

Seroprevalence of *Cytomegalovirus*, *Rubella*, *Herpes Simplex Type II* and *Chlamydia trachomatis* in Pregnant and Abortion Women in Tikrit City

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ABSTRACT

Aim of this study was to assess the Seroprevalence of *Cytomegalovirus* (CMV), *Rubella*, *Herpes simplex II* and *Chlamydia trachomatis* infections among pregnant and abortion women. This study was performed on 210 women who attended the gynecological consultative clinic in Salah El-Din general hospital during November 2021 until the end of march 2022. The sera samples were tested by ELISA assay for detection of specific IgG and IgM antibodies. Overall Seroprevalence was 10%, 5.7%, 3.3%, 1.9% of IgG for CMV, Rubella, *Chlamydia trachomatis* and HSV II respectively while IgM was 3.8%, 2.8%, and 1% for the last two respectively.

Keywords- *Cytomegalovirus*, Rubella, Herpes simplex type II and *Chlamydia trachomatis*, IgG, IGM, Tikrit city.

I. INTRODUCTION

The Cytomegalovirus (CMV), also known as HHV-5, is a linear, double-stranded DNA virus with an icosahedral capsid. It gets its name from the larger cells that are formed during active infections and are distinguished by the presence of foreign material, particularly in the nucleus (Aguayo *et al.*, 2010). Human cytomegalovirus is a common disease that infects more than half of the worldwide people (Pugel and Cekinovi, 2011). The risk of fetal harm increases if the initial infection happens in the first three months of pregnancy (Adler and Marshall, 2007). Congenital infection frequency varies among populations and ranges from 0.2% to 2.5% (Demmler, 1991; Barbi *et al.*, 1998). In addition, the incidence of congenital infections varies depending on how common the illness is overall (Malm and Engman, 2007). The risk of infection during pregnancy is between 0.7 and 1.38 % (Staras *et al.*, 2006).

Rash, low-grade fever, arthralgia, and lymphadenopathy are some of the signs and symptoms

of rubella infection. Without pregnancy, it often presents clinically as a moderate, self-limited illness. CRS may result in miscarriage and severe fetal defects such as cataracts, retinopathy, heart issues, neurological disabilities, and deafness (Dontigny *et al.*, 2008; CDC, 2001; Best JM, 2007). Antiviral treatments are not yet available to treat rubella or stop transmission to unborn children. The elimination of rubella and congenital rubella is believed to be possible with the help of vaccination campaigns.

Throughout the world, infection with the herpes simplex virus type 2 (HSV-2) is a fairly prevalent sexually transmitted infection (STI) (James *et al.*, 2020). It results in painful, recurring, and frequent genital sores associated with genital herpes and genital ulcers disease. Neonatal herpes is a dangerous and occasionally deadly illness that can develop in newborns as a result of its vertical transfer from mother to child, according to studies by Abu-Raddad *et al.*, (2008), Freeman *et al.*, (2006), and Looker *et al.*, (2017), Ahmed *et al.*, (2003), Halioua and Malkin (1999), Mertz *et al.*, (1998), Weiss *et al.*, (2001) and O'Farrell, (1999). HSV-2 has been

related to a 2- to 3-fold increase in HIV transmission and acquisition. This suggests that the two viruses may have a seroprevalence synergy (Abu-Raddad *et al.*, 2008; Looker *et al.*, 2020; Omori *et al.*, 2018).

Genital infections due to *Chlamydia trachomatis* are asymptomatic in approximately 70 % of women and 50 % of men (Harryman *et al.*, 2014). Atypical vaginal discharge, dysuria, and post-coital and intermenstrual bleeding are symptoms of uncomplicated chlamydial infection in women. Cervical friability and discharge are common clinical signs on speculum examination. Symptomatic men typically have urethral discharge and dysuria, which is sometimes accompanied by testicular pain. Most genital infections resolve spontaneously with no sequelae if left untreated, but they can cause severe complications, particularly in young women. Infection can spread to the upper reproductive tract, causing salpingitis and tubal factor infertility in women (Haggerty *et al.*, 2010). and epididymitis in men (Bébéar and de Barbeyrac, 2009). Repeated infection may increase the risk of complications.

II. AIM OF THE STUDY

To determination of the Seroprevalence of cytomegalovirus, Rubella, Herpes simplex II and *Chlamydia trachomatis* in pregnant and abortion women in Tikrit city.

III. STATISTICAL ANALYSIS

The results were analyzed statistically by applying the statistical program using the Chi-square test (minitab version17) with a probability level of $p > 0.01$ and > 0.05 .

IV. MATERIALS AND METHODS

In the Salah al-din administration, this survey was conducted between November 2021 to march 2022. 210 pregnant patients in all, ranging in age from 15 to 45 years, were a part of this study. These patients were completed a standardized questionnaire that contained personal data and were registered. Name, home address, age, and the number of abortions are all included in the registration. Each patient had 5ml of venous blood samples obtained for the purpose of serum analysis. IgG and IGM antibody were measured using the enzyme-linked immunosorbent assay (bioactiva, Germany).

V. RESULTS

29(13.8%), 18(8.5%), 6(2.8%) and 9(4.2%) respectively. out of 210 were confirmed to have cytomegalovirus, rubella herpes simplex type 2 and chlamydia trachomatis. the result showed that lower in the presence of HSV II IgG and IgM antibodies than all pathogenesis (1.9%) (1%) respectively. as in table (1).

Age group year	No. of IgG positively to MajorPathogens							
	CMV		Rubella		Herpes simplex II		chlamydia	
	No.	%	No	%	No	%	No	%
15-25	12	5.8	6	2.9	3	1.4	0	0
26-35	5	2.3	3	1.4	1	0.47	6	2.9
36-45	4	1.9	3	1.4	0	0	1	0.47
Total	21	10	12	5.7	4	1.9	7	3.3
P Value	0.393		0.475		0.138		0.041*	

Table (2) showed the prevalence due to all pathogenesis according to the age. The majority of patients were 14(5.8%) 6(2.9%) 3(1.4%) respectively,

case between (15 – 25) years. Except chlamydia trachomatis at age 26-35

Test ELISA	IgM	IgG	Total +Ve (IgM + IgG)	Total %	Total sample
Cytomegalovirus	8	21	29	13.8	210
	3.8%	10%			
Rubella	6	12	18	8.5	
	2.8%	5.7%			
Herpes simplex II	2	4	6	2.8	
	1%	1.9%			
Chlamydia trachomatis	2	7	9	4.2	
	1%	3.3%			

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

Age group year	No. of IgM positively to Major Pathogens							
	CMV		Rubella		Herpes simplex II		chlamydia	
	No	%	No	%	No	%	No	%
15-25	5	2.4	4	1.90	1	0.47	0	0
26-35	3	1.4	2	0.95	1	0.47	1	0.47
36-45	0	0	0	0	0	0	1	0.47
Total	8	3.8	6	2.8	2	1	2	1
P Value	0.473		0.452		0.281		0.284	

Table (4) showed IgG antibody of the pregnant women with all pathogenesis was most common in rural area of cases.

Age group year	No. of IgG positively to Major Pathogens							
	CMV		Rubella		Herpes simplex II		Chlamydia	
	No	%	No	%	No	%	No	%
Rural	14	6.66	8	3.8	3	1.42	2	0.95
Urban	7	3.33	4	1.9	1	0.47	5	2.38
Total	21	10	12	5.7	4	1.9	7	3.3
P Value	0.298		0.010**		0.138		0.419	

Table (5) showed IGM antibody of the pregnant women with all pathogenesis was most common in rural area of cases, while chlamydia was 100% in urban area.

Age group year	No. of IgM positively to Major Pathogens							
	CMV		Rubella		Herpes-2		chlamydia	
	No	%	No	%	No	%	No	%
Rural	5	2.38	4	1.9	2	0.95	0	0
Urban	3	1.4	2	0.95	0	0	2	0.95
Total	8	3.8	6	2.8	2	1	2	1
P value	0.107		0.053*		0.038*		0.511	

VI. DISCUSSION

Tables above shows The prevalence of CMV IgG was 10% in the current study and 3.8 percent prevalence of CMV IgM there collected (13.8%). This is not compatible with Other countries reported higher prevalence of CMV IgG among pregnant and abortion women, such as 97.2 percent in Benin (Rodier *et al.*, 1995), 96 percent in Egypt (El-Nawawy *et al.*, 1996), and 87 percent in Gambia (Bello and Whittle, 1991). of the studies performed in 87 pregnant women reported by AL-Ouqaili, in 2010 in the western Iraqi governorate of Al-Anbar revealed 29 (33.3 percent) positive cases for CMV IgM and 25 (28.5 percent) positive cases for CMV IgG (AL-Ouqaili and AL-Karbolli, 2010).

The low prevalence of CMV in this setting could be explained by Several variables, the first of which is the incidence of HIV (an important co-

infection with CMV) (DE Gasmelseed *et al.*, 2006 ; Fabiani *et al.*, 2006; Gray *et al.*, 2005; Mseleku *et al.*, 2005; S Mujtaba *et al.*, 2003). Various sociodemographic, cultural, and behavioral variables, such as breast-feeding, child care, and sexual activity, may affect and determine CMV prevalence (Adler, 1988; Handsfield *et al.*, 1985; Peckham *et al.*, 1987). The protection provided by prior CMV vaccination against reinfection or vertical infection transfer from the mother to the fetus is insufficient (Ayla Sargin Oruç, 2011).

In a recent study, it was shown that almost one-third of study seroimmune women had reactivated CMV during follow-up (Ross *et al.*, 2010). According to a recent review of the literature, the risk of congenital cmv infection rises as maternal cmv seroprevalence rises (Bakıcı *et al.*, 2002).

Rubella is a contagious illness that mostly affects pregnant women and their unborn infants

worldwide, however the prevalence of such infections varies between nation and within a country. (Ahmed, 1992). The prevalence of IgG seropositivity declined with age. This result was substantially different to another study, which discovered that IgG seropositivity increase with age. (DiFonzo and Bordia 1998). Rubella IgG seroprevalence was not significantly different by age group, with the lowest rate (1.4%) in women aged 26-35 and 36-45, and the highest rate (2.9%) in women aged 15-25. This trend did not match the report's findings for other geographic areas in Iraq (Al-rubaii *et al.*, 2010; Hasan, 2011), and similar to finding in Morocco (Caidi *et al.*, 2009). A high occurrence of immigrants to Tikrit from other governorates without the rubella vaccine may also be a factor in the prospective study's higher seronegativity than the retrospective study's.

HSV-2 is the most frequent cause of genital ulcers in the developed world and the second most common sexually transmitted viral infection globally (Mindel, 1998). Genital herpes differs throughout nations and between groups of people based on demographic and clinical features (Straface *et al.*, 2012). The main symptom herpes simplex infection is frequently the most severe, especially in women, causing blistering and ulceration of the external genitalia and cervix, vulvar discomfort, dysuria, vaginal discharge, and local lymphadenopathy (Greenwood *et al.*, 2002). Hereditary and uterus defects, hormonal and immunological dysfunctions, infectious agents, environmental contaminants, psychogenetic factors, and endometriosis are the most common causes of spontaneous abortion (Haider *et al.*, 2011). The current study's rate of seropositive anti-HSV-2-IgM antibodies was not similar to that found in other Iraqi cities such as Baghdad (8.1 percent) and Waset Province (7.7%) and Mosul (10 percent) (Al-Taie, 2010; Jasim *et al.*, 2011; Mohymen *et al.*, 2009).

Different ELISA kits used in other studies from different companies may have different reagent qualities and properties, which could explain the differences in results. Other factors that may contribute to the differences include the investigators' steps and techniques. One of the determinant factors linked to the is age HSV-2 is very common (Margan *et al.*, 2009). According to Ashley *et al.*, (Ashley and Wald, 1999), The likelihood of acquiring HSV-2 infection as a primary infection rises earlier in life ages, less than a third of a century of life This is also in agreement with Sen *et al* (Sen *et al.*, 2012). It's possible that this is due to the fact that most at this age, pregnancies are common.

Asymptomatic *Chlamydia trachomatis* infection is a significant health burden on both developed and developing countries' health-care systems. One of the disease control program's priorities is to provide accurate epidemiologic data through seroprevalence studies. The most economical method of preventing long-term problems such trachoma, pelvic inflammatory disease, ectopic pregnancy, and sterility is

early identification of chlamydial infections. In this context, a generally applicable non-invasive serological diagnostic test for testing pregnant women, especially in underdeveloped nations, is preferred. The current study discovered that (3.3 percent) of healthy pregnant women in Tikrit province had anti-*Chlamydia trachomatis* IgG antibodies. various studies produced disparate results; for example, study in Iraq found that 13.6 percent of mothers with full-term deliveries had anti-*Chlamydia trachomatis* antibodies (Abdul-Karim *et al.*, 2009). The current study discovered that 1% of women tested positive for anti-*Chlamydia trachomatis* IgM. IgM seropositivity varied from one study to the next; for example. (Rastogi *et al.*, 2002).

These differences might be explained by the severity of morbidity associated with sexually transmitted chlamydial infections, and also the sensitivity and specificity of the screening test used. Nonetheless, the low seroprevalence rate of *Chlamydia trachomatis* infection found in this study could be attributed to the conservative nature of the society as well as the rarity of STDs in general, and *Chlamydia trachomatis* in particular.

VII. CONCLUSION

The prevalence of HSV2 antibody was lower for all women. The seropositivity of chlamydia, rubella and HSV2 was significantly influenced by age and residence (p value 0.01 and 0.05). Seroprevalence was significantly higher in rural women. IgG detected more high percentage than IgM for all pathogenesis infections.

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