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Seroprevalence of toxoplasmosis and Cytomegalovirus infection in pregnant and aborted women in Wasit province-Iraq

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ABSTRACT: The study was conducted in Wasit province, 160 positive venous blood samples were collected from pregnant women infected with toxoplasmosis, cytomegalovirus (CMV), and both.

Samples collected from different areas from urban and rural of Wasit province. By using ELISA there are a 21 positive samples (13.12%) of toxoplasmosis; 85 positive samples (53.12%) of CMV, and 54 positive samples (33.75%) with mixed infection between the parasite and the virus. These results refer to a highest rate of infection with toxoplasmosis was recorded in urban area 17 (10.62%), while the lowest rates 4 (2.5%) samples were recorded in rural area. The highest infection 66 cases (41.25%) of women infected with the CMV in urban area, and it showed less with virus in rural (19) cases (11.87%). The study showed the highest positive mixed infection were recorded at urban 47 cases (29.37) and the lowest in rural 7 cases (4.37). In addition to that the age's patient is a most important to infection, the women ages (18-23) years was most affected 62 (38.75) than the other ages, and most miscarriages were among women infected with the amplified virus, followed by mixed infection between the parasite and the virus.The rate of miscarriages was 27(16.87%) in urban and 18(11.25%) in raral.

Keywords: seroprevalence, *Toxoplasma gondii*, cytomegalovirus

1. INTRODUCTION

Abortion is an elimination of fetus or embryo out women uter) us. An abortion includes purposely (induced abortion) and may be caused spontaneously (miscarriage) [1] which causes emotional distress for parents [2]. Many clinical types of abortion includes Complete and incomplete, threatened, missed, septic and non-septic abortion . As well as many factors has been caused spontaneously. Abortion included uterine and genetic abnormalities, pollutants of environment, endometriosis, psycho-genetic factors [3]. For infectious agents such as cytomegalovirus and *Toxoplasma*, it is believed that 10-15% of miscarriage caused by those agent s[4].

. *Toxoplasma gondii* infects humans and warm-blooded animals and consider intracellular protozoan [5]. "Infected human with the parasites occurring during ingestion food or water

contaminated with oocytes bring down by cats, eating raw meat or under cooked meat containing tissue cysts and by blood transfusions or by transplantations'"[6]. In pregnant women the infected with *T. gondii* can be transmitted to the fetus and cause many disease such as blindness, mental retardation, epilepsy and death [7].

One of the most common congenital viral infection is human cytomegalovirus (HCMV) it is worldwide and 90% of cases probably asymptomatic and the rest cause severe fetal damage and unusuall death due to abortion [8]. During pregnancy Cytomegalovirus (CMV) infection is very complex compared with other infections, because the virus can be frequently reactivated during the childbearing age and be inherited to the fetus despite matemal immunity [9]. "HCMV infection considered as complex original sin due to the ability of virus act as an immune modulator to avoid elimination from the host through working on an array of immune evasion strategies, and the proteins of viral contributed in the regulation of cellular gene expression and inducement of pro-inflammatory cytokine or inducement of autoimmune state"[10]. The prevalence of *T. gondii* infection in humans varies with the social and cultural habits of the community, geographical factors, cat lifestyle and density, wildlife structure, climate conditions and mode of transmission [11]. Globally, the seroprevalence of *T. gondii* infection in humans ranges from 2% to 100%, depending on the source of the sample [11].

The aims of this study to assess the prevalence of *Toxoplasma gondii* and CMV in pregnant and repeated spontaneous aborted women in different ages and regions in wasit province.

2. SAMPLES COLLECTION

2.1 Materials and Methods

Randomly collected 400 venous blood smaple from pregnant women of different ages to identify IgM and IgG toxoplasmosis and CMV infection, (200 from urban and 200 from rural), and we tested the samples by using TORCH kit. There were 160 blood samples were infected with the parasite and the virus and both (positive). The samples were subsequently tested by genuine ELISA kit for *T. gondii* and CMV infection .The infected samples that collected from urban and rural regions in Wasit province, including 130 samples from urban(alkut governorate), 30 sample from rural(wasit district and subdistrct).

3. TOOLS AND METHODS

The kits that used in the study listed on the table one and the procedures was applied according to company instruction Biotech (Hangzhou) and Beijing solarbio scince

Table (1): List of kits used with its countriesandcompanies of origin in this study

N0.	Kits	Companies	Countries
1	Human Toxoplasma IgM ELASA Kit	Biotech (Hangzhou)	China
2	Human Toxoplasma IgG ELASA Kit	Biotech (Hangzhou)	China
3	Human Cmv IgM ELASA Kit	Biotech (Hangzhou)	China
4	Human Cmv IgG ELASA Kit	Biotech (Hangzhou)	China

4.CONSTRUCTION OF REFERENCES

From 160 positive specimens there was 21 cases positive for toxoplasmosis (13.1%), 85 CMV (53.1%) and both infection (toxoplasmosis and CMV) was 54 (33.7%). The highest range of infection with toxoplasmosis recorded in urban 17 (10.62%) whereas the lowest ranges recorded in rural 4 (2.5%); also, the prevalence of CMV infection was recorded as higher rates in Al-kut center 66 case (41.25%) but the lowest shown in rural when recorded 19 case (11.87%). The specimens that appear with positive complication between two infections (toxoplasmosis and CMV) was recorded in all regions, the highest infection recorded in Al-Kut center were recorded 47 case (29.37%) and lowest in rural 7 with percent (4.37%); these results shown in figure (1). In the results of this study, there are a statistical analyses indicated significant differences between Al-Kut center and other regions in toxoplasmosis and in combined infection and also differences in CMV infection between all regions; this results agreement with study in northern Ethiopia it is detection toxoplasmosis in several regions a total of 360 pregnant women infected with toxoplasmosis, the majority (65%) of them were dwellers in urban regions and the mean age were 26.9 (± 5.7) years[12]. Additional study in this country (Ethiopia) ,reported the distribution of toxoplasmosis in several regions of north and west Ethiopia, recorded 55.6% of them were dwellers in urban regions and 38.9% of them were unable to read and write[13]. The seroprevalence study in western region of Romania to estimates prevalence of CMV where recorded a higher in women in rural areas compared with those in urban areas[14].In Iraq, applied seroprevalence to estimates the anti-CMV antibodies in their place of residence (Baghdad), there are 81 women from urban region recorded 74 (91%) of CMV-IgG antibodies and 5 (6.2%) CMV-IgM antibodies positive, whereas 19 women in rural regions with 18 (94.7%) CMV-IgG and 3 (15.8%) CMV-IgM antibodies positive[15]see figure (1). The highest range of infection with toxoplasmosis, CMV and complication with both infection was recorded significant differences in ages ranging between 18-34 years (5%, 20%, 13.75%) respectively , whereas the lowest ranges recorded in a ages ranging between 35-44 years (1.87%, 6.87%, 3.75%) with toxoplasmosis, CMV and complication with both infection respectively. The other ranges of ages ranged between them, as show in table (2) .

Table (2): Seroprevalence of Toxoplasmosis, CMV and combined infection in pregnant women according to the age group.

AGE / Year	Toxoplasmosis		CMV		Both		Summation	
	No. of infected	Percent. %	No. of infected	Percent. %	No. of infected	Percent. %	No. of infected	Percent. %
18-23	8	5	32	20	22	13.75	**62**	**38.75**
24-28	7	4.375	24	15	17	10.625	**48**	**30**
29-33	3	1.875	18	11.25	9	5.625	**30**	**18.75**
Up to 34	3	1.875	11	6.875	6	3.75	**20**	**12.5**
Total	**21**	**13.125**	**85**	**53.125**	**54**	**33.75**	**160**	**100%**

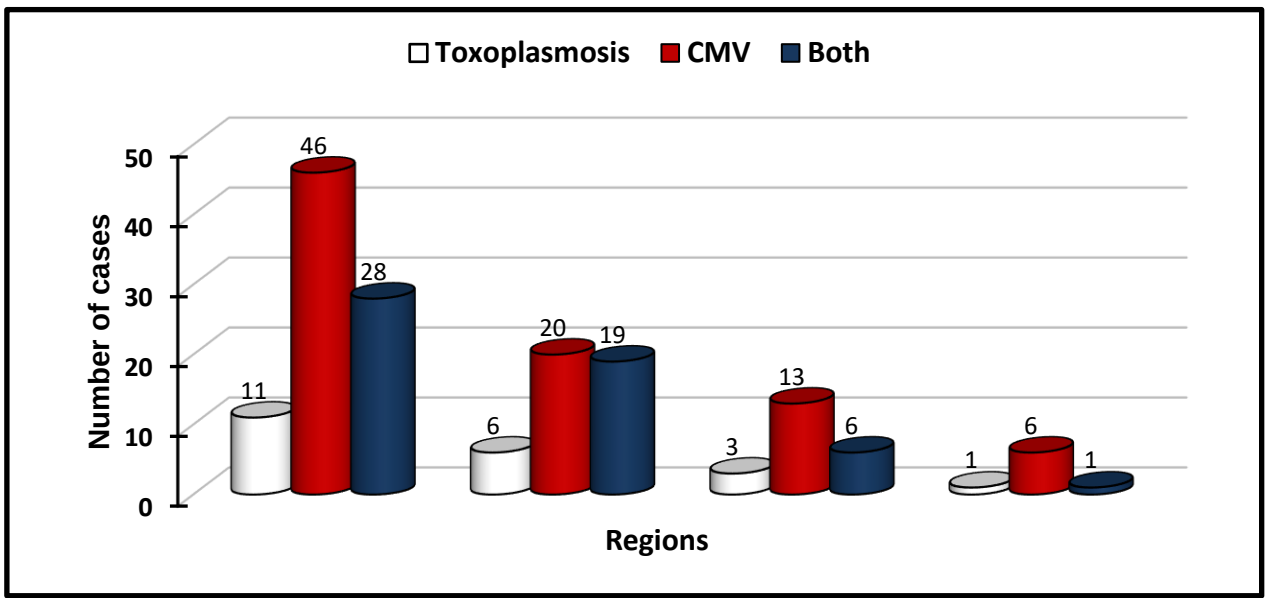

FIGURE.1: Seroprevalence of *Toxoplasma gondii*, CMV and combined infection among pregnant women according to residents of Wasit province

The results of this study agree with results that recorded in Iraq when recorded (33.92%; 37.51%; 28.57%) in women with age (17-24; 25-34; 35-44) years respectively

[16]. In addition, the study in Iraq Duok province showed that the infection was (44.9%) in pregnant women at age 29-38 years [17]. in Erbil province Capital of Kurdistan Region/ Iraq recorded the highest sero-positivity of both IgG and IgM anti-*Toxoplasma* in the age group range 21-30 years, which is 55/118(46.61%) and 20/118(16.94%) respectively, and the lowest rate of infection respecting both IgG and IgM in the age group less than 20 years, 4/31(12.96%), 3/31(6.45%) respectively [18]. The results of the current study agree with the results of study in Iraq Al-Qadisiyah province, which recorded 45.5% as the highest infection in women with toxoplasmosis between the ages ranges from 25-34 years [19].

It is clear that the age group of 24–29 years is the most affected with Cytomegalovirus, compared with others these results were confirmed also in Iraq-Babylon City when reported the age group of 20-30 years is the highest prevalence with cytomegalovirus infections could increasing the risk of abortion in pregnant women [20]. The occurrence of primary infections of CMV may be in the most marriages in Iraqi population occurred among this age groupin Kirkuk City-Iraq reported the more infection occurs in 26-36 (59%) years old [21].

In Thi-Qar-Iraq which recorded 86% seropositive for *T. gondii* at age of (12-35) years, 12% seropositive at age 36-40 years, and (2%) at age ranged of 41-48 years [21]. in Samarra city-Iraq recorded prevalence of *Toxoplasma* infection according to age; He recorded (5.9%, 24.2% and 8.6%) at ages (14-20, 21-30 and 31-46) years old respectively [22]. Whereas in Sohag City, Upper Egypt revealed that most of *T. gondii* seropositive cases were detected in women aged >35 years (45.5%) and aborted women [23]. There was study refers to the higher percentage of infection recorded in pregnant women at age 35-44 years which was 33.3% [24].

In Switzerland Geneva, reported a highest level of infection with CMV in the age (26-35) years (61.7%), more than 36 years was (27.3%) and less than 25 years was (10.9%) [25]. The highest prevalence rate with mixed infection with both toxoplasmosis and CMV recorded in (25-35) years of age, and this correlate to the number of scientific investigations in Pokhara, Nepal who recorded both infection toxoplasmosis and CMV in 104 pregnant women with age ranging from 19-37 years with a mean 26.6 years [26].

In this study, the total number 160 women infected with *Toxoplasma gondii*, cytomegalovirus and mixed infection with these pathogens, there are 45 miscarriages, including 6 miscarriages from 21 women with toxoplasmosis, 23 miscarriages from 85 with CMV, and 16 miscarriages from 54 with both Pathogens (toxoplasmosis and cytomegalovirus, (18 miscarriage in rural and 27 miscarriages in urban). As show in table (3) figure (2).

The results of this study disagreements with results that reported In Iraq – Samaraa city, recorded (31.2%) of the women who had abortions infected with *T. gondii* and contain

antibodies for this parasite whereas (13.3%) had cytomegalovirus infection, and (4.1%) had mixed toxoplasmosis and the virus [27].

Table (3): Prevalence of *Toxoplasma gondii*, CMV and mixed infection with a history of miscarriage.

Pathogen	Aborted women		Non aborted women		Summation of patient	
	No.	%	No.	%	No.	%
Toxoplasmosis	6	3.75	15	9.375	21	13.125
CMV	23	14.375	62	38.75	85	53.125
Mixed	16	10	38	23.75	54	33.75
Total	45	28.125	115	71.875	160	100.0%

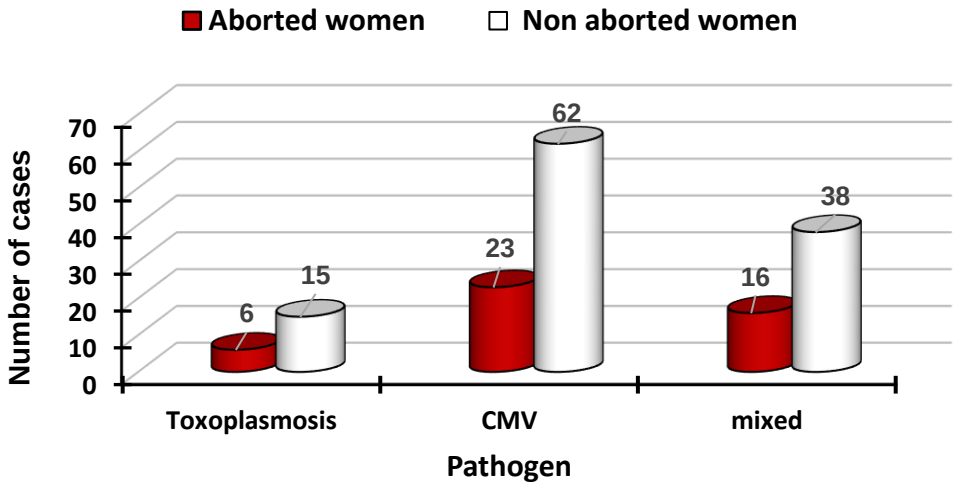

Figure (2): Prevalence of *Toxoplasma gondii*, CMV and both with a history of miscarriage.

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