

An epidemiological study of the prevalence of toxoplasmosis in pregnant and aborted women in Salah al-Din Governorate and the effect of infection on some hematological changes in female.

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Abstract

In this study, 60 blood samples were collected from Toxoplasmosis-infected pregnant and aborted women and 30 blood samples from non-infected women. 5 mL of venous blood was obtained and deposited in tubes containing the anticoagulant Ethylene Diamin Tetraacetic acid (EDTA) for a complete blood count (CBC). The current study found that pregnant women had the highest percentage of Toxoplasmosis infection (48.89%). The percentage of people infected reached its peak in the age range 20-30 years, reaching (73.33%). The current study found the highest percentage of infection among housewives (48.33%), and the highest percentage of infection (71.67%) in the case of the affected women having a garden in their home. It was found that there was a significant increase in the number of WBC in the affected women ($9.75 \pm 0.17 \times 10^9/L$). A significant decrease in the number of RBC for the affected women was ($3.87 \pm 0.0 \times 10^{12}/L$). There was a significant decrease in the number of PLT for the affected women. ($226.87 \pm 0.72 \times 10^9/L$) A significant decrease in Hb concentration in the affected women was also recorded (10.28 ± 0.14 g/dl).

Keywords: toxoplasmosis, pregnant, aborted, hematological, epidemiological.

Introduction: *Toxoplasma gondii* is an intracellular obligate protozoa. Toxoplasma parasite completes its life cycle in two hosts, the definitive host represented by cats and the intermediate host represented by humans and other mammals (Mohamed, 2020). Infection with the parasite occurs in three phases, and these phases are: Tachyzoites, Bradyzoites, and Oocysts shed by cats (Lewid and Cabanacan-Salibay, 2012). There are two ways that the parasite *Toxoplasma* might spread infection. The first route is referred to as acquisition through consumption of polluted water or food (Bray et al., 2018). The second mechanism is called congenital, and it involves the virus spreading from the infected pregnant woman to the foetus via the placenta (Asgari et al., 2011).

An imbalance in some blood components, such as white blood cells (WBC), red blood cells (RBC), and platelets (PLT), occurs when a pregnant woman has a toxoplasmosis infection. The infection can also result in anaemia (Hassan et al., 2019).

Materials and working methods

The current study was conducted during December 8, 2022 to May 24, 2022. 60 blood samples were collected from pregnant and aborted women infected with Toxoplasmosis and 30 blood samples from noninfected women. For a full blood count, 5 ml of venous blood was obtained and deposited in tubes containing EDTA, an anticoagulant material. Use a CBC device to give a complete picture of the blood components.

Results and Discussion:

According to the current study, pregnant women had the highest percentage of infection with Toxoplasmosis (48.89%), while aborted women had the lowest percentage (17.78%). (Table 1).

Table (1): Percentage of Toxoplasmosis infection among pregnant and aborted women under study.

Groups		No	Percentage
infected	aborted	16	17.78
	pregnant	44	48.89
control		30	33.33
total		90	100

It is possible that the high frequency of Toxoplasmosis in pregnant women is due to hormonal and physiological changes in the pregnant woman's body, making her vulnerable to infection (Shaaeldin et al., 2018), and that the low risk of infection in abortive women is due to a combination of factors. Abortion (such as black fever, CMV, and so forth) and the cause of abortion are not confined to Toxoplasmosis infection (Hamoud et al., 2021).

It was noted from the results of the current study (Table 2) that the percentage of infection reached its highest value in the age group 20-30 years, reaching (73.33%), and a percentage of infection was recorded at 26.67% within the age group 40-31 years.

Table (2): Percentage of infection with Toxoplasmosis according to the age groups of women under study.

age categories	infected	percentage	uninfected	percentage
30-20	44	73.33	17	56.67
40-31	16	26.67	13	43.33
total	60	100	30	100

This might be because pregnant women between the ages of 20 and 30 frequently visit hospitals and clinics for care and to protect themselves from injuries that might harm the foetus.

The current study found that female employees (20%) had the lowest rate of infection, whereas housewives (48.33%) and farmers (31%), respectively, had the highest prevalence of sickness Table (3).

Table (3): Percentage of infection with Toxoplasmosis according to the occupation of the infected women under study.

groups	infected	percentage	uninfected	percentage
Housewife	29	48.33	17	56.67
farmer	19	31.67	3	10.0
employee	12	20.0	10	33.33

total	60	100	30	100
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This may be because housewives play a significant role in preventing infection by paying attention to hygiene, properly cooking meat, and washing contaminated fruits and vegetables, but lack of knowledge about the sources of infection and methods of transmission of the *Toxoplasma* parasite infection by the housewife increases the risk of infection (Hernández et al., 2019 , Abdulwahhab, 2022).

The existence of a garden in the infected women's home was associated with a higher percentage of toxoplasmosis infection (71.67%), whereas the absence of a garden in their home was associated with a lower percentage of infection (28.33%) (Table 4).

Table (4): Percentage of infection with Toxoplasmosis according to the presence or absence of a garden in the home of the women under study

groups	infected	percentage	uninfected	percentage
having a garden	43	71.67	16	53.33
no garden	17	28.33	14	46.67
total	60	100	30	100

The fact that cats bury their waste in the ground after defecating may contribute to the increase in infection rates in gardens, since this helps to provide the ideal temperature and humidity for sprouting and the development of mature egg sacs (Gilot-Fromont et al., 2012). Infection is caused by the housewife scrubbing the garden, touching contaminated dirt, and not washing her hands.

Based on the findings of (Table 5), it was discovered that the affected women's WBC count increased significantly and reached ($9.75 \pm 0.17 \cdot 10^9/L$). According to the latest findings, the affected women's WBC levels dropped significantly ($3.87 \pm 0.03 \cdot 10^{12}/L$). It was found that there was a significant decrease in the number of PLT for the affected women ($226.87 \pm 0.72 \cdot 10^9/L$) also recorded a significant decrease in the concentration of Hb in the affected women ($10.28 \pm 0.14 \text{ g/dl}$).

Table (5): Level of some blood parameters in women with and without Toxoplasmosis under study.

groups traits	patients	control
	number	
	60	30
WBC $10^9/L$	9.75 ± 0.17 A	6.30 ± 0.20 B
RBC $10^{12}/L$	3.87 ± 0.03 B	5.13 ± 0.04 A
PLT $10^9/L$	226.87 ± 0.72 B	311.87 ± 3.66 A

Hb g/dl	10.28±0.14 B	13.73±0.19 A
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* The different capital letters within the same row indicate that there are significant ($p \leq 0.05$) differences between the groups. The fact that WBCs are defensive cells, and any rise in their number denotes the presence of inflammation in the body, may be the cause of the increase in their number. The immune system responds to inflammation or the introduction of any foreign body by treating it as such. As a result, the immune system is stimulated, which in turn causes an increase in WBC production (Hernández et al., 2021, Al-Qadi et al., 2019). This is due to WBC's high phagocytosis and motility capacities (Chielewski and Strzele, 2018). Regarding the absence of an RBC count, recent research have shown that anaemia in pregnant women is a worldwide problem that affects 41.8% of pregnant women (Garzon et al., 2020). Possible explanations for the decline in RBC count include the high anaemia prevalence. The parasite's infected host's body's tissue necrosis process, which causes haemorrhaging as a side effect, may be held responsible for the drop in RBC red blood cells. The explanation for the decline in PLT could be related to pregnant women's increased blood plasma volume (Agueree and Gernand, 2019).

Regarding the decline in Hb concentration in infected women, research has shown that anaemia is caused by the presence of some parasites, such as the *Toxoplasma* parasite, in the body (Nampijja et al., 2022, Abdulwahhab, 2021). From this, we can infer that anaemia, which reduces the number of RBC red blood cells (which contain haemoglobin inside), is the cause of the low haemoglobin Hb concentration in women with toxoplasmosis. This decrease in the number of erythroid RBC blood cells is consequently accompanied by a decrease in the concentration of haemoglobin Hb

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