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Epidemiological Study on Toxoplasmosis in Cat, Healthy and Contact Human in Al-Anbar Governorate

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ABSTRACT

Introduction: One of the most typical illnesses in women is toxoplasmosis, and considered a transmissible disease between humans and animals. Cats show a major part in contributing to the spread of toxoplasma, so they stay the final host, which shed their eggs with feces to the environment, which leads to contamination of water and food. **Objective:** The purpose of the current research is to determine if keeping cats at home contributes to the spread of toxoplasmosis or not, and what is the difference between stray and pet cats in the spread of the disease. **Patients and Methods:** An epidemiology research on toxoplasmosis was undertaken in Anbar province. A total 120 human blood samples were collected from people attending veterinary clinics in Anbar Governorate and 62 fecal samples of cats, from November 2021 to April 2022. Human's samples were tested by Latex agglutination, while cat's samples were tested by direct detection of oocyst.

Results: The result showed that 33 of 120 (27.5%) blood sample of female human were positive by (latex test IgM, IgG) and 87 of 120 (72.5%) were negative. These samples were divided into woman having cat (51.67%) and woman don't have cat (48.33%). The result of cats showed oocyst (9.67%) positive result fecal samples of cats, using feces flotation method.

Conclusion: Toxoplasmosis infection does not only occur in people who own cats, because many infected people did not have direct contact with cats, but may be infection by undercooked meat or by the soil that holds the eggs.

Keywords: Toxoplasmosis, Epidemiological Study, Human, Cats, Cross sectional study, University of Baghdad.

INTRODUCTION

Toxoplasmosis is composed of intracellular obligate protozoan organism *Toxoplasma gondii (T.gondii*), that able to infected people and other warm blood animals. Toxoplasmosis had a world-wide propagation with almost one third of the world-wide people expected to have infection with that organism [(1)]. Toxoplasmosis is an expanded infectious disease caused by *T.gondii*. Human, veterinary, and environmental health all have economic value [(2)]. Toxoplasmosis is a cause of fetus dead because *T.gondii* can be transferred to the fetus across the placenta (trans-placental) from an infested mother or at vaginal liberation [(3)].

Recently, **Asal** revealed the highest infection rate reported among younger animals while it was the lowest in older animals [(4)]. However, **Bisson *et al.*** concluded that health then ingesting of infected milk and meat can enable zoonotic diffusion of toxoplasmosis has a large variation of hosts [(5)], as approximately each warm-blooded domestic animal can be infested. Sexual reproduction of parasite that cause by only happening cat and Felids (final host), while asexual reproduction occurs in together final and intermediate host [(6,7)]. Oocyst remain transit in the fecal of cats and be transmissible within 21 days of actuality shed. Tachyzoites escape and reproduce only in an intracellular site but tissue cysts having many nor do limited bradyzoites take place in the tissues of infested animals during a week of infectivity [(8)]. Consumption of tissue cysts in infested meat or oocyst from water, food, or soil infective by feline feces are the two main ways of diffusion [(9)]. Rarely, *T.gondii* transmission occurs after blood transfusions and organ replacements in immunocompetent individuals who were 90% asymptomatic when they contracted toxoplasmosis [(10)]. Symptomatic diseases commonly cause few mark fever, headache, malaise, cervical Lymphadenopathy. Severe and pneumonia are rare but can complicate severe [(10)], lead to death in immunocompromised patient [(11)]. Diagnosis of toxoplasmosis infectivity may be recognized by serologic checks, molecular techniques, histological validation of the parasite, a toxoplasmin skin experiment and by isolation of the parasite [(12,13)]. Molecular techniques trust on PCR for the exclusive detection or examination of *T. gondii* DNA. From humans and animals [(14, 15)]. Real-time PCR remains to amplify DNA of *T.gondii* B1 gene [(16)]. Real-time PCR utilizes the 59-nuclease activity of Taq DNA polymers [(17)].

PATIENTS AND METHODS:

Sampling: Samples were collected from 120 female human blood from different areas in Al-Anbar governorate (52) in Ramadi city center of Al-Anbar and (43) Jazert Alramadi, Falluja (19) and (6) from Heet.

Serological test: The sample of all cases survived examined for the existence of exclusive IgG, IgM anti-Toxoplasma antibodies. The kit was used concurring to the company's orders but can briefly illustrated by adding 50µl of Toxo-latex substance was additional to 50µl of blood samples on slid, mixed and revolved on involuntary rotator (100 rpm) for 5 min. After mark of agglutination showed mean positive sensitive. Positive and negative controls were involved.

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Fecal samples: the cat shedding the oocyst of *T.gondii* with fesses to environment oocysts were recognized according to the Sheather, Hoffman Pons Janer or Lutz (HPJL), Willis techniques [18 – 20]. The oocysts of *T.gondii* in cat were identified by measurement of oocyst diameter using the procedure designated by **Simamora *et al.*** [22].

Ethical consideration:

The analysis was accepted by the Ethics Board of the University of Baghdad, College of Veterinary Medicine and written informed consent was taken from each person in the analysis. This is work was carried out in agreement with World Medical Association for studies that include Human.

Statistical analysis:

Data calm and processed were encoded it was analyzed by means of SPSS (the statistical packet for Medical Sciences) v20 aimed at Windows (IBM SPSS Corporation, Illinois, USA). To ensure that our data for normal distribution, we performed the data tested qualitative data ratios. Chi square analysis ($\chi 2$) to evaluate the alteration among two or more qualitative collections variants. P value < 0.05 was considered significant.

RESULTS

The result showed 33 out of 120 (27.5%) blood sample of female human were positive by (latex test IgM, IgG) and 87 out of 120 (72.5%) showed negative that show in **Figure 1**.

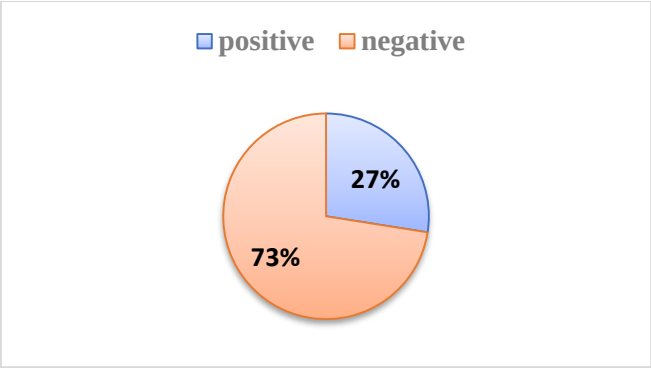

Figure (1): Results give the positive and negative case of toxoplasma latex agglutination test from female human blood sample.

The result of total 120 blood sample from female human that have cat was 62 (51.66%) show 20 (32.25%) positive result for toxoplasmosis in latex agglutination test and female human that don't have cats was 58 (48.33%) show 13 (22.41) positive result for toxoplasmosis in latex agglutination test in **Table 1**.

Table (1): Female human of toxoplasmosis that have and don't have cats.

Variable	Have cats	Don't have cats	Total
Positive	20	13	33
Negative	42	45	87
Total	62	58	120

Blood Samples were composed from 120 female human from dissimilar regions in Al-Anbar governorate (**Figure 2**).

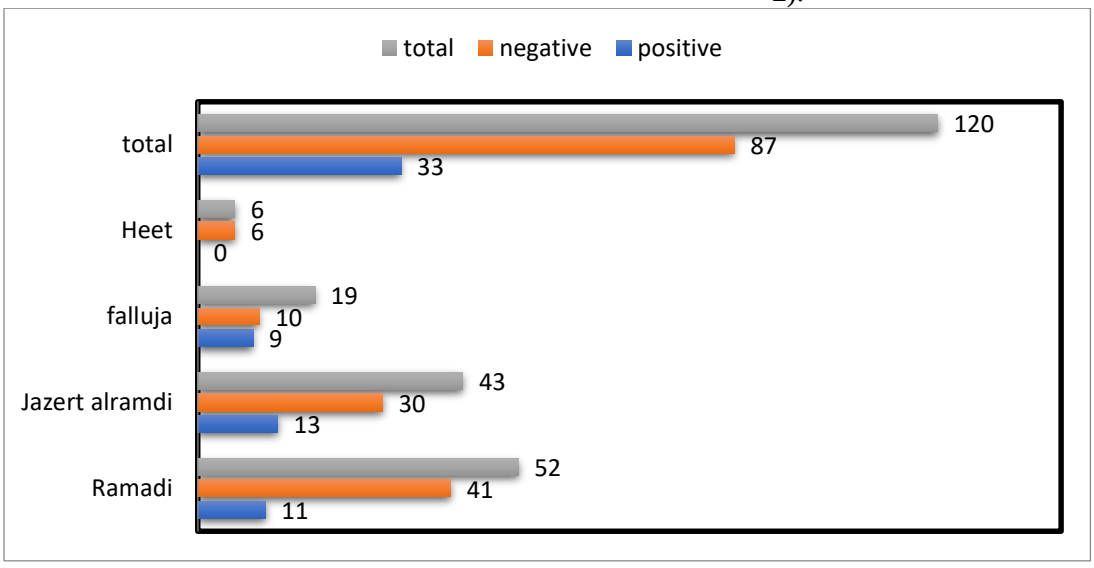

Figure (2): Result of distribution according to districts of Al-Anbar governorate.

Cats divided in to pet (35 out of 62) and local (27out of 62) cats. Positive the oocyst in the direct examination of microscope as show 2 (5.7%) in pet cat and 4 (14.8%) in stray cat, all these result are summarized in **Table 2** and **Figures 3 and 4**.

Table (2): The oocyst in the direct examination of microscope.

Variable	Pet cats	Stray cats
See oocyte	2	4
Don't see oocyst	33	23
Total	35	27

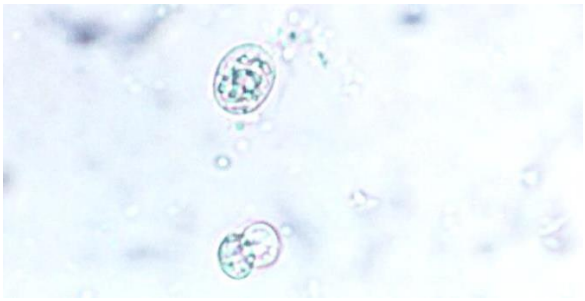

Figure (3): Oocyst of Toxoplasmosis.

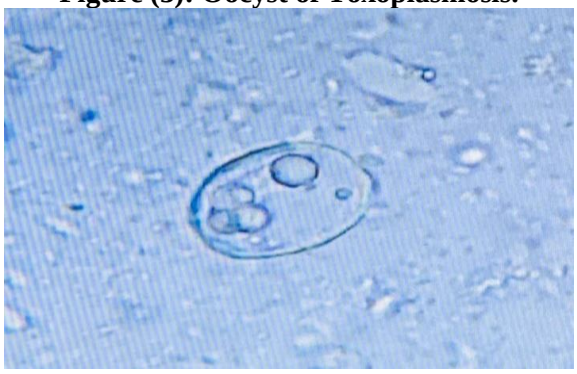

Figure (4): Oocyst of toxoplasmosis.

DISCUSSION

The rate of infection with *Toxoplasma* in women blood was 27.5% (33\120),this result was close agreement with **Al-Mosawi,** [22] and **Al-Ghezy,** [23] in Thi-Qar who recorded 21.94% and 23% respectively, and the rates **Al-Sary** reported are the closest [24] in Al Kut who recorded 17.8% rate and with **Razan and Hamad** [25] in Kirkuk who recorded 16.13%,and was opposed to **Qazaz** [26] and **Al-Sorchee** [27] in Baghdad that recorded 78.33% and 80.6% rate of infection respectively and **Al-Doori** [28] who recorded 49% in Tikrit, and **Hade *et al.*** [3] in Baghdad (61.54%).The differences in the total rate of infection with *Toxoplasma* in women blood by serological test latex attributed to several factors such as the number of samples collected, kind of serological tests used also other factors related to the socioeconomic and cultural habits of community and close contact with cats as a final host of the parasite, and the environmental conditions that effect on the infection. With regards to the studies out of Iraq this study disagreed with the results of seroprevalence in (40%) in Iran such as study recorded by **Sharif *et al.*** [29]**.** who revealed that when using ELISA respectively whether 58% were recorded by **Switzer *et al.*** [30]. In Istanbul (76.4%) toxoplasmosis antibodies were positive in street kitten [31]. While Tehran in Iran, the seropositive occurrence reached from 40% in north Iran to 86-90% street cats [32,33]. Due to difference in amount of sample, methods life of this cats, nutrition and circumstance create seroprevalence outcomes hard to compare with **Tiao *et al.*** [34]. The diagnosis and identification of *T.gondii* oocyst was done according to shape and size of this oocyst duo to their similarity to some of the parasite, and other parasites especially *Cryptosporidium* spp. These oocysts were well identified by their size and shape considering the large similarities and were confirmed as toxoplasma oocyst by **Nasiru *et al.*** [35] who found in cat fecal samples an infection rate 3.5% in Malaysia by the direct wet mount smear. These differences in the infection rates could be due to the difference in the sample numbers used, the experience of the examiner and the environmental conditions.

CONCLUSION

Toxoplasmosis is a potential illness that might affect women with or without cats, and this is attributed to other possibilities, including living in the countryside or eating food and water contaminated with toxoplasma eggs, as well as stray or pet cats, both of which are not free from toxoplasma eggs.

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