

Toxoplasma Seroprevalence in Healthy Voluntary Blood Donors from Blood Bank of Baghdad

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Abstract:

In this study (300) blood samples were collected from healthy volunteer at national transfusion center, ministry of health, republic of Iraq, was examined for anti-*Toxoplasma gondii* antibodies by enzyme linked immunosorbent assay. The seroprevalence of anti-*Toxoplasma gondii* total IgG, IgM antibodies were 85 (56.6%), 40 (26.6%) respectively. While positive rate for IgG, IgM in female and male were 65 (43.3%), 35 (23.3%) and 20 (13.3%), 5 (3.3%) respectively. The high positive rate of IgG and IgM appear in female who age rated between (21-30) and (31-40) years old, were 27 (25.7%), 7 (15.5%) respectively. Also rate of toxoplasmosis in married women greater than married men 27 (28.4%), 2 (1.9%). The same things for women cats breed, the rate of IgG and IgM was 24(44.4), higher than men who breed cats.

Key word: *Toxoplasmosis, Toxoplasma gondii.*

الخلاصة :

في هذه الدراسة تم جمع (300) عينة دم من أشخاص أصحاء متبرعين بالدم في بنك الدم ببغداد، مكونة من (150) ذكر و (150) انثى، وفحصت للكشف عن أعداد الأجسام المضادة لطيفلي المقوسات باستخدام فحص الاليزا. كانت النتائج الكلية لمستويات IgG و IgM هي 85(56.6)%، 40(26.6)%، أما النسب الموجبة لـ IgG و IgM للذكور والإناث كانت 65(43.3)%، 35(23.3)% و 20(13.3)%، 5(3.3)% على التوالي. ظهرت النسب الموجبة العالية في النساء التي تراوحت أعمارهم بين (21-30) و (31-40) لـ (IgG and IgM) إذ بلغت 27(25.7)%، 7(15.5)% على التوالي. أيضا بلغت نسبة الإصابة في النساء المتزوجات أعلى من الرجال المتزوجين وبلغت 27(28.4)%، وكذلك نسب (IgG and IgM) لمربيات القطط 24(44.4)% أعلى من المربين للقطط.

Introduction:

Toxoplasma gondii is a well known zoonosis that is a causative agent for abortions, eye problems and mental retardation in children of women who acquire primary infection during pregnancy [1], from meat and meat products or water [2].

Toxoplasma gondii infection in pregnant women can be transmitted to the fetus and may cause mental retardation, blindness, epilepsy and death [3].

Toxoplasma gondii can also cause severe encephalitis via acute infection or reactivation of latent infection immune-suppressed persons [4,5].

Routes of parasite transmission in humans include first ingesting food or water that is contaminated from cats and other members of the felid are the

definitive hosts of the parasite and shed the oocysts after they are infected [2]. These oocysts contain infective sporozoites that can cause human infection by fecal-oral transmission [5].

Humans can also be exposed to bradyzoites, contained in tissue cysts of the intermediate hosts particularly food animals, through consumption of improperly cooked with oocysts shed by cats, second eating under cooked or raw meat containing tissue cysts [4,6,7]. Third transplantation and blood transfusion [8,9].

Although many infections can be transmitted through blood transfusion, it is not possible to carry out screening tests for all.

Among the protozoan disease transmitted by blood transfusion in India,

the most important is malaria, followed by toxoplasmosis [7,8].

The epidemiology of *Toxoplasma gondii* in blood donors has been poorly studied in Iraq, there is not any seroprevalence study of *Toxoplasma gondii* screening program in blood donation, therefore, we performed study to determine the seroprevalence *Toxoplasma gondii* infection in blood donors of Baghdad and to identify characteristic of blood donors associated with seropositivity.

Materials and Method:

Sample collection:

Three hundred blood donors in center blood of Baghdad city, Iraq. For both sexes, we examined for *Toxoplasma gondii* infection between June to December (2009). Blood donors were tested for anti-*Toxoplasma gondii* IgG and IgM antibodies by ELISA (enzyme linked immunosorbent assay) socio-demographic from each participant were also obtained.

Serum preparation:

For each samples, approximately (5 ml) of blood was aseptically drawn by vein puncture into a tube without anti coagulant and refrigerated overnight at (4c), it was then centrifuged, serum harvested and stored.

Laboratory tests:

Serum samples of blood donors were analyzed for anti- *Toxoplasma gondii* IgG and IgM antibodies by a commercially available enzyme immunoassay *Toxoplasma* IgG and IgM Kit (Biochek USA, sera positive for anti- *Toxoplasma gondii* IgG antibodies were further analyzed for anti- *Toxoplasma gondii* IgM antibodies by commercially available enzyme immunoassay *Toxoplasma* IgM and IgG kit (Biochek USA).

Sociodemographic data:

The demographic data included age, material status, breed of cats in the house-hold.

Results:

Over all the (300) healthy donors at center blood banks of Baghdad city, Iraq in the table-1 shows the total positive rate for IgG, IgM is 85 (56.6%), 40 (26.6%) respectively, and 65 (43.3%) of female were positive rate for IgG, while a total of 35 (23.3%) were positive for IgM antibodies, but in male we noted 20 (13.3%) were positive for IgG, while a total of 5 (3.3%) were positive for IgM antibodies. Table-2 shows the seroprevalence of toxoplasmosis with various demographic back grounds and risk factors studied, were found age between (21-30) years had a higher seroprevalence rate of toxoplasmosis 27 (25.7%) of both IgG and IgM antibodies in female but in male at the same age (21-30) the ratio toxoplasmosis IgG and IgM (0%) no significant, but in the female who had age between (31-40) years the ratio of toxoplasmosis IgG and IgM were 7 (15.5%), but in male were 2 (2.2%), while in female with age between (41-50) years the ratio of toxoplasmosis IgG and IgM were (0%) but in man with the same age this rate were 2 (6.6%). In addition in table (2), association with marital status we found in married female the ratio of toxoplasmosis (IgG and IgM) were 27 (28.4%), but in single female ratio were 7 (12.7%), but in married man the ratio were 2 (1.9%). In addition with cat in the household the ratio of toxoplasmosis (IgG and IgM) if it yes in female the ratio were 24 (44.4%), but if on the ratio were 10 (10.4%), but in male if it yes the ratio were 3 (10%), but if it no the ratio was 1 (0.83%).

Table-1: The frequency of toxoplasmosis healthy blood sampled at blood bank.

Gender	No. of donors Blood tested	No. (%) positive IgG	No. (%) positive IgM
Male	150	20(13.3)%	5(3.3)%
Female	150	65(43.3)%	35(23.3)%

Table-2: Seroprevalence of *Toxoplasma gondii* immunoglobulins (IgG and IgM) by other related risk factors

Risk factors	No. of health female	No. (%) positive IgG and IgM	No. of health male	No. (%) positive IgG and IgM
1.age(years) 21-30	105	27 (25.7)	40	0
31-40	45	7 (15.5)	80	2 (2.5)
41-50	0	0	30	2 (6.6)
2.marital status married	95	27 (28.4)	104	2 (1.9)
single	55	7 (12.7)	46	2 (4.3)
3.cat in the Household Yes	54	24 (44.4)	30	3 (10)
No	96	10 (10.4)	120	1 (0.83)

Discussion:

In the present study, we found (28.3%), (13.3%) ratio for IgG and IgM respectively of *Toxoplasma gondii* infection in healthy blood donors. This prevalence could be considered moderate, also on the sensitivity of the test might raise. However we think that the sensitivity of the test was good and the result were reliable.

This prevalence is similar that report in the Bombay ^[10], in Urban Karnataka ^[6], where researchers found that (26.2%) and (20.3%) of blood donors were positive for anti- *Toxoplasma gondii* antibodies, respectively. Our prevalence found in Baghdad is also much lower than these reported in blood donors from New Zealand were found (42.9%) ^[11]. In contrast, our prevalence was comparable with the (7.4%) found in blood donor of

Mexico^[11], and (4.9%) in Thailand^[12]. It is possible that difference in the characteristics of the blood donor and difference in the environments might contribute to explain difference our results than those reported from other countries. In addition consumption of under cooked or raw meat is rarely found among our blood donors may also contribute to explain the low frequency of infection also environmental characteristic of Baghdad city as dry climate, may also contribute to explain the frequency of infection. This explanation is supported by previous observation that prevalence of *Toxoplasma gondii* infection in populations living in dry climate was lower than those living in other climates ^[13,14,15], our results showed higher prevalence of infection in female than male blood donors, that may referred to female more exposure to

contaminated water, food and usage meat more than male^[16]. In this study the higher positive rate were seen in age of (21-30) years, hypothesis would be that in this age increasing exposure years as the human get older^[17]. The fact that in this study the variable (cat at home) was associated with infection indicates that *Toxoplasma gondii* infection in our infected population might have occurred by ingestion parasite oocyst in contaminated food or water contact with cats has not always been associated with *Toxoplasma gondii* seropositivity in epidemiology studied, as shown in previous study in blood donors and human immunodeficiency virus (HIV) patients^[18,19].

We are unable to judge whether fraction of our blood donors might represent a risk group for parasite transmission by blood transfusion as reported previously^[19, 20].

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