

## Seroprevalence study of IgG and IgM Antibodies to Toxoplasma, Rubella, Cytomegalovirus, Chlamydia trachomatis and Herpes simplex II in Pregnancy women in Babylon Province

Ali H. M. Al-Marzoqi<sup>1\*</sup> Raad A. Kadhim<sup>2</sup> Diyar K. F. Al-Janabi<sup>3</sup> Hussein J. Hussein<sup>4</sup> Zahraa M. Al  
Tae<sup>5</sup>

1. Babylon University\College of Science for women PO box 435, Al-Hillah city, Babylon,  
Iraq. Tel: 009647710336121 E-mail: ali\_almarzoqi@yahoo.co.uk
2. Babylon University\College of Science for women
3. Al-Qadisiyah University\College of Science
4. Babylon University\College of Science for women
5. Babylon University\College of Science

\* E-mail of the corresponding author: ali\_almarzoqi@yahoo.co.uk

### Abstract

In this work 180 blood samples was collected from pregnant women in Babylon province, Babylon maternity and children hospital from October/2008 to April/2009. It revealed that TORCH infections was; *Cytomegalovirus* formed (CMV) 57.2% followed by *Toxoplasma gondii* 55.5% *Rubella* 53.9%, *Herpes simplex II* 28.9% and *Chlamydia trachomatis* 24.4%.

Seroprevalence of *Toxoplasma*, *Rubella*, *CMV*, *Chlamydia trachomatis* and *Herpes* IgM Antibodies according to various obstetric losses showed that Abortions happened in all causes with high percentage (Over than 30%) except *Herpes* infections (less than 6%), while congenital anomalies and premature delivery formed high ratio with some different in some cases. Neonatal deaths are very low under 1% except in CMV infections which formed 4.9%.

Distribution of age with type of infection according IgM Antibodies to *Toxoplasma*, *Rubella*, *CMV*, *Chlamydia trachomatis* and *Herpes simplex* revealed that major age group for infection was between <20 to 40 years which formed more than two third of all infection cases.

Residential distribution with type of infection according IgM Antibodies shows that most infection occurred in rural area (over than 50% in all agents) except in *Herpes simplex* infections which formed 82.7% in urban area.

TORCH (*Toxoplasma gondii*, *Rubella*, *Cytomegalovirus* and *Herpes simplex*) infections with incidence of abortion in pregnant women in this study revealed that First trimester was the highest ratio of infection than other two trimesters.

### Introduction

The acronym TORCH [toxoplasmosis, 'other', rubella, cytomegalovirus (CMV), and Herpes simplex (HSV-1 and HSV-2)] was introduced two decades ago to refer to those pathogens causing infection in utero, presenting with similar clinical features. The 'O' in TORCH (other) includes a list of pathogens that grows longer over time, including not only syphilis and varicella (VZV), but also newer pathogens such as human immunodeficiency virus (HIV) and parvovirus B19 [1].

Pregnancy induces a transient immunosuppression, which is thought to increase the vulnerability of pregnant women to viral infections. Since the abrogation of congenital rubella infections by vaccination, cytomegalovirus (CMV), varicella zoster virus (VZV) and parvovirus B19 are the most important viruses to cause clinically significant intrauterine fetal infections.

Viruses of the herpesvirus group, CMV and VZV are potentially teratogenic, whereas parvovirus can cause fatal anemia to the fetus. In case of VZV and parvovirus; the risk of a congenital infection is connected only with a maternal primary infection. Herpes simplex virus (HSV), although extremely rarely the cause of a congenital infection, can infect the newborn during vaginal delivery with poor [2, 3].

The first trimester of pregnancy is an important period often fraught with complications like bleeding and pain, leading to severe apprehension in the mother [4]. Pregnancy loss has been attributed to several factors involved in human reproduction. Genetic and uterine abnormalities, endocrine and immunological dysfunctions, infectious agents, environmental pollutants, psychogenetic factors and endometriosis are most important causes of spontaneous abortion. Spontaneous abortion is a new issue in terms of its social and economic impact.

Today majority of women decide to conceive in their thirties or forties, since they are career-oriented during the age of maximum fecundity [5]. After the age of 30-35 years, potential fertility declines and the rate of spontaneous abortion increases. But on the other hand, teenage pregnancy is a fairly common occurrence in countries like India. Other studies pointed out those pregnant teenagers are at greater risk and require additional care. Stress, pollutants, smoking etc. also increase the risk of miscarriage [6].

### Materials and Methods

In this study 180 blood samples were collected from pregnant women in Babylon province, Babylon maternity and children hospital from October/2008 to April/2009. For detection Rubella, *Toxoplasma gondii* and *Chlamydia trachomatis* IgG and IgM we use Elisa detection kits [Rubella and *Toxoplasma* IgG and IgM, from DRG, Germany]. While Herpes simplex Type II and CMV IgG and IgM we use Elisa detection kits [Herpes Type II and CMV IgG and IgM, from Biocheck, CA, USA].

### Results and Discussion

Table 1 shows the main causative agents that infected pregnant women depending on IgG and IgM titer by ELISA. It revealed that Cytomegalovirus formed (CMV) 57.2% followed by *Toxoplasma gondii* 55.5% Rubella 53.9%, Herpes II 28.9% and *Chlamydia* 24.4% depending on IgM.

These results agreed with other studies, Saudi study revealed *Toxoplasma* IgG antibodies were detected in 35.6%, CMV total IgG antibodies were found in 92.1%, rubella IgG antibodies in 93.3%, HSV-1 IgG antibodies in 90.9%, HSV-2 IgG in 27.1% [7]. Other study confirmed our results IgM seropositivity to *Toxoplasma* was 42.5%, Rubella was 17.5% and CMV was 29.5%. The highest percentage of these antibodies to *Toxoplasma*, Rubella and CMV was in cases of abortions i.e. 71.8%, 59.9% and 61% respectively [8]. Other Turkish study shows Of 1972 pregnant women, seropositivity for anti-*Toxoplasma* IgG antibody was found in 952 (48.3%), while 8 (0.4%) of the subjects tested were positive for the anti-*Toxoplasma* IgM antibody only, and 31 (1.6%) of the subjects tested were positive for anti-*Toxoplasma* IgG+IgM antibodies together. The seropositivities for anti-rubella IgG, IgM and IgG+IgM together were found in 1896 (96.1%), 4 (0.2%) and 35 (1.8%) of the pregnant women, respectively [9]. Other study revealed *Chlamydia trachomatis* is now recognized as the most common sexually transmitted disease organism in the United States. Although the potential for vertical transmission of *C. trachomatis* from pregnant women to their infants is well established, the extent to which infection adversely affects pregnancy and causes perinatal complications remains controversial [10].

*Toxoplasma*, Rubella and CMV are known to cause infection in utero and are often responsible for abortion, still birth, premature delivery and congenital malformation. Detection and timely treatment of such infections can prevent morbidity and mortality of the infants born to such mothers. Abortion according to *Toxoplasma gondii*, Rubella, CMV, *Chlamydia trachomatis* and Herpes was (67%, 45.5%, 55.3%, 36.3% and 5.8% respectively) these results are confirmed by other studies [8] which found (71.8% for *Toxoplasma gondii*, 59.9% for Rubella, CMV 61%). An Ethiopian study revealed that prevalence of chlamydial infection was assessed in 1,846 Ethiopian women attending clinics in Addis Ababa. Sera were tested for type-specific anti-chlamydial antibodies using purified chlamydial antigens [11].

Other obstetric losses like Neonatal death, premature delivery and Congenital Anomalies was nearly agreed with Indian study [12], which found that Neonatal death was below 2% for all causative

describe above, Premature delivery ranged from 25-35% of all pregnant women, Congenital Anomalies was below the 25% except in CMV infection there are no infection.

In table 3, the distribution of age with type of infection according IgM Antibodies to Toxoplasma, Rubella, CMV, Chlamydia and Herpes shows that the main age of infection was from (25-40 years), this results was agreed with Abtihal study, 2007 [13], which found that infection with toxoplasmosis in pregnant women occurred with age range (31-35). Seroprevalence of Toxoplasma gondii, rubella virus, cytomegalovirus, Herpes simplex virus infections (TORCH) and syphilis were determined in order to assess the immune/susceptibility status in Jamaican pregnant women in 1986. The positive rates were 57% (T. gondii), 69% (rubella), 97% (CMV), 91% (HSV), and 4.9% (syphilis), respectively and it occurs in pregnant adults women [14].

Other study for seroprevalence and incidence and fetal transmission of varicella zoster virus (VZV), cytomegalovirus (CMV), herpes simplex virus (HSV) types 1 and 2 and Chlamydia trachomatis revealed that were 96.2% for VZV, 56.3% for CMV, 54.3% for HSV, 46.8% for HSV-1, 9.3% for HSV-2 and 58.6% for parvovirus B19 infections during pregnancy in adult women with age over than 25 years old [15]. In this study, there is highly difference between rural and urban infection, it showed that in rural patients Toxoplasma, Rubella, CMV, Chlamydia and Herpes formed (73%, 58.7%, 66%, 81.8% and 17.3% for urban area respectively) while other studies revealed that area of residence (urban or rural) had no effects [15].

That the rate of Toxoplasma seropositivity in pregnant women by LATEX was highest in first trimester of pregnancy (41.66%) followed by second (35.29%) and third trimester (32.45%) respectively, although statistically there was no significant difference between seropositivity and stage of pregnancy [12].

TORCH (Toxoplasma gondii, Rubella, Cytomegalovirus and Herpes simplex) infections with incidence of abortion in pregnant women in this study revealed that First trimester was the highest ratio of infection than other two trimesters as shown in table 5, in order to establish basic knowledge for future pregnancy care. The incidence of first trimester miscarriage among the teenagers under this study was 14.3%. This is higher to the 5.5% miscarriage rate observed among the teenagers in other parts of India (Bhalerao et al., 1990) [16]. The teenage pregnancy rates reported from various parts of the world ranged from 8 - 14%. The mean age of the miscarriage cases here was 23.8 years, and is found as very close to that of normal pregnant women, which is 23.9 years [17].

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Table.1 Prevalence of IgG and IgM positively abortion cases from 180 patients

IgG and IgM antibodies present		No. of sera positive	%
<i>Toxoplasma gondii</i>	IgG	112	62.2
	IgM	100	55.5
<i>Rubella</i>	IgG	133	73.9
	IgM	97	53.9
<i>CMV</i>	IgG	140	77.8
	IgM	103	57.2
<i>Chlamydia trachomatis</i>	IgG	78	43.3
	IgM	44	24.4
<i>Herpes simplex II</i>	IgG	40	22.2
	IgM	52	28.9
Unknown		19	10.5

Table2: Seroprevalence of Toxoplasma, rubella, CMV, Chlamydia and Herpes IgM Antibodies according to various obstetric losses.

Obstetrical History	No. of IgM positively to Major Pathogens									
	<i>Toxoplasma gondii</i>		<i>Rubella</i>		<i>CMV</i>		<i>Chlamydia trachomatis</i>		<i>Herpes simplex</i>	
	No.	%	No.	%	No.	%	No.	%	No.	%
<b>Abortions</b>	67	67	44	45.5	57	55.3	16	36.3	3	5.8
<b>Neonatal death</b>	2	2	1	1	5	4.9	-	-	1	1.9
<b>Premature delivery</b>	6	6	32	32.9	37	35.9	12	27.4	18	34.6
<b>Congenital Anomalies</b>	25	25	20	20.6	4	3.9	16	36.3	30	57.7
<b>Total</b>	100		97		103		44		52	

Table 3: Distribution of age with type of infection according to IgM Antibodies to Toxoplasma, Rubella, CMV, Chlamydia and Herpes

Age group years	No. of IgM positively to Major Pathogens									
	<i>Toxoplasma gondii</i>		<i>Rubella</i>		<i>CMV</i>		<i>Chlamydia trachomatis</i>		<i>Herpes simplex</i>	
	No.	%	No.	%	No.	%	No.	%	No.	%
<b>&lt;20</b>	31	31	44	45.4	37	35.9	11	25	26	50
<b>21-30</b>	42	42	18	18.6	35	34	23	52.4	20	38.5
<b>31-40</b>	18	18	26	26.8	26	25.3	8	18.1	4	7.7
<b>41-50</b>	8	8	9	9.2	3	2.9	2	4.5	2	3.8
<b>&gt;50</b>	1	1	-	-	2	1.9	-	-	-	-
<b>Total</b>	100		97		103		44		52	

Table 4: Residential Distribution with type of infection according IgM Antibodies to Toxoplasma, Rubella, CMV, Chlamydia and Herpes

Residential Distribution	No. of IgM positively to Major Pathogens									
	<i>Toxoplasma</i>		<i>Rubella</i>		<i>CMV</i>		<i>Chlamydia</i>		<i>Herpes simplex</i>	
	No.	%	No.	%	No.	%	No.	%	No.	%
<b>Rural</b>	73	73	57	58.7	68	66	36	81.8	9	17.3
<b>Urban</b>	27	27	40	41.3	35	34	8	18.2	43	82.7
<b>Total</b>	100		97		103		44		52	

Table 5: Distribution of IgM Antibodies to Toxoplasma, Rubella, CMV, Chlamydia and Herpes seropositivity according to trimester of pregnancy

Trimester of pregnancy	<i>Toxoplasma</i>		<i>Rubella</i>		<i>CMV</i>		<i>Chlamydia</i>		<i>Herpes</i>	
	No.	%	No.	%	No.	%	No.	%	No.	%
<b>First trimester</b>	43	43	51	52.6	44	42.7	30	68.2	9	17.3
<b>Second trimester</b>	22	22	35	36.1	23	22.3	14	31.8	33	63.5
<b>Third trimester</b>	25	25	11	11.3	36	35	-	-	10	19.2
<b>Total</b>	100		97		103		44		52	