

# Chlamydial genital infection in Addis Ababa, Ethiopia

## A seroepidemiological survey

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**SUMMARY** A seroepidemiological survey was undertaken in Addis Ababa to assess the prevalence of chlamydial genital infections among patients attending a sexually transmitted diseases (STD) clinic and patients with no overt genital symptoms. In the STD clinic patients antibodies to *Chlamydia trachomatis* serotypes D to K (genital types) were detected in 68 of 210 (32.4%) men and in 72 of 159 (45.3%) women, a rate of exposure as high or higher than that found in Europe. Serological evidence of active chlamydial infection was present in 26.7% of men and 28.9% of women. Women were at risk of contracting STD, including chlamydial infections, at the age of 14 years or earlier. The titres of antichlamydial IgG were extremely high in some patients attending the STD clinic, with titres of between 1/512 and 1/8192 in 9.5% of men and 13.2% of women. This suggests that some patients had severe or disseminated chlamydial disease. The prevalence of exposure to chlamydial genital infections among 148 patients with no overt genital disease was 14.2%, which is significantly higher than that found in the United Kingdom.

Among the total of 517 patients tested the prevalence of exposure to trachoma, lymphogranuloma venereum, and *Chlamydia psittaci* agents was very low.

### Introduction

Recent studies in Ethiopia suggest that sexually transmitted diseases (STD) are common<sup>1</sup> and that social factors, such as informal marriage contracts and extensive prostitution, play an important role in the widespread dissemination of these diseases.<sup>2</sup>

In developed countries chlamydial genital infections and their complications, such as epididymitis<sup>3</sup> and salpingitis,<sup>4</sup> are well recognised. The prevalence of these infections in most developing countries, however, is not known, although a recent serological survey in Nigeria<sup>5</sup> indicated that chlamydial genital infections were as common there as in Europe.

We present the results of a seroepidemiological survey conducted in Addis Ababa of chlamydial

genital infections among patients attending an STD clinic and among patients admitted to hospital for other reasons.

### Patients and methods

All patients came from Addis Ababa and no special basis of selection was used. They included: 210 men (mean age 28 ± 12 years) and 159 women (mean age 27 ± 13 years), attending as new patients at the Venereal Disease Centre and presenting with a variety of genitourinary symptoms; 111 male and female inmates of the Amanuel Mental Hospital (mean age 35 ± 15 years); and 37 male and female patients with leprosy from the Alert Hospital (age unknown).

Serum was collected from each patient and tested for the presence of type-specific IgG and IgM antichlamydial antibodies at starting dilutions of 1/16 and 1/8 respectively. Pools of chlamydial antigens were derived from trachoma, oculogenital,

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and lymphogranuloma venereum (LGV) serotypes of *C trachomatis* and selected isolates of *C psittaci*. These antigens were incorporated in a modified micro-immunofluorescence (micro-IF) test,<sup>5a</sup> which was used to test all sera. Serum antibody titres suggesting active chlamydial genital infection were taken as IgG  $\geq 32$  or IgM  $\geq 8$  for men and IgG  $\geq 64$  and IgM  $\geq 8$  for women.<sup>6,7</sup>

## Results

The distribution of antibodies against the various chlamydial serotypes is shown in table I. Antibodies specific for *C trachomatis* serotypes D to K (genital types<sup>8</sup>) were found in 161 of 517 (31.1%) patients tested. The prevalence of IgG and IgM antibodies specific for *C trachomatis* serotypes D to K is shown in table II.

Active chlamydial genital infection (IgG titres  $\geq 32$  or IgM titres  $\geq 8$  in men and IgG titres  $\geq 64$  or IgM titres  $\geq 8$  in women) was evident serologically in 56 (26.7%) men and 46 (28.9%) women from the VD centre.

The titres of antibodies to serotypes D to K are shown in tables III and IV. Extremely high titres of IgG were found in some of the patients attending the VD centre; 20 of 210 (9.5%) men and 21 of 159 (13.2%) women had IgG titres between 512 and 8192. The distribution of these antibody results among various age groups in the VD centre population is shown in table V.

Of the 517 individuals tested, antibodies to *C trachomatis* serotypes A to C (trachoma types<sup>9</sup>) were found in six (1.2%), to LGV serotypes in two (0.4%), and to *C psittaci* in only one (0.2%) (table I).

TABLE I Distribution of antibodies to chlamydial serotypes in Addis Ababa, Ethiopia

Patient group (sex)	No of patients	Total No (%) with antibodies	No (%) with antibodies to:			
			<i>C trachomatis</i> serotypes			<i>C psittaci</i>
			A-C	D-K	LGV 1-3	
VD centre (M)	210	72 (34.3)	3 (1.4)	68 (32.4)	1 (0.5)	0
VD centre (F)	159	75 (47.2)	3 (1.9)	72 (45.3)	0	0
Amanuel Mental Hospital	111	15 (13.5)	0	13 (11.7)	1 (0.9)	1 (0.9)
Alert Leprosy Hospital	37	8 (21.6)	0	8 (21.6)	0	0
Total	517	170 (32.9)	6 (1.2)	161 (31.1)	2 (0.4)	1 (0.2)

TABLE II Prevalence of serum antibodies to *C trachomatis* serotypes D to K in Addis Ababa, Ethiopia

Patient group (sex)	No of patients	No (%) IgG-positive*	No (%) IgM-positive†	Total No (%) positive
VD centre (M)	210	67 (31.9)	37 (17.6)	68 (32.4)
VD centre (F)	159	71 (44.7)	42 (26.4)	72 (45.3)
Amanuel Mental Hospital	111	12 (10.8)	1 (0.9)	13 (11.7)
Alert Leprosy Hospital	37	8 (21.6)	0	8 (21.6)
Total	517	158 (30.6)	80 (15.5)	161 (31.1)

\*IgG-positive = titre  $\geq 16$

†IgM-positive = titre  $\geq 8$

TABLE III Distribution of titres of serum IgG antibody to *C trachomatis* serotypes D to K in patients in Addis Ababa, Ethiopia

Patient group (sex)	No of patients	Serum IgG antibody reciprocal titre							GMT*
		<16	16	32	64	128	256	512-8192	
VD centre (M)	210	143	12	9	9	7	10	20	1/138
VD centre (F)	159	88	10	15	6	8	11	21	1/193
Amanuel Mental Hospital	111	99	9	1	2				1/38
Alert Leprosy Hospital	37	29	2	2	1	3			1/49

\*Geometric mean titre of sera containing IgG antibody at titre of  $\geq 16$

TABLE IV Distribution of IgM titres to *C trachomatis* serotypes D to K in Addis Ababa; Ethiopia

Patient group (sex)	No of patients	Serum IgM antibody reciprocal titre						GMT*
		<8	8	16	32	64	128	
VD centre (M)	210	173	3	6	14	5	9	1/23
VD centre (F)	159	117	10	3	11	9	9	1/31
Amanuel Mental Hospital	111	110	1					1/8
Alert Leprosy Hospital	37	37						

\*Geometric mean titre of sera containing IgM antibody at a titre of  $\geq 8$

TABLE V Distribution of antibodies to *C trachomatis* serotypes D to K in VD Centre, Addis Ababa, related to age of patients

Age (years)	No of patients*	No antibody-positive (%)
<b>Men:</b>		
$\leq 14$	1	0
15-29	149	45 (30.2)
30-49	48	20 (41.7)
$\geq 50$	8	1 (12.5)
<b>Women:</b>		
$\leq 14$	9	2 (22.2)
15-29	91	42 (46.2)
30-49	37	21 (56.8)
$\geq 50$	17	5 (29.4)

\*Ages known in 206 men and 154 women

## Discussion

Among unselected patients attending the VD centre, Addis Ababa, the prevalence of exposure to chlamydial genital infections, as indicated by the presence of antibodies to *C trachomatis* serotypes D to K, was 32.4% in men and 45.3% in women. Studies using the same serological test have detected antichlamydial antibodies in 32% of selected men with non-gonococcal urethritis<sup>6</sup> and in 43% of women attending an STD clinic<sup>7</sup> in the United Kingdom and in up to 39% of South African women attending an STD clinic.<sup>10</sup> In a recent study in Nigeria these antibodies were detected in 19% and 27% of men and women respectively attending an STD clinic.<sup>5</sup> Our results suggest that the rate of exposure to chlamydial genital infections is as high or higher in Addis Ababa than elsewhere.

Serum antibody titres suggesting active chlamydial infection were present in 26.7% of men and 28.9% of women attending the VD centre. In the Nigerian STD clinic population 12% of men and 23% of women had antibodies at these titres.<sup>5</sup>

The titres of IgG and IgM antibodies to serotypes D to K among patients attending the STD clinic, Addis Ababa, were much higher than those found in the United Kingdom or Nigeria. The geometric mean titre (GMT) of IgG among these men from Addis Ababa was 1/138, and 9.5% of patients had titres

between 512 and 8192. Among the women the GMT was 1/193 and 13.2% had titres at these extremely high levels. Using the same serological test in the United Kingdom men with chlamydial urethritis had serum IgG titres of around 32<sup>5a, 6</sup> and women with chlamydial cervicitis titres of around 64.<sup>5a, 7</sup> We also found similar titres in patients attending an STD clinic in Nigeria (GMT 1/37 in men and 1/71 in women). The titres of antibodies to serotypes D to K in these Ethiopian men constituted the highest titres yet detected by us in any group of men. The titres in the women were similar to those found by us in women in the United Kingdom with pelvic inflammatory disease (GMT 1/98 and 1/160)<sup>12, 13</sup> and perihepatitis (GMT 1/149).<sup>14</sup> These patients from Addis Ababa thus may have more severe or disseminated chlamydial genital disease than is usually seen in STD patients either from the United Kingdom or Nigeria.

The highest proportion of patients attending the VD centre who had antibodies to serotypes D to K were found among those aged 15 to 49 years, the age range of greatest sexual activity. Although the numbers were small more women than men were exposed to chlamydial genital infections at 14 years or under and at 50 years or over. Similarly more women than men of these ages actually attended the STD clinic with a complaint. Thus, in this sexually active female population there is a risk of contracting STD at 14 years of age or earlier. This may be a reflection of the widespread prostitution in Addis Ababa.<sup>2</sup>

Patients from the Amanuel and Alert hospitals were not accurately matched as controls for patients attending the VD centre nor were they representative of the general population of Addis Ababa; however, they were individuals without overt signs of genital disease. Among these groups the overall prevalence of exposure to chlamydial genital infection was 14.2%. One (0.7%) patient had antichlamydial IgM and six (4.1%) IgG at titres of  $\geq 64$ . This level of exposure is appreciably higher than that found in the United Kingdom, where, for example, among male and female blood donors a prevalence of only 2% was found using the same laboratory test.<sup>15</sup>

Antibodies to *C trachomatis* serotypes A to C (trachoma types) were detected in six of 517 (1.2%) sera tested. The prevalence of LGV and *C psittaci* infections were also low at 0.4% and 0.2% respectively. The low prevalence of LGV is similar to our findings in Nigeria,<sup>5</sup> where these antibodies were detected in 0.3% of the population studied.

Thus, the prevalence of chlamydial genital infections is high in Addis Ababa. This may reflect particular social conditions and the lack of facilities for diagnosis and treatment of STD in Ethiopia.<sup>2</sup>

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