Chlamydia trachomatis and rubella antibodies in women with full-term deliveries and women with abortion in Baghdad

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أضداد الـمُتَدَثِّرات الـحَثَرية والحصبة الألمانية لدى نسوة أتممن حملهن وأخريات عانين من الإجهاض في بغداد

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الخلاصة: قاست الباحثات الانتشار المصلي للأضداد من الغلوبلينات المناعية G لكل من الـمُتَدَثِّرات الحثرية والحصبة الألمانية لدى نسوة أتممن حملهن (وعددهن 198)، وأخريات عانين من الإجهاض (وعددهن 79)، في إحدى مستشفيات بغداد في العراق. ووجدت الباحثات عيارات إيجابية لأضداد الحصبة الألمانية لدى 42.9٪ من الأمهات اللاتي أتممن حملهن، ولدى 34٪ من اللاتي عانين من الإجهاض. كما لوحظت العدوى بالـمُتَدَثِّرات الـحَثَرية لدى 13.6٪ ممن أتممن حملهن، ولدى 6.4٪ ممن أجهضن، مع وجود فرق يعتد به إحصائياً بين المستويات الوسطية للأضداد لدى المجموعتين. وهناك حاجة للتحرِّي الروتيني عن الـمُتَدَثِّرات الـحَثَرية والحصبة الألمانية لدى الحوامل في العراق.

ABSTRACT The seroprevalences of *Chlamydia trachomatis* and rubella IgG antibodies were measured in women with full-term deliveries (*n* = 198) and with abortion (*n* = 79) in a hospital in Baghdad city, Iraq. Positive rubella antibody titres were found in 42.9% of mothers with full-term deliveries and 34.2% with abortion. *C. trachomatis* infection was found in 13.6% of mothers with full-term deliveries and 6.4% with abortion, with a significant difference in mean antibody levels between the 2 groups. Routine screening for *C. trachomatis* and rubella is needed for pregnant women in Iraq.

Anticorps anti-Chlamydia trachomatis et antirubéoleux chez la femme ayant accouché à terme ou ayant avorté à Bagdad

RÉSUMÉ La séroprévalence des anticorps anti-*Chlamydia trachomatis* et antirubéoleux de type IgG a été mesurée chez des femmes ayant accouché à terme (*n* = 198) et ayant avorté (*n* = 79) dans un hôpital de Bagdad (Iraq). Des taux d'anticorps positifs pour la rubéole ont été obtenus chez 42,9 % des mères ayant accouché à terme et chez 34,2 % de celles qui avaient avorté. Une infection à *C. trachomatis* a été détectée chez 13,6 % des mères ayant accouché à terme et chez 6,4 % de celles qui avaient avorté, avec une différence significative des taux moyens d'anticorps entre les deux groupes. Le dépistage systématique de l'infection à *C. trachomatis* et de la rubéole chez les femmes enceintes en Iraq est nécessaire.

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Introduction

Two infectious diseases have important implications for the reproductive health of pregnant women: *Chlamydia trachomatis* and rubella. The Centers for Disease Control and Prevention estimate that 3 million people are infected annually with *C. trachomatis*, with 75% of infected women having few or no recognized symptoms [*1*].

Prenatal consequences of *C. trachomatis* infection for mothers and newborns include ectopic pregnancy, spontaneous abortion, preterm labour, ammionitis, premature rupture of membranes, low birth weight, prematurity, stillbirth and neonatal death [*2*]. Maternal–infant transfer of this disease occurs in approximately 23%–70% of infants born to infected mothers [*3*]. Inclusion conjunctivitis occurs in 11%–44% of newborns of untreated mothers, and pneumonia in 11%–20% of cases [*4*]. Testing for *C. trachomatis* is desirable for detecting and subsequently treating the infection in pregnant women and for reducing the associated morbidity [*5*].

Rubella infection is generally an asymptomatic childhood disease but during the first trimester of pregnancy it can cause fetal death or severe congenital defects [congenital rubella syndrome (CRS)] [*6,7*]. One published report on a series of mothers who acquired rubella during pregnancy showed that 4% suffered spontaneous abortion and another 2% had stillbirth [*8*].

In Iraq, rubella vaccination was adopted into the measles/mumps vaccine for children and routine vaccination for schoolgirls, but there is no vaccination programme for adult women or serological testing for rubella antibodies in pregnant women. Furthermore, vaccination programmes that were previously running regularly in Iraq have been disrupted by the continuing political instability in the country.

According to the Advisory Committee on Immunization Practices, nearly 50% of cases of CRS can be prevented by ensuring the vaccination of mothers [*9*]. Therefore it is important to establish the presence of antibodies (which indicate prior infection) in all women of reproductive age before pregnancy [*10*].

This study in Iraq was carried out to determine the frequency of *C. trachomatis* and rubella antibodies (IgG) among samples of women with full-term deliveries and women with abortion.

Methods

A cross-sectional study was conducted at the Al-Kadhimya Teaching Hospital, Baghdad in 2 groups of women: one group included 198 mothers with full-term deliveries (32 with caesarean section and 166 with vaginal delivery) and the other group included 79 women with abortion (60 in the 1st trimester and 18 in the 2nd trimester). The women recruited were a convenience sample during the work duties of the researcher in the period December 2004 to July 2005. Data were obtained from the 2 groups through a structured questionnaire.

Blood samples were obtained from the 2 groups to measure *C. trachomatis* and rubella-specific IgG antibody levels via a micro-enzyme-linked immunosorbent assay technique following World Health Organization standard methods [*11*]. Standardization procedures were carried out for the rubella and chlamydia antigens (Institute Virion Ltd), antihuman IgG Fab-specific peroxidase conjugate (Sigma) and antisera. The dilutions were found to be 1:10, 1:500 and 1:2 respectively. The tests were carried out in the Medical College, Al-Nahrain University, under the supervision of the Department of Microbiology.

Sample values below the cut-off value [(mean +2 standard deviations (SD)] were considered negative and those that were equal to or greater than the cut-off value were considered positive. For rubella, because we did not have the reference standard to express the results in international units, the antibody levels were divided into the following groups according to absolute optical density (OD) values based on the manufacturer's recommendations: < 1.00 (weak positive); 1.00–1.99 (positive); ≥ 2.00 (strong positive). The *C. trachomatis* antibody levels were divided into the following OD groups: < 0.91 (negative); 0.91–1.09 (equivocal); > 1.09 (positive) [*12*].

Data analysis was done using *SPSS*, version 11.0 and *t*-tests and correlations were used as test of significance. A *P* value ≤ 0.05 was considered significant.

Results

We found that 13.7% of women with full-term deliveries and 6.4% of women with abortion had *C. trachomatis* antibodies > 1.09 OD. Rubella antibody levels showed a higher percentage of mothers with antibody level > 1.00 OD in women with full-term deliveries than those women with abortion (42.9% and 34.2% respectively), while 57.1% of women with full-term deliveries and 65.8% of women with abortion had weak-positive antibody (IgG) levels (Table 1).

There was a significant difference in *Chlamydia* antibody titres between the 2 groups: mean antibody titres were 0.93 (SD 0.78) OD in normal women versus 1.31 (SD 0.48) OD in women with abortion. There was no significant difference, however, for rubella antibody levels (Table 2).

There were 6 women with full-term deliveries and 3 with abortion who reported having rubella infection, while only 32.8% of women with full-term deliveries and 43.0% of women with abortion reported that they had received rubella vaccination (Table 3).

Discussion

C. trachomatis infection rates reported in pregnant women in the United States of America (USA) and Canada vary from 5% to 20% [*4*]. The present study showed that the infection rate was 13.7% among women with full-term deliveries. The increasing

Table 1 **Distribution of *Chlamydia trachomatis* and rubella antibodies among women with full-term deliveries and women with abortion**

Variable	Women with full-term deliveries (*n* = 198)		Women with abortion (*n* = 79)	
	No.	%	No.	%
C. trachomatis antibody levels[a]				
< 0.91	146	73.7	22	27.8
0.91–1.09	25	12.6	52	65.8
> 1.09	27	13.7	5	6.4
Rubella antibody levels[a]				
< 1.00	113	57.1	52	65.8
1.00–1.99	50	25.3	16	20.3
> 2.00	35	17.6	11	13.9

[a]*Absolute optical density values.*

Table 2 **Comparison between level of *Chlamydia trachomatis* and rubella antibodies among women with full-term deliveries and women with abortion**

Variable	Antibody levels[a]						Significance
	Women with full-term deliveries (*n* = 198)			Women with abortion (*n* = 79)			
	Mean	SD	Range	Mean	SD	Range	
Chlamydia	0.93	0.78	0.00–3.10	1.31	0.48	0.24–2.59	$t = 2.8$; $P < 0.05$
Rubella	1.19	0.80	0.05–3.10	1.02	0.84	0.20–3.00	$t = 1.15$; $P > 0.05$

[a]*Absolute optical density values.*
SD = standard deviation.

incidence of *C. trachomatis* infection in the community has been well documented along with an increase in cases of neonatal Chlamydia [*12,13*].

In the present study rubella antibodies were positive in only 42.9% of women with full-term deliveries and 34.2% of women with abortion, while they were weakly positive in 57.1% of women with full-term deliveries and 65.8% of women with abortion. These rates are much higher than in a study by Turgut et al. in Turkey, who found that 17.2% of pregnant women were seronegative [*6*]. Our results are striking and might indicate improper vaccination or lack of vaccination (only 32.8% of normal women and 43.0% of women with abortion reported a positive vaccination history).

The test used in this study was implemented as a screening test to detect past exposure and no further action was taken for those who tested positive for anti-*Chlamydia* antibodies and for women who had weak or negative anti-rubella antibodies. Further studies are needed to clarify the problem of *C. trachomatis* infection among adult females and the situation of rubella immunity in our country.

These findings also highlight the need to instigate routine antibody testing for *C. trachomatis* in pregnancy, and the need for rubella screening for pregnant women at their first prenatal visit, with standing orders for rubella vaccination after delivery together with reinforcement of the rubella vaccination programme.

Table 3 **Past exposure to rubella virus (history of rubella infection or vaccination) among women with full-term deliveries and women with abortion**

Variable	Women with full-term deliveries (*n* = 198)		Women with abortion (*n* = 79)	
	No.	%	No.	%
Previous rubella infection				
Yes	6	3.0	3	3.8
No	192	97.0	76	96.2
Previous rubella vaccination				
Yes	65	32.8	34	43.0
No	133	67.2	45	57.0

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