

# Serological Detection of *Chlamydia trachomatis* among Infertile Women in Basra

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**ABSTRACT-** *Chlamydia trachomatis* is a gram negative obligate intracellular bacteria, it is the common cause of bacterial sexually transmitted disease in the world. More than 85% of women with urogenital Chlamydial infections do not manifest obvious symptoms, the consequences of such untreated infections include pelvic inflammatory disease, infertility and ectopic pregnancy. Serum was collected from two hundred infertile women which have a history of primary and secondary infertility attending the infertility center in Basra maternity and child hospital for molecular detection of *C. trachomatis* IgM and IgG antibodies by ELISA. Out of 200 infertile women 22(11%) was positive for *Chlamydia* IgM Ab and 11(5.5%) for IgG Ab. The highest level of both Ab were found at the age group 21-30. Screening of infertile women for *C. trachomatis* is recommended in the first year of infertility so that early therapeutic can be instituted to allow women to conceive naturally.

**KEY WORDS-** *Chlamydia trachomatis*, Polymerase chain reaction, Serology, Infertile women.

## 1. INTRODUCTION

*Chlamydia* are a gram negative, non-motile obligate intracellular pathogen [1], pleomorphic, about 0.2-1.5  $\mu\text{m}$  in length [2]. *Chlamydia trachomatis* is the common treatable cause of bacterial sexually transmitted infections in both men and women [3]. There is about 92 million cases of new Chlamydial infections are reported worldwide [2].

More than two-thirds of these infections are found in the development countries, where diagnostic and treatment facilities are not existent [4]. In females, *C. trachomatis* cause cervicitis, urethritis, endometriosis and pelvic inflammatory disease that lead to complications such as ectopic pregnancy and tubal factor infertility [5]. Most infections with *Chlamydia trachomatis* remains undetectable (70-80 %), because these cases are asymptomatic [6]. Tubal damage is an important cause of infertility, and is now recognized that *C. trachomatis* infection is the most common cause of tubal peritoneal damage [7]. The immunological damages to fallopian tubes from *C. trachomatis* are more severe than the damages introduced by other bacterial species [1]. The risk of tubal infertility increased from 11% after one episode of PID to 23% and 54% after two and three episodes [8]. Previous and chronic infections can be determined by the determination of *C. trachomatis* antibodies, so Immunoglobuline (IgG) antibodies are markers of previous *C. trachomatis* infection and can persist for years, while IgM antibodies are markers of chronic infection [8]. The delay in the diagnosis of Chlamydial infection as it is asymptomatic that may cause harmful effects but the early detection and treatment can minimize complication in patients [9]. Damage to fallopian tubes are not

caused by *Chlamydia trachomatis* but by the immune response to the organism. Women with tubal infertility have prevalence of *Chlamydia trachomatis* antibodies higher than infertile women without tubal damage [10]. *Chlamydia* serology is considered as a screening test that is used for the detection of tubal damage in infertile women [7]. There is an association between the appearance of *Chlamydia trachomatis* antibodies in the serum and tubal pathology, so chlamydial antibody testing has been widely used as a screening test for tubal factor infertility [11].

## 2. MATERIALS AND METHODS

The study population was consisted of 200 infertile women at reproductive age with history of primary and secondary infertility from the infertility center in Basra maternity and child hospital.

5ml of blood samples were collected from all the infertile women included in the study for the laboratory measurement of the serum IgM and IgG antibodies against *C. trachomatis* by using the Nova Tec *C. trachomatis* IgM-ELISA and IgG-ELISA, both kits were used according to the manufacturer's instructions.

### STATISTICAL ANALYSIS

Statistical package for social science (SPSS) version 20 was used to analyze the data. Chi-square ( $X^2$ ) test was used to assess the significance of differences between groups. P-value less than 0.05 was considered as statistically significant.

### 3. RESULTS

Out of 200 infertile women 22 (11%) were positive for IgM Ab and 11(5.5%) for IgG Ab.

**Table 1 Detection of *C. trachomatis* IgM and IgG Ab by ELISA among infertile women according to age groups.**

Serologically IgM Ab, has been detected in 22(11%) of all age groups, 178(89%) were reported negative. Among the age group 21-30 yr, IgM Ab were shown in (11.7%). Antibodies also were detected without any significant differences in (11.1%, 10.7% and 9.1%) in age groups (<20, 31-40, >40) respectively (P>0.05). Out of 200 women, 11(5.5%) were positive for IgG Ab while 189(94.5%) were negative the percentage was higher in the age group 21-30 that was (8.5%), there was no significant differences among age groups (P>0.05).

**Table 1** Detection of anti-Chlamydial IgM and IgG Ab according to age groups

Age groups	IgM *		IgG**		Total
	Positive		Positive		
	N	%	N	%	
<20	1	(11.1)	0	(0)	9
21-30	11	(11.7)	8	(72.7)	94
31-40	7	(31.8)	1	(9.1)	64
>40	3	(31.2)	2	(18.2)	33
<b>Total</b>	<b>22</b>	<b>(11)</b>	<b>11</b>	<b>(5.5)</b>	<b>200</b>

$\chi^2=0.982, P>0.05^*$

$\chi^2=0.252, P>0.05^*$

**Table 2 Detection of IgM Ab among infertile women according to type of infertility and tubal blockage.**

The percentage of IgM antibodies in primary infertile women (Table2) with blocked tubes was (18.8%) and in secondary infertile women was (11.1%), without any significant differences (p>0.05). The percentage of IgM Ab in primary

infertile women with patent tubes was (10.3%), while there was no Ab in secondary infertile women with patent tubes. There were significant differences between primary and secondary infertile women with patent tubes (p<0.05).

**Table 2** Detection of anti- Chlamydial IgM Ab among infertile women according to type of infertility and tubal blockage

Tubal blockage	Type of infertility	IgM				Total
		Positive		Negative		
		N	%	N	%	
<b>Blocked*</b>	<b>Primary</b>	<b>9</b>	<b>(18.8)</b>	<b>39</b>	<b>(81.2)</b>	<b>48</b>
	<b>Secondary</b>	<b>1</b>	<b>(11.1)</b>	<b>8</b>	<b>(88.7)</b>	<b>9</b>
<b>Patent**</b>	<b>Primary</b>	<b>12</b>	<b>(10.3)</b>	<b>104</b>	<b>(89.7)</b>	<b>116</b>
	<b>Secondary</b>	<b>0</b>	<b>(0)</b>	<b>27</b>	<b>(100)</b>	<b>27</b>
<b>Total</b>		<b>22</b>	<b>(11)</b>	<b>178</b>	<b>(89)</b>	<b>200</b>

$\chi^2=0.58, df=1, p>0.05^*$

Fishers exact test\*=0.501

$\chi^2=0.081, df=1, p<0.05^{**}$

Fishers exact test\*\*=0.072

**Table 3 Detection of IgG Ab among infertile women according to type of infertility and tubal blockage.**

The percentage of IgG Ab in primary infertile women with blocked tubes (Table 3) was (6.2%) while there was no Ab in secondary infertile women with blocked tubes, without any significant differences p>0.05. Also the percentage of IgG Ab in primary infertile women with patent tubes was (6%) and in secondary infertile women with patent tubes was (3.7%) (p>0.05).

**Table 3** Detection of anti-Chlamydial IgG antibody among infertile women according to type of infertility and tubal blockage

Tubal blockage	Type of infertility	IgG				Total
		Positive		Negative		
		N	%	N	%	
Blocked*	Primary	3	(6.2)	45	(93.8)	48
	Secondary	0	(0)	9	(100)	9
Patent**	Primary	7	(6)	109	(94)	116
	Secondary	1	(3.7)	26	(96.3)	27
Total		11	(5.5)	189	(94.5)	200

$\chi^2=0.441, p>0.05^*$  Fishers exact test\*=0.591

$\chi^2=0.635, p>0.05^{**}$  Fishers exact test\*\*=0.533

#### 4. DISCUSSION

The *Chlamydia trachomatis* is one of the most important cause of sexually transmitted diseases [12]. *C. trachomatis* infections in women varies from asymptomatic infections to ascending infections that leads to pelvic inflammatory disease associated with late ectopic pregnancy and tubal infertility [13].

This study was performed to determine the prevalence of *C. trachomatis* in infertile women attending the infertility center in Basra maternity and child hospital by serological techniques. Understanding the major effect of *C. trachomatis* in a population is based on studying the prevalence of current and past infection using the sensitive and specific techniques.

The overall seropositivity of IgG and IgM *Chlamydia* antibodies was 5.5% and 11% respectively. Infection with *Chlamydia trachomatis* results in the formation of antibodies detectable in sera, so *Chlamydia* serology can be used as a screening test for tubal damage in infertile women [14]. *Chlamydia* IgG antibody persist for years and is considered as a marker of previous *C. trachomatis* infection [15]. The *Chlamydia* IgG antibody test was introduced as a simple screening test for the risk of pathological tubal conditions, so there are many studies that demonstrated the relationship between tubal damage and antibody titer, so *C. trachomatis* IgG antibody titer can serve as a non-invasive simple screening test for previous *Chlamydia* infection and suspected tubal block [7]. The highest percentage of IgM antibodies was found in the age group 21-30 years (11.7%) (Table1), this result agree with results obtained by Surana et al., [16] they indicate that Chlamydia

genital infections are more prevalent in the age 20-30. The highest percentage of IgG antibodies were found in the age group 21-30 yrs that shows (72.7%) (Table1), this results agree with Malik et al., [17] that found the highest percentage of IgG antibodies in the age group 20-30. The level of infection is high in young women because that young groups are more sexually active than elders which have the role to evaluate the chance of spread of bacteria.

In this study the highest percentage of IgM Ab was found in primary infertile women with blocked tubes (18.8%) and in the secondary infertile women with blocked tubes (11.1%). The percentage of IgM Ab in primary infertile women with patent tubes was (10.3%) and no secondary infertile women with patent tubes were recorded (Table 2).

The percentage of IgG Ab was higher in primary infertile women with patent tubes (6%) (Table3) this disagree with the study performed by Akande et al.,[7] they reported that the antibody titer in women with tubal blockage were higher than women without tubal blockage. Negative *Chlamydia* serology does not preclude the diagnosis of tubal damage and high titers do not necessarily indicate the presence of tubal damage [7]. False negative results may appear due to that immune-mediated reaction responsible for adhesions or tubal occlusion may not have occurred in these women for unknown reasons [18]. Because most of *C. trachomatis* cases are silent [19], so laboratory diagnosis for early detection of this bacteria especially in females is so important and its treatment will help in positive pregnancy outcomes. The percentage of infertile women with IgM Ab were higher than the percentage of IgG Ab.

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