

Asymptomatic gonorrhoea and chlamydial infection in rural Tanzanian men

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Abstract

Objective—To measure the prevalence of urethritis due to *Neisseria gonorrhoeae* and *Chlamydia trachomatis* in rural Tanzanian men.

Design—About 500 men aged 15-54 years were selected from each of 12 rural communities by random cluster sampling; interviewed concerning past or present symptoms of sexually transmitted diseases; and asked to provide a first catch urine specimen, which was tested for pyuria with a leucocyte esterase dipstick test. Subjects with symptoms or with a positive result on testing were examined, and urethral swabs were taken for detection of *N gonorrhoeae* by gram stain and of *C trachomatis* by antigen detection immunoassay.

Setting—Mwanza region, north western Tanzania.

Subjects—5876 men aged 15-54 years.

Main outcome measures—Prevalence of urethral symptoms, observed urethral discharge, pyuria, urethritis (>4 pus cells per high power field on urethral smear), *N gonorrhoeae* infection (intracellular gram negative diplococci), and *C trachomatis* infection (IDEIA antigen detection assay).

Results—1618 (28%) subjects reported ever having had a urethral discharge. Current discharge was reported by 149 (2.5%) and observed on examination in 207 (3.5%). Gonorrhoea was found in 128 subjects (2.2%) and chlamydial infection in 39 (0.7%). Only 24 of 158 infected subjects complained of urethral discharge at the time of interview (15%).

Conclusion—Infection with *N gonorrhoeae* and *C trachomatis* is commonly asymptomatic among men in this rural African population. This has important implications for the design of control programmes for sexually transmitted disease.

Introduction

Urethritis is one of the most common reasons for outpatient attendance in developing countries, often accounting for up to 10% of all consultations by men.¹ Incidence estimates of 3% and 10% in the general population were obtained in two urban hospital based studies in Africa,^{1,2} but accurate incidence figures are not available in developing countries as most patients do not seek treatment from the official health sector. Facilities for its treatment are poorly developed, reflecting a longstanding neglect of sexually transmitted diseases by health authorities in most countries.

Several studies of hospital patients suggest that *Neisseria gonorrhoeae* is the major cause of urethritis in sub-Saharan Africa, although infection with *Chlamydia trachomatis* is also prevalent.³ The public health importance of these infections has increasingly been recognised in the past decade, particularly because of their serious effects in women and neonates and their possible role in facilitating the transmission of HIV via heterosexual contact⁴; but at the same time the treatment of gonorrhoea has become more difficult and expensive in developing countries due to increasingly widespread resistance to commonly available antimicrobial agents.³

The World Health Organisation (WHO) recom-

mends that syndromic treatment for urethritis should be made available in primary health care in developing countries. Patients and their sexual contacts should be treated for both *N gonorrhoeae* and *C trachomatis* infection with a single dose of cefixime 400 mg and a one week course of doxycycline 100 mg twice daily.⁷ As the expense of this regimen is beyond the means of most developing countries and free treatment is desirable on public health grounds, the support of international donors in supplying these drugs is being canvassed.

These measures will succeed in controlling *N gonorrhoeae* and *C trachomatis* infection only if a high proportion of infected people seek treatment. It is therefore important in the assessment of their likely impact to know the prevalence of symptomatic and asymptomatic infection in the population; but although many studies have documented a high prevalence of asymptomatic infection among women,⁸ little information is available on asymptomatic infections in men in developing countries. We report here a population based study of the prevalence and aetiology of urethritis in 5876 randomly selected men aged 15-54 years in a rural area of Tanzania.

Methods

The study took place in 1991-2 in Mwanza region, which is situated on the southern shores of Lake Victoria and has a population of about 2 million.⁹ The study sample was selected from 12 rural communities involved in an intervention trial to assess the impact of improved treatment services for sexually transmitted diseases on the incidence of HIV infection and other such diseases over a two year period; this study was part of the baseline survey to determine the prevalence of sexually transmitted disease in the 12 communities before the intervention.

In each community about 2000 to 3000 adults living within 90 minutes' walk of a health centre formed the study population. In Tanzania the smallest administrative unit is the "balozi," which comprises about 10 households. The balozis within the study population were enumerated and aggregated into about 16 clusters each of three to four balozis or 30 to 40 households. A random sample of seven to nine of these clusters was chosen in each community in which all adults between the ages of 15 and 54 years were eligible for enrolment, providing a total of 15 000 eligible adults, about half of whom were men. These men made up the study population.

Local leaders were informed of the study's objectives, and a convenient central location was established for members of each cluster to be interviewed and examined. Informed (oral) consent was obtained from each adult at enrolment, and personal characteristics and details of self reported sexually transmitted disease syndromes were obtained through a confidential interview. All subjects were told that they were entitled to see the study clinician for medical treatment.

Male subjects were asked to provide a first catch urine sample, which was tested on the spot with a leucocyte esterase dipstick test (Nepthur-Test+Leuco, Boehringer-Mannheim, France) according to the

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BMJ 1996;312:277-80

manufacturer's instructions; 60 to 120 seconds after immersion the colour reaction was compared with a standardised colour chart and recorded as negative, 1+, 2+, or 3+. All men complaining of urethral discharge or genital ulcer and all those with positive results on the dipstick test were offered a clinical examination. The presence of urethral discharge was noted after "milking" the urethra if a discharge was not initially seen. After obtaining oral consent urethral swabs were taken for gram stain and *C trachomatis* antigen detection from all men with self reported discharge (whether or not confirmed by the clinician), from all those in whom a discharge was seen (even if not reported), and from all men with a positive result on the dipstick test. For logistic reasons it was not possible to attempt isolation of *N gonorrhoeae*. All those with symptoms or signs of a sexually transmitted disease, or both, were treated on the spot according to Tanzanian national guidelines.

Smears for gram stain were heat fixed in the field and transported to the laboratory in Mwanza at the end of the week for staining and reading according to standard techniques. Urethritis was defined as the presence of five or more polymorphonuclear leucocytes per high power field in the urethral smear. The presence of intracellular gram negative diplococci was taken as evidence of *N gonorrhoeae* infection. Subjects with eight or more pairs of extracellular gram negative diplococci were assigned to the category of "possible *N gonorrhoeae* infection." Specimens to be used to test for the presence of *C trachomatis* antigen were stored in transport medium at 4°C for up to one week before testing by an antigen capture enzyme immunoassay (IDEIA, NovoNordisk Diagnostics, Cambridge) according to the manufacturer's instructions, positive and grey zone results being confirmed with a blocking assay.

Results

A total of 5876 men were interviewed (80% of those eligible). Over 80% were farmers; and 65% were of the Sukuma ethnic group, 65% were Christian, 4%

Moslem, and 30% belonged to other religions. Their mean age was 30.9 years. Overall, 1780 (30%) were single and had never married, 3577 (61%) were married and living with their wives, and 513 (8.7%) were divorced, widowed, or living apart from their wives. A total of 3915 (67%) had travelled outside their home village and 1001 (17%) outside Mwanza region in the previous year.

Overall, 1618 subjects (28%) reported ever having a urethral discharge and 888 (15%) ever having a genital ulcer; 324 (5.5%) reported having a urethral discharge in the past year. A current urethral discharge was reported by 149 (2.5%), of whom 128 were examined, and 117 were swabbed for both *N gonorrhoeae* and *C trachomatis*. The presence of a discharge was observed in 74/128 (58%) men with reported discharge and in an additional 133/1441 (9.2%) men who did not report a discharge, giving a total of 207 men with observed urethral discharge, 185 of whom were swabbed for both *N gonorrhoeae* and *C trachomatis*.

A urine sample was tested by the leucocyte esterase dipstick test for 5803 (99%) of those interviewed, and 1576 (27%) of these had positive results. A total of 1664 men were eligible for swabbing (table 1), including 1576 with a positive result on the dipstick test, 149 who reported a discharge, and 10 who reported a genital ulcer but were observed to have a discharge (some men were eligible on more than one criterion). Urethral swabs for both *N gonorrhoeae* and *C trachomatis* were taken from 1451 of 1664 eligible men (87%).

Of the 1451 men swabbed, *N gonorrhoeae* was diagnosed in 128 (8.8%) and *C trachomatis* in 39 (2.7%), with nine dual infections (table 1). The positive predictive value of the dipstick test for *N gonorrhoeae* and *C trachomatis* infection in this population was 154/1390 (11%). Possible *N gonorrhoeae* infection (≥ 8 pairs of extracellular gram negative diplococci) was noted in a further 230 of those swabbed (16%). Urethritis was present in 556 of 1234 men in whom the polymorphonuclear leucocyte count was recorded (45%); in 128/147 of those with *N gonorrhoeae* or *C trachomatis*, or both (87%), in 123/218 men with possible *N gonorrhoeae* (56%), and in 305/869 men with no evidence of either *N gonorrhoeae* or *C trachomatis* (35%).

Overall, 24 of the 158 men found to have *N gonorrhoeae* or *C trachomatis* infection, or both, complained of a urethral discharge (15%), a further 30 (19%) were found to have a discharge on examination, and 104 (66%) had neither symptoms nor signs (table 2). Of the 158 infected men, 92 denied ever having had a urethral discharge (58%).

In the 117 men who reported urethral discharge and were swabbed, a discharge was confirmed by the clinician in 64, and 17 of these were infected with *N gonorrhoeae/C trachomatis* (27%). Among subjects complaining of discharge which was not confirmed on examination, 7/53 were infected (13%).

The minimum prevalence of infection in this population was 128/5876 (2.2%); 95% confidence interval 1.8% to 2.6% for *N gonorrhoeae*, 39/5876 (0.7%); 0.5% to 0.9% for *C trachomatis*, and 158/5876 (2.7%); 2.3% to 3.1% for either or both. The minimum population prevalence of urethritis was 556/5876 (9.5%); 8.7% to 10.2% and of urethral discharge confirmed on examination was 207/5876 (3.5%); 3.1% to 4.0%.

Discussion

We are aware of only one previous population based survey of gonorrhoea in African men. Infection rates of 7/166 (4.2%) and 24/270 (8.9%) were found in two districts of Uganda in 1973.¹⁰ Swabs were taken only from those with urethral discharge on examination. The prevalence of urethral *C trachomatis* infection in

Table 1—Number of men eligible for urethral swabbing, number of swabs taken, and number of *N gonorrhoeae* and *C trachomatis* infections detected among 5876 men in Mwanza region, Tanzania

Reason eligible	No eligible	No (%) swabbed	Positive for		
			<i>Neisseria gonorrhoeae</i>	<i>Chlamydia trachomatis</i>	Either
Positive results on dipstick test	1576	1390 (88)	124	39	154 (11%)*
Discharge reported	149	117 (79)	23	3	24 (21%)
Ulcer reported/discharge observed	10	10 (100)	1	0	1 (10%)*
Total eligible†	1664	1451 (87)	128 (9%)	39 (2.7%)	158 (11%)

*Percentage prevalence among those swabbed.

†Some men were eligible on more than one criterion.

Table 2—Number of infections with *N gonorrhoeae* or *C trachomatis*, or both, according to result of dipstick test, reported symptoms, and observed signs among the 1451 men swabbed according to protocol

Test results	Discharge reported (n=117)		Discharge not reported (n=1334)		Total
	Seen	Not seen	Seen	Not seen	
Dipstick test positive and swabbed	37	20	120	1213	1390
Positive for either infection	16	4	30	104	154
Dipstick test negative swabbed	27	33	1	0	61
Positive for either infection	1	3	0	0	4
Total swabbed	64	53	121	1213	1451
Positive for either infection	17 (26%)	7 (13%)	30 (25%)	104 (8.6%)	158 (11%)

Key messages

- Sexually transmitted diseases are a major cause of morbidity in developing countries, especially in women and infants
- After decades of neglect, facilities for their treatment are poorly developed in many countries
- There is increasing evidence that the treatable bacterial sexually transmitted diseases facilitate the heterosexual transmission of HIV
- Asymptomatic urethral infection with *Neisseria gonorrhoeae* and *Chlamydia trachomatis* is common in rural Tanzanian men
- In view of the high prevalence of asymptomatic infection in both men and women, the control of sexually transmitted diseases in developing countries will require innovative approaches to screening or mass treatment, or both, in addition to improved clinical services for patients with symptoms

men has not previously been measured in African populations.

It should be emphasised that the population prevalences of *N gonorrhoeae* and *C trachomatis* infection found in this study (2.2% and 0.7%, respectively) are minimal estimates. Urethral swabs were taken only from those with urethral symptoms or a positive result on the leucocyte esterase dipstick test, which may have excluded some infected men, and for logistic reasons the laboratory tests used to diagnose *N gonorrhoeae* and *C trachomatis* infection were not the most sensitive available.

The high proportion of asymptomatic *N gonorrhoeae* infection in men in Mwanza region was unexpected, although significant prevalences of asymptomatic infection have been reported in some previous surveys, both in Africa¹¹ and the United States.¹²⁻¹⁴ Diagnosis in the present study was based on gram stain only. Repeat microscopy by two external scientists on a sample of slides with positive and negative results showed satisfactory concordance. The gram stain technique is a highly sensitive and specific method for the detection of symptomatic *N gonorrhoeae* but less so in asymptomatic men.¹⁵ Further studies are therefore needed to determine what proportion of apparently asymptomatic infections in Mwanza region can be confirmed on culture. If we assume the proportion is high, what explanations might be offered?

Some men may have failed to recognise or report their symptoms, but whereas 19% of *N gonorrhoeae* and *C trachomatis* infections occurred in men in whom urethral discharge was unreported but observed on clinical examination, 66% showed neither signs nor symptoms. A high proportion of infected men may have had symptoms at an earlier stage, the results of this cross sectional study merely reflecting the natural history of untreated or inadequately treated gonorrhoea: a relatively brief symptomatic illness followed by a long period of asymptomatic infection.¹² Data from Mwanza and elsewhere in Africa indicate that a large proportion of patients with sexually transmitted diseases either fail to seek treatment or receive inadequate treatment often with inappropriate antimicrobial drugs obtained through commercial outlets.^{15,16} If this is so then improved clinical services that ensure that men receive effective treatment soon after the onset of symptoms may have a major public health impact. Of the 158 infected men in our study, however, 92 (58%) denied ever having a urethral discharge; and of the remainder most occurred more than a year before, suggesting a previous episode of infection.

A third possibility is that some men had only recently been infected and had not yet developed symptoms, but the incubation periods of *N gonorrhoeae*

and *C trachomatis* are short, and this is unlikely to account for more than a small proportion of infections.¹²

Finally, many infections may have been continuously asymptomatic, as has been documented in an American study,¹³ perhaps as a result of infection with less pathogenic strains or of immunological characteristics of the host. Further research is required to explore these questions and to determine whether asymptomatic men, who may harbour smaller numbers of pathogenic organisms, are as infectious to their sexual partners as those with symptoms. If a high prevalence of continuously asymptomatic infections is confirmed and if they are infectious this implies that treatment strategies relying on passive case finding, by using an algorithm for which the entry point is a complaint of urethral discharge, may be ineffective in controlling these infections.

The algorithm currently recommended by WHO excludes men complaining of urethral discharge from treatment unless a discharge can be demonstrated on examination. We have found that 7/53 (13%) such subjects in this community based study were infected with *N gonorrhoeae* or *C trachomatis*, or both. As the proportion infected is likely to be higher in those who attend a health facility because of urethral symptoms we believe this algorithm may be in need of modification.

In women it has long been recognised that a high proportion of *N gonorrhoeae* and *C trachomatis* infections are asymptomatic, and novel strategies for the detection of these women are being evaluated—for example, screening programmes at antenatal or family planning clinics, and the use of “risk assessment” algorithms to identify women at high risk of infection.^{18,19} Similar strategies may need to be considered for men,²⁰ although they will be more difficult to apply as men come into contact with the health services less frequently.

The leucocyte esterase dipstick test on urine may be a useful tool for screening asymptomatic men,^{13,14} although its sensitivity has been reported to be low in certain settings in industrialised countries, particularly for the detection of *C trachomatis*.²¹ We previously evaluated this test in 151 medical outpatients without urethral discharge at a Mwanza hospital¹⁷ and found that 22 (15%) had a positive result. Of these, seven were found to have *N gonorrhoeae* or *C trachomatis* infection, or both, giving a positive predictive value of 32% in this outpatient group, similar to the 27% recorded in the general population in the present study. We have been unable to evaluate the sensitivity of the test in our population as it was not considered acceptable to take urethral swabs from asymptomatic subjects who had negative results on the dipstick test. Future studies to investigate the sensitivity and negative predictive value of the test would provide valuable information on its utility as a screening test.

The prevalence of chlamydial infection recorded in the present study was surprisingly low as several studies in this and other regions of Africa have found the prevalences of *N gonorrhoeae* and *C trachomatis* infection to be similar among antenatal patients.^{18,19,22} As subjects with urethral *C trachomatis* infection are more likely than those with *N gonorrhoeae* to have negative results on the dipstick test and to have no symptoms²¹ we may have considerably underestimated the prevalence of *C trachomatis* infection by swabbing only those subjects who had positive results on the dipstick test and those with symptoms. Moreover the antigen detection assay that we used is less sensitive than the DNA amplification techniques now available for the diagnosis of *C trachomatis* infection.²²

Gonorrhoea and chlamydial infection are currently out of control in many parts of Africa. There is an urgent need for innovative approaches to control sexually transmitted diseases, which could include screening programmes for men and women with cheap, simple, and effective new diagnostic tests when these become available, improved case finding strategies, or, as suggested by Arya *et al* in 1973, selective mass treatment.¹⁰ Considerable investment will be needed, and the impact and cost of these various approaches should be carefully evaluated. But the implementation of improved services for people with sexually transmitted diseases should not await the outcome of such studies since, as the world development report of 1993 has emphasised, the treatment of bacterial sexually transmitted diseases is one of the most cost effective health interventions available in developing countries.²³

We thank the principal secretary, Ministry of Health, and the director general of the National Institute for Medical Research for permission to carry out and publish the results of this study. The support of regional, district, ward, and village government and party officials is gratefully acknowledged. We are particularly grateful for the support and hospitality of the people included in the survey.

Funding: Commission of the European Community, Centre for International Migration and Development of the Government of the Federal Republic of Germany, and Overseas Development Administration of the United Kingdom.

Conflict of interest: None.

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(Accepted 17 November 1995)

Randomised trial comparing hysterectomy with endometrial ablation for dysfunctional uterine bleeding: psychiatric and psychosocial aspects

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Abstract

Objective—To compare in psychiatric and psychosocial terms the outcome of hysterectomy and endometrial ablation for the treatment of dysfunctional uterine bleeding.

Design—Prospective randomised controlled trial.

Setting—Obstetrics and gynaecology department of a large teaching hospital.

Subjects—204 women with dysfunctional bleeding for whom hysterectomy would have been the preferred treatment were recruited over 24 months and randomly allocated to hysterectomy (99 women) or to hysteroscopic surgery (transcervical resection (52 women) or laser ablation (53 women)).

Main outcome measures—Mental state, marital relationship, psychosocial and sexual adjustment in assessments conducted before the operation and one month, six months, and 12 months later.

Results—Both treatments significantly reduced the anxiety and depression present before the operation, and there were no differences in mental

health between the groups at 12 months. Hysterectomy did not lead to postoperative psychiatric illness. Sexual interest after the operation did not vary with treatment. Overall, 46 out of 185 (25%) women reported a loss of sexual interest and 50 out of 185 (27%) reported increased sexual interest. Marital relationships were unaffected by surgery. Personality and duration of dysfunctional uterine bleeding played no significant part in determining outcome.

Conclusions—Hysteroscopic surgery and hysterectomy have a similar effect on psychiatric and psychosocial outcomes. There is no evidence that hysterectomy leads to postoperative psychiatric illness.

Introduction

Dysfunctional uterine bleeding is an uncomfortable and inconvenient complaint that may not be relieved by drug treatment in the long term. In such circumstances, hysterectomy has been regarded as the best

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BMJ 1996;312:280-4