

Sero prevalence of *Toxoplasma gondii* antibodies in Karbala **الوبائية المصلية للأجسام المضادة لطفيلي المقوسات الكوندية في كربلاء**

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الخلاصة

اجريت هذه الدراسة للتحري عن تعرض النساء لطفيلي *Toxoplasma gondii* عن طريق الكشف عن الأجسام المضادة لهذا الطفيلي للفترة من عام 2008-2009 في كربلاء. إذ اجريت هذه الدراسة الوصفية التحليلية لعينات المصول بشكل عشوائي ل (288) شخص وتم اختبارها بواسطة فحص التلازن (Toxocell latex, Biokit, Barcelona, Spain). كانت نسبة انتشار المرض بشكل عام في كربلاء هي 67.7% و قد كانت هناك فروق معنوية في مجاميع المواقع حيث كانت الدلائل المصلية للتعرض لطفيلي المقوسات في منطقة الحيدرية (مدنية) اكبر بشكل معنوي منه في مركز المدينة , ووجد فرق معنوي عالي في مجموعة الأعمار (18-30) مقارنة لمجموعة الأعمار (30-43) و لم تتواجد فروق معنوية بين المجاميع الثانوية من حيث العمر ونوع المهن و مستوى التعليم و الحالة الزوجية و تواجدها بين الحيوانات بصورة عامة.

Abstract:

This Seroprevalence study is conducted to determine the prevalence of infection with *Toxoplasma gondii* in women by detection of antibodies in serum samples for this parasite in the period 2008 – 2009 in Karbala.

So descriptive and analytical study was carried out to serum samples taken from (288) persons from Karbala randomly, and had been tested by latex agglutination test (Toxocell latex, Biokit, Barcelona, Spain). The over all seroprevalence of *T.gondii* was (67.7%). in location groups Haidarea (urban) seroprevalence of *Toxoplasma* antibodies is greater significantly than ancient city center, there is high significant difference in the women with age group (18-30) than the age group than (31-43) , no significant difference between subgroups according to (age, type of occupation, education, marriage animal presence).

Introduction:

Toxoplasma gondii is an intracellular protozoan parasite of medical importance. Toxoplasmosis is an infectious disease affecting both animals and humans (1). Toxoplasmosis is a worldwide distributed zoonotic disease caused by the ingestion

of undercooked meat or the water contaminated with Oocyst or tissue cysts of *Toxoplasma gondii* (2).

Its estimated that 20-90% of the world adult population depending on the region, already had been had contacted with the parasite (3). Avoidance of human contact with cat feces is clearly important in control particularly pregnant women with negative serologic tests (4).

Toxoplasmosis prevalence is related to several factors ,including cultural levels ,nutritional habits ,age , residency setting .seroprevalence of toxoplasmosis in some Asian countries from 17-48% have serologic evidence of previous exposure to the parasite(5).

This parasite is iniquitously distributed throughout the world, so that the antibodies specific for *Toxoplasma* were observed in humans at various rates in almost all nations (6).

Especially, old surveys in some human populations reported extremely high prevalence rates of approximately 90%. Once infected, humans cannot eliminate the parasite, and specific antibody persists throughout life. Therefore, antibody prevalence rates indicate the percentage of humans who harbor *Toxoplasma* parasites (7). Acquired toxoplasmosis is usually asymptomatic and benign (8).

Diagnosis of toxoplasmosis is performed by the isolation of parasite from patients and more commonly by serological tests (9).

Materials and methods:

Study population: this group consist of (288) persons distributed according to age into two groups (18-30) and (31-43), that represent child bearing age for females; the study population live in several parts in Karbala city including urban areas (Haydarea, Jazera, ancient city center,) and semi rural area around it, with deferent educational and occupational levels.

Serological test: in this study all sera were screened using latex agglutination test for semi quantitative detection of anti *Toxoplasma* antibodies (Toxocell latex, Biokit SA , Barcelona, Spain) this is a rapid test using latex particle for determination of anti *Toxoplasma* antibodies in serum qualitatively and semi quantitatively.

Statistical analysis: it performed with student's T- test to asses the significance of differences between groups.

Results:

From 288 serums the over all seroprevalence of *T.gondii* in studied population was 195 (67.7 %).

Table (1) represent distribution of positive anti *Toxoplasma* antibodies according to titer frequency (the serum that gave prevalent titer less than 10 IU/ml considered negative) , that the most prevalent titer was 20 IU/ml represent (27%) of positive sera , in contrast the least in frequency was 320 IU/ml represent (9 %) of positive sera.

In addition positive sera titrations differences among risk factors (Locality, Age, Occupation, Education, Animal presence, Marriage), reveal that no deference between risk factors in titrations levels except age that titrations in (18-30) group is higher significantly than (31-43) group table (2).

Distribution in positively for serum of anti *Toxoplasma* antibodies (total) that represent past exposure table (3) indicates that there are a significant deference among groups of location that Haydarea (urban) higher significantly than City center, while no significant difference among outside Karbala city (semi rural) and Jazera (urban) with other locations and between them.

No significant differences in positively for serum distributing among risk factors (Location , Age, Occupation, Education, Animal presence, Marriage) table (4).

Table 1: Distribution of anti *Toxoplasma gondii* antibodies concentrations with its frequencies and percentages.

Seropositive with total antibodies concentration IU/ml	Frequency	
	NO.	(%)
10	21	(12.12)
20	54	(26.66)
40	45	(23.03)
80	24	(12.12)
160	33	(17)
320	18	(9)
Total	195	(100)

Table(2): Titrations differences among studied positive groups, represents no deference between risk factors in titrations levels except age factor that titrations in (18-30) group is higher significantly than (31-43) group.

Risk factor	group	NO of tested	T grouping	P-value
Age	18-30	252	A	0.04*
	31-43	36	B*	
Address	Semi rural outside city	21	A	1.91
	Haydarea	63	A	
	ancient city center	66	A	
	Jazera	138	A	
Occupation	instructor	39	A	0.54
	student	243	A	
	staff	16	A	
Education	high school and more	39	A	
	primary school	249	A	
Animal presence	absent	123	A	0.10
	present	165	A	
Merriment	marred	60	A	1.50
	not marred	228	A	

***Means of sub groups with different letter within the same column are significantly different.**

* Confidence interval = 0.95

Table (3): distribution of positive serum for antitoxoplasma antibodies according to location differences significantly center.

Group	NO. of tested	sero positive	sero Positive rate	T Grouping
Haydarea	63	57	90.4	A
Semi rural outside city	21	15	71.4	AB
Jazera	138	87	63	AB
ancient city center	66	36	54.5	*B

*Significant P-value : 0.05

***Means of subgroups with different letter within the same column are significantly different. , AB Letters refers to sub groups that not significantly different with A and with B subgroups.**

* Confidence interval = 0.95

Table (4): Risk factors distribution of positive sera for anti *Toxoplasma* antibodies according to (age, occupation, education, animal presence and marriage)

Risk factor	Group	NO. of tested	sero positive	sero Positive rate	T Grouping
Age	18 - 30	252	165	65.4	A
	31 - 43	36	30	83.3	A
Occupation	instructor	18	12	66.6	A
	student	228	156	68.4	A
	staff	42	27		A
Education	high school and more	45	24	53.3	A
	primary school	243	171	70.3	A
Animal presence	present	165	105	63.6	A
	absent	123	90	73.1	A
Marriage	married	60	36	60	A
	not married	228	159	69.7	A

*P-value : 0.10

*Means with the same letter are not significantly different.

* Confidence interval = 0.95

Discussion:

The over all seroprevalence of *T.gondii* from 288 person was 195 (67.7%) in Karbala population, this result approximately near to that obtained in Basra in Iraq were it was 52% (11), and 74.5% in Sao Tom in Taiwan, and differ from other regions like northern Thailand were it has several percentages according to race into (7.9, 9.1 , 37.9 %) for Han people , Akka aborigine ,and for Yau aborigine respectively (12), and 48 % in Nepal (13), and 6.4 in Thailand(14), and 42.9 in New Zealand(15), and 28% in Kinmen island wile 2.7% in Penghu island in Taiwan (16), and 11% in south Yorkshire in England (17).

In case of rejoin distribution Karbala divided into four parts three parts inside the city and the forth the semi rural rounding area, table three indicates that the greatest rate of exposure is in Haydarea and this area represent poorest part in the city (Hai al Gahder, Hai al Askary , Hai al Aamil , Hai al Huor) that suffer of crowded life manner with poor sanitation and that may be the cause of the high exposure rate to *T.gondii* , and Haydarea differ significantly with ancient city center and this may be due to the difference in life manner of those people ,wile outside Karbala city and Jazera have rates lower than Haydarea and greater than city center and have not significant differences with both of them. Geographic distribution of *T.gondii* infection influenced generally by life manner and for those people including food coking and eating habits and other contact conditions for this pathogen (12).

The risk factors (Age, Occupation, Education, Animal presence, Marriage) have no significant differences within their groups for *T.gondii* parasite exposure. In other hand, in some countries such as Thailand the children and elderly people more susceptible to this pathogen (12). Presence of animals living in the house has no significant differences with absence of them in exposure to *T.gondii* this similar that in (14) and this may be due to the culture of studied population that rarely let cats live closely in the houses. Occupation and education in studied population correlated were who have greater occupation have always greater education so all of them have no significant differences. In case of marriage risk factor the results suggests that no relation between the marriage and population exposure with contaminated material with *T.gondii*.

Distributions of positive sera titers among risk factors yield a significant difference within age groups that (18-30) group greater significantly than (31-42) and that may be due to the immune system in younger group stronger than elderly group.

In conclusion the local sanitation is an important factor influence exposure of population to *Toxoplasma gondii* in Karbala rejoin and important factors in controlling infection spreading.

References:

- 1- Montoya, J.G.; Liesenfeld , O.,(2004). Toxoplasmosis. Lancet 363, 1965-1976.
- 2- Ramirez, M.I.; Varagas, R.; Duran, S and Rodregz, I(1998). Analysis of Toxoplasma gondii antigens with sera from toxoplasmosis patients, rev. Soc. Brazil .Med .Trop., 31:271-277.
- 3- Geo, F; Janet, S.; Stephen, A. (2008) Medical microbiology.Lang,686.
- 4- Samad, M.A. ; Dey, B.C.; Chawdhury, N.S.; Akhtar, S. and Kahan, M.R.(1997) Sero-epidemiological studies on *Toxoplasma gondii* infection in man and animals in Bangladesh. Southeast Asian .J. Trop. Med. Public health , 28:339-343.
- 5- Remington, JS; Desmonts , G. (1990)Toxoplasmosis. In: Remington JS, Klein JO, eds. Infectious diseases of the fetus and newborn infants. Philadelphia: WB Saunders, pp 89-195.
- 6- Bearman, MH; McCabe ,RE; Wong ,S; Remington, JS.(1995) *Toxoplasma gondii*. In: Mandell GL, Bennett JE, Dolin R, eds. Principles and Practice of Infectious Disease, 4th Ed. New York: Churchill Livingstone, p 2455-75.
- 7- Johnson, AM. (1985) the antigenic structure of *Toxoplasma gondii*: a review. Pathology, 17: 9-19.
- 8- Miller, MJ; Aronson ,WJ; Remington ,JS.(1969) Late parasitemia in asymptomatic acquired toxoplasmosis. Ann. Intern. Med., 71: 139-145.
- 9- Dubey, J.; Beattie, C. (1988) Toxoplasmosis of Animals and Man., CRC Press Inc., Boca-Raton, Florida, USA.pp1-213.
- 10- Jong, M; Sung, H; Hyun, S; Hwan, S et.al.(2000) Seroprevalence of toxoplasmosis in the residents of Cheju island, Korea , Korean J. Parasitol., 38,(2): 91-93.
- 11- Yacoub, AA;Bakr, S;Hameed, AM; Thamery, AA and Fartoci,MJ (2006)seroepidemiology of selected zoonotic infections in basra rejoin of iraq ,eastern medetranian health journal ,12(1&2):1-6.
- 12- Fan ,CK ; Liaw, CW; Wu, MS; Su, KE; and Han, BC(2003) Seroepidemiology of *Toxoplasma gondii* infection among Chinese aboriginal and Han people residing in mountainous areas of northern Thailand, journal of Parasitology 89(6):1239-1242.
- 13- Rai, SK; Kubo, T; Yano, k *et. al.* (1996) Seroepidemiological study of *Toxoplasma* infection in central and western rejoins in Nepal, Southest Asian journal of tropical medicine and public health, 27(3):548-553.
- 14- Sukthana, y; kaewkungwal, J ;Jantanavivat, *et.al.*(2003) *Toxoplasma gondii* antibody in Thai cats and their owners ,Southest asian J trop Med Publec Health , 34(4): 733-8.

- 15- Zarkovic, A; MacMurray, C; Deva, N, *et al.*(2006) Seropositivity rates for *Bartonella henselae* ,*Toxocara canis* and *Toxoplasma gondii* in New Zealand blood donors , j clinical & Experimental ophthalmology, 35(2):131-134.
- 16- Fan, CK; Liaw, CW; Kaw, TC; Lu, JL; Su, KE (2001) *Toxoplasma gondii* infection :Relationship between seroprevalence and risk factors among inhabitants in two offshore islands from Taiwan, Acta.Med.Okayama, 55(5) :301-308.
- 17- Walker, J; Nokes, DJ; Jennings, R (1992) longitudinal study of *Toxoplasma* seroprevalence in south Yorkshire, Epidemiol. Infect, 108(1):99-106.