

Prevalence of chlamydial antibody in Malaysians

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Abstract

A single antigen indirect immunofluorescence test was used to screen for chlamydial antibody among Malaysian infants, children, sexually active adults and prostitutes. Of 794 serum samples tested, 361 (45.5%) were positive. Seropositivity increased with age and sexual activity and ranged from 10 to 16% among children under 10 years old to 94.4% among prostitutes. Pregnant women and female adolescents showed a higher antibody prevalence than non-pregnant and older women. Six (13%) infants under 6 months of age were positive for chlamydial IgM.

Chlamydial serology, though generally considered to be of little use as a diagnostic tool in individual patients, has been shown to play an important part in defining the epidemiology of chlamydial infection. Seroepidemiological surveys have helped to define the prevalence of asymptomatic chlamydial infections and the association of *Chlamydia trachomatis* with extra-genital syndromes.¹

In tropical countries there is usually a lack of accurate data on the prevalence of chlamydial infections as facilities for the isolation of *C trachomatis* are rather limited. Several epidemiological surveys have indicated that chlamydial genital tract infections may be as common as or more common than those occurring in developed countries.^{2,3} This paper describes the extent of exposure to chlamydial organisms among some sections of the Malaysian community.

Methods

The study population was predominantly urban Chinese (86%) from the capital city of Kuala Lumpur and the adjacent town of Petaling Jaya and included the following: (a) 251 male and 234 female patients of all ages with no overt signs and symptoms of genital tract infection; (b) 101 women attending antenatal clinics; (c) 46 infants under 6 months old who were screened for congenital defects and intrauterine or perinatal infections; (d) 108 prostitutes including 11 homosexual men; and (e) 54 men attending a private sexually transmitted disease (STD) clinic, all of whom gave a history of extra-marital sex, mainly with prostitutes.

Blood was collected by venepuncture and all sera were kept at -20°C before being tested. Sera were tested for the presence of chlamydial

antibody by the indirect fluorescent antibody staining technique using the Chlamydia-Spot IF Kit (BioMérieux, France) which uses an inactivated, egg-grown *C trachomatis* serotype L2 as the antigen and fluorescein isothiocyanate (FITC) labelled anti-human globulin conjugate. Test procedures were carried out according to the manufacturer's instructions. Infant sera were also tested for the presence of specific IgM antibody using a FITC-labelled anti-human IgM globulin conjugate. Serum dilutions used for screening were 1/16 for male patients, 1/64 for female patients and neonates of both sexes, and 1/8 for the chlamydial IgM test. Positive sera were not titrated out further. Control positive and negative serum samples were included with each run.

Results

A total of 794 serum samples collected over a period of one year from August 1988 to July 1989 were tested, of which 361 (45.5%) were regarded as positive. Age specific rates of antibody titre are shown in the table. For both sexes, with the exception of adolescents, there was a general increase in antibody prevalence with age, from 10-16% among children under 10 years, to >70% among adults over 50 years. Seropositivity in men seemed to reach a plateau after 30 years of age, but for women, there was an unexplained sharp increase in antibody prevalence after 50 years of age. The influence of sexual activity was obvious as prostitutes and their clients showed significantly higher antibody prevalence than the non-STD population studied ($p < 0.01$). Pregnant women often had higher titres of antibody than their age matched controls. Young women (11-20 years) consistently showed higher seropositivity than older women whether they were students, antenatal mothers, or prostitutes.

Among 46 infants (newborn to 6 months old), 18 (39%) were positive for IgG and six (13%) were positive for IgM. The IgG prevalence among infants was similar to that among antenatal women and probably reflected transplacental transfer of immunoglobulins. Of the six sera positive for IgM, however, five were from neonates less than 2 weeks old, suggesting intrauterine infection.

Discussion

The microimmunofluorescence test developed by Wang and Grayston for immunotyping *C trachomatis* has been widely applied for sero-epidemiological surveys.⁴ The original method uses all 15 immunotypes as antigen to show a

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Table Distribution of chlamydial antibodies by age group

No tested (% positive)	Age (years)						Total
	0-10*	11-20	21-30	31-40	41-50	> 50	
Males	37 (16.2)	66 (28.8)	44 (36.4)	37 (62.2)	31 (61.3)	36 (72.2)	251 (43.4)
Females (non-pregnant)	30 (10)	43 (25.6)	40 (7.5)	48 (14.6)	34 (24.2)	39 (66.7)	234 (24.8)
Females attending antenatal clinic		12 (50)	56 (32.1)	33 (33.3)			101 (34.7)
Prostitutes		22 (95.5)	63 (92.1)	17 (100)	6 (100)		108 (94.4)
Males attending STD clinic							
No tested (% positive)		21 (71.4)	20 (60.0)	8 (87.5)	3 (100)	2 (100)	54 (72.2)

*Excludes infants under 6 months of age.

A positive titre for men is $\geq 1/16$; a positive titre for women is $\geq 1/64$.

serotype specific antibody response to *C trachomatis* infection. Subsequently, micro-immunofluorescence crossreactions were found between *C trachomatis* and *C psittaci*⁵ and between *C trachomatis* and *C IOL-207*⁶ which had been shown to be antigenically related to the new chlamydia organism, *C TWAR*.⁷ With wider use of the micro-immunofluorescence test, it soon became clear that antibodies of broad specificity often exist in patients' sera and that the microimmunofluorescence test can probably detect both group specific as well as type specific antibodies.⁸ This made it possible and more convenient to use a single broadly reacting antigen to screen for chlamydial antibody. Indeed, it has been shown that single antigen immunofluorescence tests can be as sensitive as the microimmunofluorescence test, although they are slightly inferior in specificity.⁹

In this study the antigen used in our indirect immunofluorescence test was LGV 2 which belongs to the BEDL group of related strains responsible for most genital chlamydial infections in Europe. The antibodies we detected probably reflected the prevalence of both sexually transmitted and non-sexually transmitted chlamydial infections in our population.

Our findings showed many similarities with seroepidemiological data from Western industrialised countries. As reported in the United States,¹⁰ we found antibody prevalence to be correlated with age and sexual activity. Like Mardh¹¹ and Brunham,¹² our results suggested that female adolescents were more susceptible to chlamydial infection than older women whether they were pregnant or not. There were also indications that pregnancy itself might be a risk factor for chlamydial infection, possibly as a result of hormonal changes and the immunosuppression that occurs during pregnancy.

Using a screening dilution of 1/8, Schachter found a 20-25% antibody prevalence among asymptomatic, sexually active adult men in San Francisco.¹³ Using a higher screening dilution of 1/16, we obtained an even higher antibody prevalence of 36.4 to 62.2% among men aged 21 to 40 years. Antibodies to *C trachomatis* have been reported to occur more often and in higher titres in women than in men.¹⁴ From studies correlating antibody titres with isolation rates, it has been suggested that a titre of 1/64 in women with cervicitis may indicate current chlamydial infection.¹⁵ Hence we screened our women at a 1/64 serum dilution for possible clinical infection but found that even at this

higher titre, seropositivity was common among totally asymptomatic women.

Among people who are not sexually active chlamydial infection is fairly common: seropositivity rates of >20% have been reported for celibate nuns, women with no history of sexual intercourse, and prepubertal children with no evidence of sexual abuse.¹⁶ Grayston found a seroconversion rate of 2-3% among young children in Seattle, United States of America.¹ Chlamydial antibodies in these populations could be the result of extragenital infections of *C trachomatis* which has been potentially associated with pharyngitis, otitis media, pneumonia,¹⁷ endocarditis,¹⁸ and meningoencephalitis.¹⁹ The mode of transmission in these infections is not yet clear. A small proportion of antibodies detected by immunofluorescence could also be caused by *C psittaci* or *C TWAR* infections. The former is an established respiratory tract pathogen; the latter has been increasingly recognised as a cause of acute respiratory infections.²⁰ Malaysia is not known to be endemic for trachoma, but acute respiratory infections are very common. In this study 50% of children under 10 years, 30% of adolescent boys, and 40% of adolescent girls had a clinical diagnosis of viral fever. Of the seropositive children and adolescents, 40% and 20%, respectively, were IgM positive for chlamydia. It is reasonable to postulate that a considerable proportion of our acute respiratory infections have a chlamydial aetiology. Another possible explanation for the seropositivity among children with febrile illness is that the febrile illness could have reactivated a latent chlamydial infection acquired perinatally.

Perinatal infection is common among infants born to infected mothers, but the role of *C trachomatis* in intrauterine infection is less well established. Although five of our neonates under 2 weeks old were chlamydial IgM positive, suggesting intrauterine infection, it must be borne in mind that an indirect immunofluorescence test can detect fetal IgM produced against maternal IgG and not against *C trachomatis*.²¹

In conclusion, our data indicate that chlamydial infection is widespread among Malaysians and support our clinical impression that chlamydial genital infection is common among sexually active adults. The high antibody prevalence among pregnant women suggests a need to consider antenatal screening for chlamydial genital infection and follow up of

exposed infants for consequences of perinatal infection. Our management of acute respiratory infections should perhaps also include investigation for a chlamydial aetiology.

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