



## Tikrit Journal of Pure Science

ISSN: 1813 – 1662 (Print) --- E-ISSN: 2415 – 1726 (Online)

Journal Homepage: <http://tjps.tu.edu.iq/index.php/j>



### Detection of infection by *Toxoplasma* and *Herpes simplex virus 2* among women exposed to abortion in Ninavah province/ Iraq

Mahmood Nafi Mahmood , Mohammed Hazem Najem

Ninavah health directorate , Mosul , Iraq

<https://doi.org/10.25130/tjps.v25i4.268>

#### ARTICLE INFO.

##### Article history:

-Received: 9 / 12 / 2019

-Accepted: 20 / 5 / 2020

-Available online: / / 2020

**Keywords:** Toxoplasma, Herpes simplex 2 virus, abortion, Iraq

##### Corresponding Author:

**Name:** Mahmood Nafi Mahmood

**E-mail:**

[mahmoodnafi.mn@gmail.com](mailto:mahmoodnafi.mn@gmail.com)

**Tel:**

#### ABSTRACT

The aims of this study were to find the relationship among the infection of *Toxoplasma*, *herpes simplex virus* and abortion at different age groups. For this purpose 127 samples from healthy women were collected in period from February to September 2017 to detected of IgM and IgG for *Toxoplasma* and *Herpes simplex virus*2.

The results of the current study showed that *Toxoplasmosis* was the most common infection with high level of IgM antibodies 11.8%. *Herpes simplex 2 virus* give positive results for IgM in rate of 6.2% and none of them showed raised IgG level. HSV-II virus infected was the lowest and age group 32-40 years showed the highest rate of infection 12.5%.

Most of the patients experienced two abortions were reported at age group 25-31 years 17% and 4.2% had three abortions. 40% of the patients with *Toxoplasmosis* experience 2 abortion had cut off >1.25. fifty% with *Herpes simplex 2* had cut off value of >1.25 experience one abortions and two abortions respectively.

#### Introduction

*Toxoplasma gondii*, is a parasitic protozoan with worldwide, has the ability to infect wide-range of warm blooded vertebrates such as humans [1]. Infection with *T.gondii* can spread via contaminated food and vegetables, via the actions that humans do (farming, gardening, etc.), and via the animals (farm animals, pets, and wild animals) that they raise or encountered [2]. The commonness several factors that influence of toxoplasmosis are contact with cats, nutritional habits, age and residency [3]. *Toxoplasmosis* is still one of the most common and important cause of foodborne illnesses and congenital and pediatric disorder. *Toxoplasmosis* transplacental transmission and association of the fetus with pathological effects including chorioretinitis, intracranial calcification, hydrocephalus, and even stillbirth, consequently severe complications in the fetus or the newborn infant can cause brain or eye damage at birth or death of the fetus and spontaneous abortion [6]. Congenital and neonatal *toxoplasmosis* pose the highest complications which include miscarriage, encephalitis, neurological retardation, mental illnesses, auditory, and visual inflammatory disorder, cardiovascular abnormalities and pain [7].

*Herpes simplex virus type 2* infection is most

widespread viral sexually transmitted disease (STD) globally [8]. This virus belong to Alphaherpesviridae. During pregnancy, infections can be transmitted to newborns: HSV-1 and HSV-2 may lead to eye or skin lesions, meningoencephalitis, disseminated infections, or foetal malformations [9,10]. HSV-2 infection in pregnancy is believed to be related with a continuous occurring of certain negative obstetric consequences, for example: Spontaneous abortions, inaauterine fetal death, stillbirths, fetal malformations, preterm labor, congenital herpes, intrauterine growth retardation, neonatal herpes, intrauterine death, low birth weight deliveries, and spontaneous abortions [11]. Typically, the first time infection of the mother, according to recent finding, is the most vital element for the transmission of genital herpes to fetus or newborn. Actually, the risk of transmitting these viruses to the newborns becomes greater in pregnant women who acquire genital herpes as a primary infection in the final half of pregnancy, in comparison with acquiring it prior to pregnancy [12].

##### Aims of the study

To determine the occurrence of *toxoplasma* and *Herpes simplex 2* viruses patient's serum and to fined

correlation between the presence of infection with *Toxoplasma* and *Herpes simplex 2* viruses and abortion at different age groups.

### Materials and methods

In the present study blood was collected from 127 women at reproductive age exposed to abortion or had repeated abortion. All blood samples were tested for *Toxoplasma* and *Herpes simplex 2 virus*. Blood samples were taken from the period between beginning of February 2017 to the end of September 2017.

- Three to five ml of blood samples were drawn aseptically from all registered cases and controls for routine investigations.
- All the serum samples collected for the study and control groups were tested for *Toxoplasma* and *Herpes simplex 2 virus* infection by commercially-available (ELISA) kits. The kit used in this study were bioelisa TOXO IgM and IgG 3000-1210 kit and

3000-1214 kit respectively and bioelisa HSV-2 IgG 3000-1208 (Bioelisa Toxo IgM, IgG, Barcelona - SPAIN, Bioelisa HSV-2 IgM, IgG, Barcelona-SPAIN).

The results were read by a Microwell reader and compared in a parallel manner with controls; optical density was read at 450 nm on an ELISA reader.

### Results and Discussion

The results in Table I showed that 15 women 11.8% had raised *Toxoplasma* immunoglobulin M level. Whereas *Toxoplasma* immunoglobulin G showed a high level in 16 with 12.5%. *Herpes simplex 2 virus* high level for immunoglobulin M was recorded in 8 females with 6.2% and none of *herpes simplex 2 virus* infected patients showed raised immunoglobulin G level. The control group showed that out of 30 subjects, 3.3% of the women infected with *Toxoplasma* had raised immunoglobulin M.

**Table I: Seropositive of *Toxoplasma* and HSV-2 in women exposed to abortion**

Type of infection	No. of positive cases IgM		Percentage		No. of positive cases IgG		Percentage	
	Test	Control	Test	Control	Test	Control	Test	Control
Toxoplasma	15	1	11.8%	3.3%	16	0	12.5%	0
Herpes simplex virus	8	0	6.2%	0	0	0	0%	0
<b>Total number</b>	<b>(127)</b>	<b>(30)</b>			<b>(127)</b>	<b>(30)</b>		

The results is agreement with Druish & Aziz [13] in Baghdad, Iraq, showed that 51 (41.8%) of the 122 aborted women have antibodies against *T.gondii*, 25 (59.5%) women were positive for presence of IgG antibodies, while 17 women (40.5%) had IgM antibodies, and 9(17.6%) women had both IgG and IgM antibodies. Also the results correspond to Hasan et.al. [14] the results revealed that the rate of anti-herpes simplex type 2 IgG antibody among pregnant women was 2 out of 91(2.19%), while 89 out of 91(97.8%) were negative. Additionally, 2 out of 91(2.19%) women were positive for antiherpes simplex type 2 IgM antibody, while 89(97.8%) out of 91 were negative. These results also agreed with Moniri, et.al. [15] in Kashan, Iran, as 3.8% of the immunoglobulin M cases were found to be seropositive for *Toxoplasmosis* and 6 cases 7.5% were positive for the HSV infections.

The relationship between infection with *Toxoplasma* and *Herpes simplex virus type 2* immunoglobulin M and immunoglobulin G in different age group is illustrated in Table 2. The results revealed that were 6 patients 11.7% with *toxoplasma* immunoglobulin M positive serum and 8 patients 15.6% with *toxoplasma* immunoglobulin G positive out of 51 patients at age group 18-24 and 5 (10.6%) patients with *toxoplasma* immunoglobulin M positive sera and 4 (8.5%) with *toxoplasma* immunoglobulin G out of 47 patients in the second age group 25-31. The third age group in which the sample size was smaller, 4 patients 13.7% showed increased immunoglobulin M level while 4

patients 13.7% gave positive results for immunoglobulin G. the results were in agreement with Mohaghegh. et.al. [16]. In north Khorasan, Iran, their results revealed that Out of 350 pregnant women included in their study, 110 (31.42%) were positive for IgG and 12 (3.42%) for IgM. The IgM positive subjects also had positive result for IgG.34(24.3%),66(42%), 10(18.9%) with *toxoplasma* IgG positive cases were at age groups 18-25, 25-35 and 35-45 respectively. The IgM-positive subjects, 5(3.6%), 7(4.5%) at age groups 18-25, 25-35, respectively, while none of patients were positive for *toxoplasma* IgM at age groups 35-45. Similarly, Kamal. et.al.[17] in Egypt, found that Seroprevalence of *T. gondii* infection in high-risk pregnancy group was 61/120 women 50.5% vs 10/120 women 8.3% in normal pregnancy group. Seropositivity of both groups for *T. gondii* IgM and/or IgG antibodies were 22 (18.3%), 46 (38.3%) respectively. The high-risk pregnancy age groups were found at 2125 years. It had been shown that low socioeconomic standard, residing in rural area, low educational level, consumption of undercooked meat or contaminated water and daily contact with animals and soil were important risk elements for *T. gondii* infection.

This table also showed that *Herpes simplex 2 virus* infections were the lower than *toxoplasma*, patients in third age group 32-40 years showed the highest rate of infection as 12.5% of patients showed high level of IgM followed by age group 25-31 and 18-24 years as the rate of positive result of this immunoglobulin

were 7.6% and 5.2% respectively and no one of whole patients had antibodies of IgG against this virus. This result agreed with Kalu, et.al. [18] in Benin, Nigeria, who found that out of 674 pregnant women surveyed, 312 (46.30%) were HSV- 2 seropositive; while 362 (56.70%) were HSV- 2 seronegative. The ages of the participants in their study were between 18 and 44 years (mean age 25-35

years). Similarly, Kim, et.al. [19] noted that 85 out of 415 were positive for HSV-2. The mean age group of the gravidas was 27-35 years in HSV2 positive group and 2634 years in healthy control group. There was a significant difference in ages of the gravidas between two groups. HSV-2 was found to be highest at age group 30-34.

**Table 2: The relation between *Toxoplasma* and *Herpes simplex 2 virus* IgG and IgM abs. and different age groups of the studied patients**

Age of years	Total No.	No. of IgM positive	Percentage	No. of IgG positive	Percentage	No. of negative	0	Sig.
<i>Toxoplasma</i>								
18-24	51	6	11.7%	8	15.6%	37	no	noo
25-31	47	5	10.6%	4	8.5%	38	0.09	0.092
32-40	29	4	13.7%	4	13.7%	21		
<i>Herpes simplex virus</i>								
18-24	51	2	5.2%	0	0%	49	0.19	0.077
25-31	47	3	7.6%	0	0%	44		
32-40	29	3	12.5%	0	0%	26		

A number of abortions in relation to age groups of female patients included in the study were illustrated in Table 3. The patients in this study were divided in

to three groups which were 18-24, 25-31 and 32-40 years all the patients experience abortion for one, two or more.

**Table 3: number of abortion in relation to age groups in studied patients**

No.	Ages	Total no.	No. of abortions					
			Single abortion	%	Double abortions	%	Triple abortions	%
1	18-24	51	46	90.1%	4	7.8%	0	0%
2	25-31	47	38	80.8%	8	17%	2	4.2%
3	32-40	29	25	86.2%	4	13.7%	0	0%

The result in Table 3 showed that most of the patients with two abortions were reported in the second age group 25-31 years as eight patients out of the 47 (17%) had two abortion and two 4.2% had three abortions, followed by third age group as 13.7% had two abortions, then the first age group in which only 7.8% had two abortions, while 90.1% of patients in this age group, and 86.2% of patients in the third group experienced one abortion. Mohammad and salman [20] in Kirkuk, Iraq, reported that out of 252 cases, 56 suffered from single abortion, 76 double abortions, 43 Triple abortion and eight patients had more than three abortions, in their study the rate of *toxoplasma* infection among women was high, this

reflects the degree of environment contamination with the oocysts of cat, the final host and water contamination especially in area where water chlorination and filtration process were not continuously used.

Table (4) showed the relationship between the cut off value which is correlated with severity of infection by *toxoplasmosis* with the abortion numbers experienced by those patients, the result exhibited that 40% the patients with cut off (> 1.25) experience 2 abortions, and 40% experience one abortion and one patient experienced three abortions, while 42.8% experience two abortion have a

**Table 4: The cut off value of *toxoplasmosis* in relation to a number of abortions**

No.	Cut off	No. of patients	No. of infected	No. of abortions					
				Single abortion	%	Double abortions	%	Triple abortions	%
1	1< - 1.25	7	7	4	57.1%	3	42.8%	0	0%
2	>1.25	5	5	2	40%	2	40%	1	20%

This result agreed with Findal, et.al. [21] their results showed that 44 out of 93 positive cases 51.2% were certainly infected during pregnancy have a cut off value of (>1). The cut-off values in this study for low

IgG avidity were in agreement with the manufacturer's recommendations and were also similar to values used in former studies. Also agreed with Moniri, et.al. [15] who concluded that the values

above 1.1 were considered as positive whereas those below 0.9 were taken as negative and the values between 0.9 to 1.1 were recorded as suspicious.

Table (5) showed the relationship between the cut off value of *Herpes simplex 2 virus* and the abortion

numbers experienced by those patients, the result displayed that 50% of the patients with cut off value of  $> 1.25$  and  $1 < -1.25$  experience 2 abortions, 33.3% and 16.6% of the second group experienced one and three abortions respectively.

**Table 5: the cut off value of *Herpes simplex 2 virus* in relation to a number of abortion**

No.	Cut off	No. of patient	No. of infected	No. of abortions					
				Single abortion	%	Double abortions	%	Triple abortions	%
1	$1 < -1.25$	6	6	2	33.3%	3	50%	1	16.6%
2	$>1.25$	2	2	1	50%	1	50%	0	0%

This result agreed with Biswas, et.al. [22] who showed that out of 1640 pregnant women from five Northeastern states of India studied, 142(8.7%) had *Herpes simplex 2 virus* infection, the cut-off value

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## التحري عن الاصابة بالمقوسات الكونيدية وفايروس الحلاّ البسيط لدى النساء المعرضات للأجهاض في محافظة نينوى/العراق

محمود نافع محمود ، محمد حازم نجم

دائرة صحة نينوى ، الموصل ، العراق

### الملخص

هدفت هذه الدراسة الى تحديد العلاقة بين الاصابة بداء المقوسات وفايروس الحلاّ البسيط مع وجود الاجهاض ضمن مجموعات عمرية محددة. جمعت عينات الدم من بداية شهر شباط ولغاية شهر ايلول عام 2017 من 127 امرأة تعرضت سابقاً للاجهاض اضافة الى 30 امرأة اخرى كعينات سيطرة. فحصت جميع العينات للكشف عن وجود الكلوبيولين المناعي IgM والكلوبيولين المناعي IgG للاصابات المذكورة. اظهرت النتائج ان داء المقوسات كان اكثر الاصابات شيوعاً مع نسبة اصابة اعتماداً على IgM 11.8%. بالنسبة لفايروس الحلاّ البسيط، 6.2% فقط من الحالات اعطت نتائج ايجابية لـ IgM بينما لم تعطي اي اصابة لـ IgG. اعلى نسبة اصابة بداء المقوسات كانت ضمن الفئة العمرية 32-40 سنة 13.7%. بينما اعلى نسبة اصابة بفايروس الحلاّ البسيط 12.5% ظهرت ضمن الفئة العمرية 32-40 سنة. عانت معظم المصابات من حالي اجهاض، ظهرت في الفئة العمرية 25-31 سنة. 40% من المصابات بداء المقوسات عانين من حالي اجهاض وبلغت قيمة الـ CUT OFF 1.25، بينما 50% من المصابات بفايروس الحلاّ البسيط كن قد عانين من حالة اجهاض واحدة وبلغت قيمة الـ CUT OFF 1.25.