Original Article

Seroprevalence of anti- *chlamydia trachomatis* IgG and IgM antibodies Among Pregnant women in Diyala province

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Summary:

Background: *Chlamydia trachomatis* infections are the most prevalent bacterial sexually transmitted infections (STI) recognized throughout the world. Screening programs for C. trachomatis is of paramount importance in the prevention of long-term sequelae.

Objectives: To investigate the anti-chlamydia IgG and IgM seropositivity of healthy pregnant women in Baquba-Diyala province.

Subjects and methods: A total of 91 normal healthy women were included in this study, which was conducted for the period from 1st. November/ 2011 to 1st. March 2012. They were chosen by simple random selection from Al-Batool Teaching Hospital for maternity and children, and some health care centers in Baquba city. The age range was 17-42 years. 49 (53.8%) and 42 (46.1%) were from rural and urban areas respectively. 77 (84.6%) of women with no previous abortion, and 14 (15.3%) with one or more abortions. 15 (16.5%) with no previous deliveries, and 76 (83.5%) had a number of children ranging from 1 to 7. The anti-*chlamydia* IgG and anti-*chlamydia* IgM antibodies were detected using ELISA technique. Statistical analysis was performed using SPSS version -15, and P - value of < 0.05 was considered significance.

Results: The results revealed that the rate of anti-*chlamydia* IgG antibody among pregnant women was 5(5.5%), and 3 (3.3%) women were positive for anti-*chlamydia* IgM antibody. All anti-chlamydia IgM and the majority of anti-*chlamydia* IgG antibody positive women were belong to the age group 20-29 years. The anti-*chlamydia* IgM and IgG positivity rate has no association with residency, number of children, number of previous abortions, and the duration of pregnancy.

Conclusion: The rate of *Chlamydia trachomatis* infection among healthy pregnant women in diyala province was low.

Keywords: C. trachomatis, anti-chlamydial IgG, anti-chlamydial IgM.

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Introduction:

Chlamydia trachomatis infections are the most prevalent bacterial sexually transmitted infections (STI) recognized throughout the world. Worldwide, the magnitude of morbidity associated with sexually transmitted chlamydial infections is enormous [1]. Based on the available evidence, approximately 20% of women with chlamydial lower genital tract infection develop pelvic inflammatory disease (PID), 4% develop chronic pelvic pain, 3% infertility, and 2% adverse pregnancy outcome [2]. Over 50% of chlamydia infections in women are asymptomatic and progress to silent PID and infertility [3].

Screening programs for *Chlamydia trachomatis* is of paramount importance in the prevention of long-term sequelae. The diagnosis can be based either on direct detection of the organism or its components or indirectly by measuring antibodies as markers of the individual's response to the infection [4,5]. Several studies have agreed that ELISA technique were preferred for detection of anti-*Chlamydia trachomatis* IgG and IgM antibodies [6,7]. Furthermore, it has been reported that the presence of specific IgA antibodies may serve as a diagnostic tool for monitoring of active chlamydial infection, while IgG levels remained for longer period [8].

Al-Hindi et al. (2010) [9] reported that 12.8% of Palestinian women attended in vitro fertilization center complaining from infertility and abortion were positive for anti-chlamydia IgM antibodies, suggesting that *Chlamydia trachomatis* is still constitute a public health problem among pregnant women. In Saudi pregnant women *Chlamydia trachomatis* IgG antibodies were detected in 8.7% and IgM antibody was found in 1.5% of different age groups [10]. Sharma et al. (2002)[11] reported that antichlamydial IgG antibodies were present in 68% of women with infertility, 50% of women with bad obstetric history and 10% in healthy pregnant women. In another study, 85 (57.4%) pregnant women were found to be positive for IgM antibodies to *Chlamydia trachomatis*, and the maximum seroprevalence was found among those in the first trimester of pregnancy, Multigravidae and multifarious pregnant women [12]. Olliaro et al. (1994)[13] reported that IgG antibody was detected in 37.4% of healthy pregnant women, compared to 46% of non-

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pregnant women, and IgG levels did not vary with increasing age among the pregnant women, but rose significantly with age in non-pregnant women. Anti-*Chlamydia trachomatis* IgG antibody was found in 13.6 of mothers with full-term deliveries and 6.4 with abortion, recommending a routine screening for pregnant Iraqi women [14].

Subjects and methods:

A total of 91 normal healthy women were included in this study, which was conducted for the period from 1st. November/ 2011 to 1st. March 2012. They were chosen by simple random selection from Al-Batool Teaching Hospital for maternity and children, outpatient clinic of Baquba teaching hospital and some health care centers in Baquba city (Al-Saraie, Al-Tahrer, Buhriz, and Al-Takia). The age range was 17-42 years. 49 (53.8%) and 42 (46.1%) were from rural and urban areas respectively. 77 (84.6%) of women with no previous abortion, and 14 (15.3%) with one or more abortions. 15 (16.5 %) with no previous deliveries, and 76 (83.5 %) had a number of children ranging from 1 to 7. The anti-*chlamydia* IgG and anti-*chlamydia* IgM antibodies were detected by ELISA technique (Nova Tec Immunodiagnostica GmbH- Germany). Data were statistically analyzed.

Results:

The results revealed that the rate of anti-chlamydia IgG antibodies among pregnant women was 5(5.5%), while 86(94.5%) were negative. Additionally, 3 (3.3%) women were positive for anti-chlamydia IgM antibodies, while 88 (96.7%) were negative. All anti-chlamydia IgM and the majority of anti-chlamydia IgG antibody positive women were belong to the age group 20-29 years. The statistical analysis showed no significant differences in both cases, table (1).

Table (1): Anti-chlamydia IgM and IgG antibodies according to the age.

Age group (ys)	IgM		Total (%)	IgG		Total (%)
	Negative (%)	Positive (%)		Negative (%)	Positive (%)	
➢ 20	8 (8.8)	0	8 (8.8)	8 (8.8)	0	8 (8.8)
20-29	47 (51.6)	3 (3.3)	50 (54.9)	46 (50.5)	4 (4.4)	50 (54.9)
30-40 +	33 (36.3)	0	33 (36.3)	32 (35.2)	1 (1.1)	33 (36.3)
Total	88 (96.7)	3 (3.3)	91 (100)	86 (94.5)	5 (5.5)	91 (100)
P value	➢ 0.05 [NS]			➢ 0.05 [NS]		

The results also showed that there were no significant differences regarding the distribution of anti-*chlamydia* IgG and IgM positive women according to the area of residency, table (2).

Table (2): Anti-*chlamydia* IgM and IgG antibodies according to the residency.

residency	IgM		Total (%)	IgG		Total (%)
	Negative (%)	Positive (%)		Negative (%)	Positive (%)	
Urban	41 (45.1)	1 (1.1)	42 (46.2)	39 (42.9)	3 (3.3)	42 (46.2)
rural	47 (51.6)	2 (2.2)	49 (53.8)	47 (51.6)	2 (2.2)	49 (53.8)
Total	88 (96.7)	3 (3.3)	91 (100)	86 (94.5)	5 (5.5)	91 (100)
P value	➢ 0.05 [NS]			➢ 0.05 [NS]		

Similarly, there were no significant differences regarding the distribution of anti-*chlamydia* IgG and IgM positive women according to the levels of education, although in both cases, the positive women were belong to the primary and secondary levels of education, table (3).

Table (3): Anti-chlamydia IgM and IgG antibodies according to the levels of education.

Education	IgM		Total (%)	IgG		Total (%)
	Negative (%)	Positive (%)		Negative (%)	Positive (%)	
Illiterate	3 (3.3)	0	3 (3.3)	3 (3.3)	0	3 (3.3)
Primary	33 (36.3)	1 (1.1)	34 (37.4)	31 (34.1)	. (3.3)	34 (37.4)
Intermediate & secondary	41 (45.1)	2 (2.2)	43 (47.3)	41 (45.1)	2 (2.2)	43 (47.5)
Higher	11 (12.1)	0	11 (12.1)	11 (12.1)	0	11 (12.1)
Total	88 (96.7)	3 (3.3)	91 (100)	86 (94.5)	5 (5.5)	91 (100)
P value	➢ 0.05 [NS]			➢ 0.05 [NS]		

Regarding the duration of pregnancy, women were divided into three categories, first trisemester, second trisemester and third trisemester. The results revealed that there were no significant differences among anti-*chlamydia* IgM and IgG positive women according the duration of pregnancy, table (4).

Table (4): Anti-*chlamydia* IgM and IgG antibodies according to the duration of pregnancy.

Duration of pregnancy	IgM		Total (%)	IgG		Total (%)
	Negative (%)	Positive (%)		Negative (%)	Positive (%)	
1st. trisemester	19 (20.9)	1 (1.1)	20 (22.0)	19 (20.9)	1 (1.1)	20 (22.0)
2nd. trisemester	17 (18.7)	2 (2.2)	19 (20.9)	17 (18.7)	2 (2.2)	19 (20.9)
3rd. trisemester	52 (57.1)	0	52 (57.1)	50 (54.9)	2 (2.2)	52 (57.1)
Total	88 (96.7)	3 (3.3)	91 (100)	86 (94.5)	5 (5.5)	91 (100)
P value	➢ 0.05 [NS]			➢ 0.05 [NS]		

The results also revealed that there were no relationship between the number of children and the positivity rate of anti-*chlamydia* IgM and IgG antibodies, table (5).

Table (5): Anti-*chlamydia* IgM and IgG antibodies according to the number of children.

No. children	IgM		Total (%)	IgG		Total (%)
	Negative (%)	Positive (%)		Negative (%)	Positive (%)	
Non	13 (14.3)	2 (2.2)	15 (16.5)	15 (16.5)	0	15 (16.5)
1-3	49 (53.8)	1 (1.1)	50 (54.9)	46 (50.5)	4 (4.4)	50 (54.9)
4-7	26 (28.6)	0	26 (28.6)	25 (27.5)	1 (1.1)	26 (28.6)
Total	88 (96.7)	3 (3.3)	91 (100)	86 (94.5)	5 (5.5)	91 (100)
P value	➢ 0.05 [NS]			➢ 0.05 [NS]		

Furthermore, there was no association between the anti-*chlamydia* IgM and IgG positivity rates and the number of previous abortions, table (6).

Table (6): Anti-*chlamydia* IgM and IgG antibodies according to the number of abortions.

No. abortion	IgM		Total (%)	IgG		Total (%)
	Negative (%)	Positive (%)		Negative (%)	Positive (%)	
Non	75 (82.4)	2 (2.2)	77 (84.6)	74 (81.3)	3 (3.3)	77 (84.6)
1-3	7 (7.7)	1 (1.1)	8 (8.9)	6 (6.6)	2 (2.2)	8 (8.9)
4-5	6 (6.6)	0	6 (6.6)	6 (6.6)	0	6 (6.6)
Total	88(96.7)	3 (3.3)	91 (100)	86 (94.5)	5 (5.5)	91 (100)
P value	➢ 0.05 [NS]			➢ 0.05 [NS]		

Discussion:

Asymptomatic infection with *Chlamydia trachomatis* represents an important health burden to the health care system in both developed and developing countries. One of the priorities of the disease control program is to provide accurate epidemiologic data through seroprevalence studies. Early diagnosis of chlamydial infections is the most cost effective means of preventing the long term sequelae of trachoma, pelvic inflammatory disease, ectopic pregnancy and infertility. In this regard, a non-invasive serological diagnostic test to screen pregnant women is preferable that can be used widely, especially in developing countries.

The present study found that the anti-*Chlamydia trachomatis* IgG antibodies in healthy pregnant women in Diyala province was 5.5%. Upon reviewing the literature different studies had yielded different results; for instance, In Saudi pregnant women *Chlamydia trachomatis* IgG antibodies were detected in 8.7% [10]. In India, antichlamydial IgG antibodies were present in 10% of healthy pregnant women [11]. However, another study in Iraq reported that 13.6 of mothers with full-term deliveries were positive for anti-*Chlamydia trachomatis* IgG antibodies [14]. These discrepancies may be related to the magnitude of morbidity associated with sexually transmitted chlamydial infections, beside the sensitivity and specificity of the screening test employed. Nevertheless, the low seroprevalence rate of *Chlamydia trachomatis* infection obtained in this study may reflect the conservative nature of the society and the rarity of STD in general and *Chlamydia*

trachomatis in particular. Furthermore, the results showed that the seroprevalence of *Chlamydia trachomatis* infection does not significantly influenced by age, residency, levels of education, duration of pregnancy, previous abortion, and parity. These results are consistent with certain studies on one hand [10,13,14], and inconsistent with other on another hand [9,11,12]. These variations in the results may be related to the nature of women enrolled in these studies.

Concerning the anti-*Chlamydia trachomatis* IgM, the current study found that 3.3% of women were positive. Again the IgM seropositivity was differ from one study to another, for example, Rastogi et al.(2002)[12] found that 57.4% of pregnant women were positive for IgM. In Saudi pregnant women *Chlamydia trachomatis* IgM antibody was found in 1.5% of different age groups [10]. Al-Hindi et al. (2010) [9] reported that 12.8% of Palestinian women complaining from infertility and abortion were positive for anti-*Chlamydia* IgM antibodies. It is clearly evident that the anti-*Chlamydia trachomatis* IgM seropositivity depend on the prevalence of *Chlamydia trachomatis* infection in the community and factors that promote STIs, and this in turn explain the low *Chlamydia trachomatis* infection in the present study. Furthermore, supporting this notion, the present study found that none of the demographic factors including age, residence, educational levels, previous abortion, parity, and duration of pregnancy has significant influence on the IgM positivity rate. Since the international surveys and experience indicate that the proportion of the population threatened by *Chlamydia trachomatis* is above 10% [15]. The overall rate of *Chlamydia trachomatis* infection in this low-risk pregnant woman was 3.3%. The data from the different studies ranged between 1.6% and 9.7% [4]. The chlamydia-infected pregnant women in Diyala province is below the critical 10%. In conclusion, the rate of C.trachmatis infection among health pregnant women in Diyala is very low, and further studies on the infection in risky women are recommended.

Author contribution:

Asmaa Haseeb Hwaid , Abul-Razak SH. Hasan and Abbas A. Al-Duliami: Variable, Study concept, Design, Acquisition of data analysis, Interpretation of data, Drafting of manuscript, Critical revision

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