

Incidence rates of *Toxoplasma gondii* chronic infection among aborted women in Elmergib region, Libya

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Abstract:

Toxoplasma gondii is an obligate intracellular parasitic protozoan that causes the disease toxoplasmosis. The parasite capable of infecting a broad range of intermediate warm-blooded hosts including humans, and it is still the major causes of abortion in pregnant women.

73 serum samples were collected from aborted women who live in Elmergib region during the period from October 2021 to March 2023. Samples were screened against anti *T gondii* IgG using commercially available ELISA kits according to the instructions provided in the manufacturer's manual.

In a total of 73 Libyan aborted women anti *T gondii* IgG was detected in 51.00%. Our results showed high prevalence of *T gondii* infection among Libyan women who had miscarriages compared with pregnant women who did not have abortion, the patients age had not significant relation with *T gondii* infection. In conclusion, according to the finding of this study, toxoplasmosis could be considered a potential risk factor for abortion. It is recommended to carry out further and more comprehensive investigations to determine the effect of *T. gondii* infection on abortion in Libya.

Keywords: *Toxoplasma gondii*, Aborted women, IgG antibodies, ELISA, Elmergib region, Libya.

معدلات الإصابة المزمنة بطفيل التوكسوبلازما بين النساء المجهضات في منطقة المرقب، ليبيا

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الملخص:

طفيل التوكسوبلازما جوندي *Toxoplasma gondii* هو حيوان أولي داخلي التطفل يسبب داء المقوسات. هذا الطفيلي قادر على إصابة مجموعة واسعة من الحيوانات ذوات الدم الحار بما في ذلك البشر، ولا يزال يعتبر من الأسباب الرئيسية للإجهاض عند النساء الحوامل.

تهدف هذه الدراسة إلى توفير بيانات عن معدلات انتشار طفيل التوكسوبلازما عند النساء المجهضات في منطقة المرقب حيث تم جمع 73 عينة مصل من النساء المجهضات اللاتي يعشن في منطقة المرقب خلال الفترة من أكتوبر 2021 إلى مارس 2023. وتم فحص العينات لوجود الأجسام المضادة من نوع IgG والمتخصصة لطفيل *T gondii* باستخدام تقنية ELISA وفقاً للتعليمات الواردة في دليل الشركة المصنعة.

في إجمالي 73 امرأة ليبية مجهزة، تم اكتشاف وجود الأجسام المضادة IgG المتخصصة لطفيل *T gondii* في 51.00% من العينات. أظهرت نتائج هذه الدراسة ارتفاع في معدل انتشار عدوى *T gondii* بين النساء الليبيات اللاتي تعرضن للإجهاض في منطقة المرقب مقارنة بنتائج الدراسات السابقة في الدولة والإقليم، نتائج التحليل الإحصائي أثبت أن العمر ليس له علاقة بمعدل الإصابة في هذه الدراسة. في الختام، وفقاً لنتائج هذه الدراسة، يمكن اعتبار داء المقوسات عامل خطر محتمل للإجهاض في منطقة المرقب ليبيا لذا نوصى بإجراء المزيد من الدراسات عن هذا الطفيل لتحديد تأثير عدوى المقوسة على معدلات الإجهاض في ليبيا.

الكلمات المفتاحية: توكسوبلازما جوندي، النساء المجهضات، الأجسام المضادة IgG، الإليزا، منطقة المرقب، ليبيا.

1. Background:

Toxoplasmosis is a parasitic zoonotic disease caused by the protozoan *Toxoplasma gondii*, the organism is first discovered by Nicolle and Manceaux in 1908 [1][2], *T gondii* is obligate intracellular parasite, it has three infectious forms: sporozoites (in oocysts), tachyzoites (rapidly multiplying form) and bradyzoites (tissue cyst form) [3][4].

People often get the infection from eating undercooked meat, and can also get it from contact with cat faces, Rarely, the disease may be spread by blood transfusion [5][6]. The parasite can pass to a baby during pregnancy [5]. Most people infected with *T gondii* do not have symptoms because the immune system usually keeps the parasite from causing illness. Some people get flu-like symptoms. Serious disease most often affects infants and people with suppressed immune systems Toxoplasmosis during pregnancy may cause abortion and fetal abnormalities [2][7]. Prevention is by properly preparing and cooking food, Pregnant women are also recommended not to contact with cats or, if they must, to wear gloves and wash their hands afterwards [5][8].

Based on formal reports, over one billion people in the world are estimated to be infected with *T. gondii* although; epidemiological data has shown that the global seroprevalence of *T. gondii* infection varies from 0.6% to 43.8% in women with abortions [5]. On the other hand, the prevalence of *T. gondii* infection in women with abortions is not well known and there is very poor knowledge about the characteristics of women with miscarriages in connection to *T. gondii* infection [3][4][8].

In this study, we aimed to determine the prevalence of *T gondii* in Libyan women who had abortion at Elmergib region, depending on seroprevalence of anti *T gondii* IgG using ELISA technique.

2. Methods:

Clinical isolates: blood serum samples were collected from 73 Libyan women who had abortion in the period between October 2021 and March 2023. All of 73 women are lived in Elmergib region.

Samples were investigated for anti *T gondii* IgG using ELISA to determine the chronic infection with *T gondii*. The serological tests were performed using commercially available ELISA kits according to the instructions provided in the manufacturer's manual. Anti-*T gondii* IgG in-vitro ELISA (Enzyme-Linked Immunosorbent Assay) kit is designed for the accurate quantitative measurement of IgG class antibodies against *T gondii* in Human serum. A 96-well plate has been precoated with *T gondii* antigens to bind cognate antibodies. Controls or test samples are added to the wells and incubated. Following washing, a horseradish peroxidase (HRP) labelled anti-Human IgG conjugate is added to the wells, which binds to the immobilized *T gondii* specific antibodies. TMB is then catalyzed by the HRP to produce a blue color product that change to yellow after adding an acidic stop solution, the density coloration is directly proportional to the amount of *T gondii* IgG sample captured in plate. The association between *T gondii* infection, abortion status and patient's age was explored. Statistical analyses were performed with manual Statistical formulas.

3. Results and discussion:

In a total of 73 Libyan women who have had abortion *T gondii* chronic infection was detected in 51.00% of these cases. Our results showed high prevalence of anti *T gondii* IgG in Libyan women who had miscarriages, the patients age had not significant relation with *T gondii* infection (table1, figures 1 and 2).

Table 1: Characteristics of patients with *T gondii* infection.

	Age Group (years)			Total N = 73
	15-25 N = 36	26-35 N = 25	36-45 N = 12	
Anti <i>T gondii</i> IgG positivity	19 (53%)	13 (52%)	5 (42%)	37 (51.00%)
Indicators	1- Age was not significant. R= -0.05 2- Overall prevalence was high. 3- All samples from women who had abortion.			

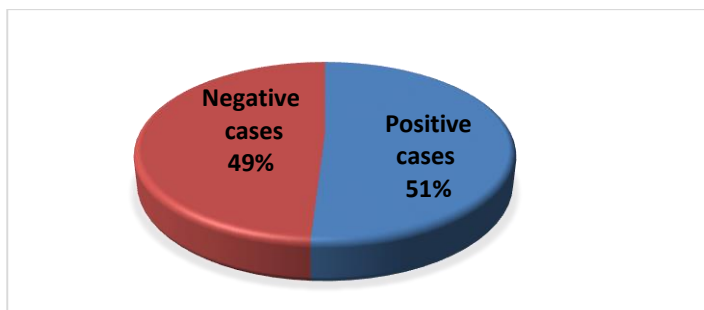
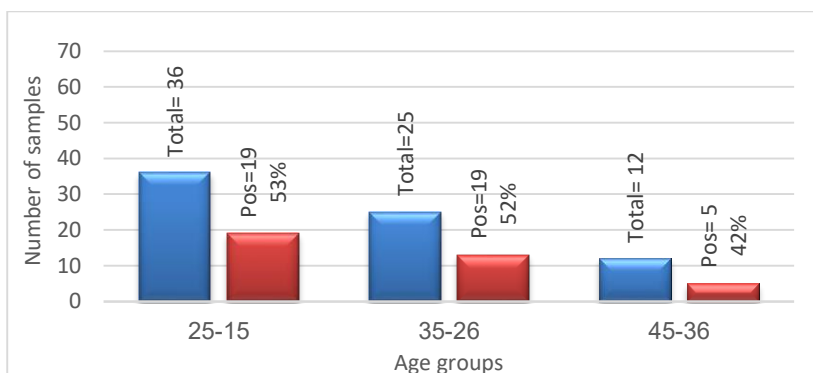


Figure 1: Pie chart of anti *T gondii* IgG positivity among 73 aborted Libyan women.



Red bars refer to positive cases in each age group.

Blue bars refer to the total cases in each group.

Figure 2: Prevalence rate of anti *T gondii* IgG among aborted women by age groups.

Many reports indicated high prevalence of *T gondii* infection in deferent geographical areas, In Egypt, on the basis of four studies conducted on blood donors, the recorded prevalence of *T. gondii* from Dakahlia, Alexandria, and Benha was found ranging from 33.6- 67.4% [9]. In Tunisia, toxoplasmosis represents a common parasitic infection with an overall prevalence estimated at 58.4% and Toxoplasmosis seroprevalence in Tunisian pregnant women ranges from 39.3% to 45.6% [10]. The current study also showed high seroprevalence of anti *T gondii* IgG among Libyan women who had miscarriage (51.00%).

There was a seroprevalence study of toxoplasmosis among Libyan pregnant women conducted in Benghazi, the prevalence ranges between 44.8 %, 47.4 % and 50 % [11]. However, in Tripoli the prevalence of *T gondii* infection among non-pregnant Libyan women was estimated to be around 18.14 % and 43.4 % among adult males, and 43.7 % of school children [12][13]. While in the current study the prevalence of anti *T gondii* IgG among aborted women was 51.00% our results showed high prevalence of *T gondii* in aborted women compared with women who did not have abortion. *T gondii* is one of the major causes of abortion in pregnant women. Most cases of abortion occur in the acute phase of infection and early pregnancy. The relations between Toxoplasmosis and abortion established. There was a study indicated that, the seroprevalence positive rate of IgG among women who had experienced abortion was observed 32% and the seroprevalence positive rate of IgM based on the fixed-effect model and positive IgG rate based on the random-effect model was evaluated 4% and 32% among women immediately after an abortion, respectively [14][15]. Our study indicated high prevalence of anti *T gondii* IgG among Libyan women who had abortion in Elmergib region.

4. Conclusion:

According to the finding of our study, toxoplasmosis could be considered a potential risk factor for abortion. It is recommended to carry out further and more comprehensive investigations to

determine the effect of *T. gondii* infection on abortion to prevent and control toxoplasmosis among pregnant women around the country.

5. References:

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