertile (cases) and Fertile Women (Referents)**

Parameter	Cases (%)	Referents (%)	Odds ratio	95% CI
Spouses ≥ 2	65/100 (65)	94/200 (47)	2.1	1.2–3.6
GAT positivity	76/100 (76)	78/197 (40)	3.1	1.9–5.0
GAT pos & spouses ≥ 2	51/100 (51)	40/197 (20)	4.2	2.4–7.3
Intracellular diplococci	18/96 (19)	32/196 (16)	1.2	0.6–2.3

The study area borders southern Tanzania, southern Malawi, southern Zambia and northern Zimbabwe. All these areas are known to be highly affected by HIV infection and other STDs. The peace treaty in Mozambique will presumably lead to the return of Mozambican refugees from high HIV incidence areas for resettlement in their (low HIV incidence) areas of origin in northern Mozambique. Few valid data on reproductive health are available in the northern part of Mozambique.

The high prevalence of syphilis and gonorrhoea seropositivity in the infertile population in this setting indicates that HIV infection, if introduced in the community, may develop at an alarming rate. Infertile women in an area such as this may be at increased risk of HIV infection. Their excess risk of HIV transmission should be noted and the basic problem of childlessness should be addressed more vigorously.

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