

## Pregnant Women With Toxoplasmosis In Al-Hai City ,Wasit Governorate , Iraq

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### Abstract

**Objective** :Toxoplasma gondiis an intracellular parasite that infect one third of world population . Toxoplasmosis is very important especially in pregnant women and in immunocompromised patient , the infection in pregnant women would be life threatening and sever disordered for the fetus . The aim of this study was to determine the seroprevalence of the parasite antibodies in pregnant women and to investigate the relationship between Toxoplasmosis and some of the sociodemographic factors.

**Methods** : A total of 244 pregnant women attended to Martyr Dr. Fayrouz General Hospital in Al- Hai and Private gynecological clinics in Wasit province during the period 1 July 2020 to 1 January 2021-were examined . Their ages were ranged from (15-45) year old . Blood samples were collected from pregnant women then anti-toxoplasma gondii IgG and IgM antibodies were tested by Enzyme Linked Immune Sorbent Assay (ELISA).

**Results** : This study showed that (34.01%) were total positive by ELISA IgG and IgM which considered as a confirmed Toxoplasmosis , (25.81%) of them had IgG and (8.19%) had IgM , The high rate of IgG was recorded in age group (20-≥29) years was (26.66%) while the high rate of IgM was found in age group (30-≥39) years was(10.52%) and the high rate of seroprevalence recorded in pregnant women with first trimester in IgG (28.12%) while in IgM the high rate in current abortion was found in first trimester was recorded (90%) , Seroprevalence of Toxoplasma gondii in pregnant women in single abortion recorded high percentage in IgG (26.26%) while the high rate of IgM in current abortion was found in single abortion was recorded (70%) . Pregnant women in rural recorded high seroprevalence of toxoplasmosis in IgG (26.66%) and IgM (10%) .

**Conclusion**: The present study indicates that the prevalence of Toxoplasmosis is relatively high in pregnant women in Al-Hai city , Thus , The Serological tests for Anti – Toxoplasma antibodies is necessary to reduce the risk of Congenital transmission.

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### Introduction

Toxoplasmosis is a worldwide zoonotic disease caused by a protozoan parasite called Toxoplasma gondii, which is an intracellular protozoan that infects humans and warm-blooded animals as an intermediate host [1]. While the last host of the parasite is many members of the cat family, including cats, in which sexual reproduction and the production of Oocysts are the main source of infection and spread of disease [2]. The

parasite during which the life cyst appears in three stages Tachyzoite and Bradyzoite in all intermediate hosts and the additional intestinal stage in the final host and the third stage is Oocyst which appears only in the final host [3].

Infection occurs in humans in two ways, the first way is by eating undercooked meat that contains a tissue cyst, or through vegetable food, water, milk, and soil contaminated with the feces of infected cats. Blood transfusion or organ transplantation [4]. The second method of infection, which is the most dangerous, occurs through the congenital transmission of the parasite from the infected mother to the fetus via the placenta, which leads to miscarriage and abortion, especially if the infection occurred in the first trimester [1-3] of pregnancy. But if the infection occurs in the last trimester of pregnancy, the infection may not be accompanied by clinical symptoms of the fetus in the early period but with age, the condition progresses and may lead to chorioretinitis or ocular toxoplasmosis [5].

The severity of the disease depends on many factors such as the immunity of the host, the parasite strains, the size of the parasite vaccination, and the infection provokes the body to produce an immune response represented by cellular immunity, which is the mainline of defense against the parasite and confusion. Immunity represented by immunoglobulin or antibodies that act to kill the parasite in the outside of the cell [6]. In immunosuppressed single infections in most cases, they are asymptomatic or sometimes accompanied by influenza-like symptoms, while infection in the immunosuppressed patient is very dangerous and may lead to an increase in the severity of symptoms and lead to the death of the patient [7].

Toxoplasmosis is usually diagnosed based on serological tests such as the stain test, the latex agglutination test (LAT), and the enzyme-linked immunosorbent assay (ELISA). The direct agglutination test (DAT) [8] and diagnosis of disease by polymerase chain reaction (PCR) is essential for the definitive diagnosis of toxoplasmosis during pregnancy, genetically for the parasite from the three strains of type 1, type 2, and type 3 that have been classified according to the pathogen in mice [9].

## **MATERIALS AND METHODS**

**Study area:** Al-Hai it is one of the districts of Wasit Governorate located in the southeast of the Capital Baghdad and it is considered an active commercial and agriculture region. The member of the district's population is about 280.000 people and the city's population is about 171.000 people.

**Sample examination :** The present study was carried out on 244 pregnant women in different stage trimesters of pregnancy and private attended to Martyr Dr. Fayrouz General Hospital in Al- Hai gynecological clinics in Wasit province from 1st July 2020 to 1st January 2021 to investigate for IgG and IgM antibodies a single sample from each pregnant women was five ml of venous blood put into plain tube and left half to one

hour at room temperature to stand then undergone to centrifugation at 3000 rpm for 5 minutes to obtained serum then stored until be used to determine the IgG and IgM by ELISA IgG and IgM .A questionnaire sheet was prepared for each women Containing; age , residency , gestational age , number of abortion.

**RESULTS**

Two hundred fourty – four pregnant women were tested for toxoplasma gondiiseroprevalence (IgG and IgM) overall prevalence of anti – T.gondii antibodies were positive in 83/244 (34.01%) , 63/244 (25.81%)of them were positive for anti – Toxoplasma gondiiIgG and 20/244 (8.19%) were positive for IgM0 Statistically analysis results showed significant differences at level (**P≤0.001**).as shown in table (1) .

**Table (1) :Prevalence of anti – Toxoplasma gondii IgG and IgM**

Toxoplasma antibodies	Number tested	Number positive	Percentage (%)	P-value
IgG	244	63	25.81	0.001**
IgM	244	20	8.19	
Total	244	83	34.01	

According to the age group the highest seropositivityof both ToxoplasmaIgG and IgM found in the age group 20≥29 years was 40/150 (26.66%) for IgG while the high rate for IgM found in age group 3≥039 years was (10.52%) and the Lowest rate of seropositivity of both Toxoplasma IgG and IgM found in the age group (40 ≥ ) 1/6 (16.66%) for IgG and 0/6 (0%) of IgM .Statistically analysis results regarding to the IgG with age group was no significant but with IgM was significant differences at level (P≤0.05). as shown in table (2).

**Table (2) : Prevalence of anti – Toxoplasma gondii (IgG and IgM) according to age group**

Age (years)	Number tested	IgG		IgM	
		Number positive	Percentage (%)	Number positive	Percentage (%)
20<	31	7	22.58	3	9.67
20 - ≥ 29	150	40	26.66	11	7.33
30 - ≥ 39	57	15	26.31	6	10.52

<b>40 ≥</b>	<b>6</b>	<b>1</b>	<b>16.66</b>	<b>0</b>	<b>0</b>
<b>Total</b>	<b>244</b>	<b>63</b>	<b>25.81</b>	<b>20</b>	<b>8.19</b>
			<b>Chi-Sq 2.807</b> <b>P-Value 0.422</b> <b>N.S</b>	<b>Chi-Sq 9.966</b> <b>P-Value 0.019*</b>	

The highest seroprevalence of anti – Toxoplasma gondii IgG according to abortion time found in the first trimester in IgG was recorded 36/128 (28.12%) in previous abortion while the high rate in IgM in current abortion found in the first trimester was recorded 18/20 (90%). Statistically analysis results regarding to the IgG with abortion time was no significant differences while in IgM with abortion time in current abortion was significant differences at level (P≤0.001) as shown in table (3).

**Table (3) : Prevalence of anti – Toxoplasma gondii according to the abortion time in previous and current abortion in pregnant women**

<b>Abortion Time</b>	<b>Number of previous abortion</b>	<b>IgG</b>		<b>Number of current abortion</b>	<b>IgM</b>	
		<b>Positive</b>	<b>Percentage (%)</b>		<b>Positive</b>	<b>Percentage (%)</b>
<b>First trimester</b>	<b>128</b>	<b>36</b>	<b>28.12</b>	<b>20</b>	<b>18</b>	<b>90</b>
<b>second trimester</b>	<b>11</b>	<b>2</b>	<b>18.18</b>	<b>20</b>	<b>2</b>	<b>10</b>
<b>third trimester</b>	<b>4</b>	<b>1</b>	<b>25</b>	<b>20</b>	<b>0</b>	<b>0</b>
<b>Total</b>	<b>143</b>	<b>39</b>	<b>27.72</b>	<b>20</b>	<b>20</b>	<b>100</b>
			<b>Chi-Sq 2.174</b> <b>P-Value 0.337</b> <b>N.S</b>	<b>Chi-Sq 146</b> <b>P-Value 0.001**</b>		

According to the previous abortion in pregnant women. The highest seroprevalence of anti – Toxoplasma gondii in the single abortion in IgG was recorded 26/99 (26.26%) while in current abortion the high rate in IgM was found in single abortion was recorded 14/20 (70%). Statistically analysis results regarding to the IgG

with number of abortion was no significant differences but in IgM was significant differences at level ( $P \leq 0.001$ ).as shown in table (4).

**Table (4) : Prevalence of anti-Toxoplasma gondii according to the number of abortion of previous abortion and current abortion**

Number of Abortion	Number of previous abortion	IgG		Number of current abortion	IgM	
		Positive	Percentage (%)		Positive	Percentage (%)
Single abortion	99	26	26.26	20	14	70
Double abortion	25	6	24	20	4	20
third abortion	9	2	22.22	20	2	10
<b>Total</b>	<b>133</b>	<b>34</b>	<b>25.56</b>	<b>20</b>	<b>20</b>	<b>100</b>
		Chi-Sq 0.339 P-Value 0.844 N.S				Chi-Sq 62 P-Value 0.001**

Respecting to the residency the higher seropositivity of anti – Toxoplasma gondii IgG and IgM found in rural dwellers recorded in IgG 24/90 (26.66 %) and IgM was 9/90 (10%) than those in urban dwellers was recorded in IgG 39/154 (25.32 %) and IgM 11/154 (7.14 %).According to the residency statistically analysis results showed significant differences in both antibodies IgG and IgM.as shown in table (5).

**Table (5) : Prevalence of anti – Toxoplasma gondii (IgG and IgM) according the residency in pregnant women**

Residency	Number tested	IgG		IgM	
		Positive	Percentage (%)	Positive	Percentage (%)
Rural	90	24	26.66	9	10
Urban	154	39	25.32	11	7.14
		Chi-Sq0..034 P-Value 0.853 N.S		Chi-Sq0..477 P-Value 0.490 N..S	

### Discussion

The current study demonstrated a total seropositivity of both antibodies IgG and IgM was 34.01 % , 25.81 % of them was seropositivity for IgG (chronic infection) and 8.19 % was IgM (acute infection) . Table (1) The result of this study agreement with a previous study was conducted by Al-Mayahi[10] in Wasit province was recorded (38.99%) also the results are closer to study was conducted by Ali et al.[11] was recorded (43%) . While the result of present study is disagree with study was conducted by AL-Srayet al.[12] in Wasit Province who recorded seroprevalence of IgG 17 % and 0.8 % for IgM. Maternal infection by Toxoplasma gondii during pregnancy may have serious consequences for the fetus ranging from miscarriage, central nervous system involvement , retinochoroiditis or ocular disease , The ELISA method for the detection of IgG and IgM anti – Toxoplasma gondii antibodies was chosen in this study because a acute infection usually diagnosed on the basis of IgM antibodies detection acute infection [13] while the IgG antibodies means that the infection has happened but do not differ between past or recent infection [14] seroprevalence of Toxoplasmosis varies throughout the world depending on many factors like age , socioeconomic condition , eating and hygiene habits , climate , educational level and geographic location .

Regarding to the age group high seroprevalence of IgG was recorded in age group (20 - ≥29) years was 22.66 % for IgG while in IgM was found in age group (30 - ≥ 39) years was recorded 10.52% while the low result recorded in age group (40 ≥) was recorded 16.66 % for IgG and 0 % for IgM . Table (2) The results in the current study were agreement with study conducted by Shahatha.[15] was recorded the high ratio 65.02 % in

age group (26-30) years. Also the result agreement with study conducted by Haddi and AL-Omashi.[16] was recorded the high rate in age group (21 – 27) years was recorded 42.9 % .

The results in this study were also agree with study conducted by badi and Hamedon.[17] who recorded the highest rate in age group (35 – 39) years was 25 % and the result disagree the study conducted by Al-Mayahi.[10] was recorded the high rate in IgG in age group (40-50) years was recorded 52.94% and in IgM the high rate in age group (16-19) years was recorded 33.33% .Also the result disagree the study conducted by Saadi and Ahmed.[18] who recorded the high ratio 77.77 % in age group (40 – 50) and the low ratio in age group (<20) years was recorded 40 % .

The reason for the high rate of seroprevalence in this age group may be due to several reasons including the high rate of marriage and childbearing at this stage especially in eastern societies, In addition to that this stage represent the peak of activity in domestic work which gives women a greatest opportunity to be exposed to the pathogens of the disease Oocysts and tissue cysts through cooking and cleaning .

As for the time of abortion the high rate in IgG in previous abortion found in the first trimester was recorded 28.12% while in the current abortion the high rate of IgM was found in the first trimester was recorded 90% . The results were agreement with study conducted by Hadiet al.[19] who recorded the high prevalence rate 52.7 % in the first trimester the result were agree also with study conducted by Al-Zubadi.[20] who recorded the high rate of infection in IgM was 23.7% in the first trimester . The result disagree with the study conducted by Kadhim and Al-awadi.[21] who recorded the high rate of infection in the third trimester was 42.69%. The reason may be due to the frequent abortion in the first trimester because the immune system of the fetus at this stage is weak and incomplete and the antibodies formed in the fetus after the third month of pregnancy and the infection during pregnancy depends on the degree of resistance of the fetus and the immunity acquired through the placenta .

According to the number of previous abortions of pregnant women , The single abortion recorded the highest seroprevalence than the double and multiple abortion in current study in IgG was 26.26 % while the high rate in IgM in current abortion was 70 % the result of study is agreement with study conducted by Al-Mayahi.[10] in Wasit province who recorded high prevalence in single abortion was 54.42 % and also agreement the study conducted by Darweesh et al.[22] who recorded the high seroprevalence in pregnant women in single abortion was recorded 50%, The result of study were disagree the results of study conducted by Ali et al.[11] was recorded high prevalence in multiple abortion in IgG who recorded 100%. The reason for the high rate of infection in a single abortion may be due to the fact that some women may have been infected and did not perform the examination , The disease was not diagnosed and the treatment was not taken and with return of the pregnancy infection may recur again . According to the residence the highest

rates in both IgG and IgM was recorded in Rural dwellers in pregnant women were 26.66% for IgG and 10 % of IgM while the results in urban areas were 25.32% for IgG and 7.14% for IgM Table (5) .

The result in this study was agreement with study conducted by Abdullah and Mahmood.[23] who recorded the high prevalence in Rural in both IgG was 44.18 % and IgM 20.39 % , The results in this study were disagree the study conducted by Aliet al.[11] who recorded in urban was 26.5 % while Rural was 16.5 % , The reason for the high rate of infection in the Rural dwellers may be due to the nature of work in agriculture and frequent contact with soil which is the main incubator for Oocysts or because of the lack of health education and guidance for people and their ignorance for the seriousness of the disease .

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