

SEROPRAVALENCE AND ASSOCIATED RISK FACTORS OF TOXOPLASMOSIS IN PREGNANT WOMEN IN CERTAIN REGION IN BAGHDAD ⁺

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Abstract:

Infection by *Toxoplasma gondii* is widely prevalent in humans and other warm-blooded animals. Symptomatic disease is usually uncommon and most of the infections are asymptomatic. The aim of the study was carried out to investigate the epidemiology and associated toxoplasmosis predisposing risk factors in certain regions in Baghdad city. A total of 850 serum samples were examined for detection of specific *Toxoplasma gondii* IgG , IgM antibodies by Latex, and the Toxo –latex ve+(520) samples examined by Enzyme-linked immunosorbent assay (ELISA). A structured questionnaire was used to collect information on predisposing risk factors for toxoplasmosis from each patient .Data was analyzed on SPSS. In order to check for statistical differences,. The results indicated that 48.57% (170 out of 350) of the women's sera had anti-*Toxoplasma gondii* IgG antibodies. However, there is statistically significant differences were observed between age group, the peak seropravalence was detected in the 20-29 year- old age group .Totally280 (67.30 %)of (350) pregnant women were found to positive for *T .gondii* IgG(60.71%) and IgM & IgG(39.28%) antibodies respectively . Risk factors showed that *T. gondii* was positively correlated with eating raw food or under-cooked meat, potable water sources , a history of abortion ,contact with cats and chickens . Therefore, health education especially in women who are going to marry and also during pregnancy is necessary during antenatal visits.

الانتشار المصلي وعوامل الاختطار المرافقة لداء المقوسات لدى النساء الحوامل في مناطق معينة في بغداد

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المستخلص :

أن الإصابة بطفيلي الـ *Toxoplasma gondii* منتشرة وعلى نطاق واسع بين البشر والحيوانات ذوات الدم الحار . أعراض المرض عادة ما تكون غير مألوفة ، وأن معظم الاصابات بهذا الطفيلي لا ترافقها اعراض . الهدف من الدراسة التأكد من عوامل الاختطار المرافقة والمهيئة للانتشار الواسع لداء المقوسات في مناطق محددة من مدينة بغداد . ومن المجموع الكلي 850 عينة مصلية استخدمت في الدراسة تم فصلها للكشف عن الازداد IgM , IgG الخاصة بطفيلي *Toxoplasma gondii* بواسطة اختبار Latex ، و520 عينة مصل Toxo–latex ve+ فحصت بواسطة اختبار

⁺ Received on 30/1/2013 , Accepted on 24/4/2014

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التلازن المرتبط بالانزيم أل (ELISA) وصمم أستبيان لجمع المعلومات عن عوامل الاختطار المهيئة لداء المقوسات لكل مريض ، استخدم البرنامج الاحصائي SPSS لتحليل البيانات للتحقق من وجود أختلافات احصائية . أظهرت النتائج أن مانسبته 48.57% (170) من أصل 280 من النساء المصابات بداء المقوسات حاملة للاضداد من نوع IgG . وبلغ الانتشار المصلي للاضداد ذروته في الفئة العمرية 20-29 سنة . وبلغت نسبة تواجد الاضداد (Toxoplasma gondii IgM & IgG) (39.28%) ، (60.71%) في النساء الحوامل . وأظهرت عوامل الاختطار ان الاصابة بطفيلي *Toxoplasma gondii* ذا علاقة طردية مع تناول الطعام النيء أو اللحم غير المطبوخ جيداً، مصادر تزويد المياه ، الاجهاض وعدد مراته، التماس المباشر مع القطط أو الدجاج. وعلى ضوء ذلك يكون التنقيف الصحي ضروري للنساء على وشك الزواج وخلال فترة الحمل للمراجعات السابقة للولادة .

Introduction:

Toxoplasmosis is a very common infection caused by the obligate protozoan parasite *Toxoplasma gondii*. Most *Toxoplasma* infections is asymptomatic, but the implications in pregnant woman are manifold. The women may have spontaneous abortions, stillbirths or premature delivery in addition to various fetal anomalies [1, 2]. The parasite is transmitted to humans by ingestion of the tissue cysts in raw or undercooked meat, as well as ingestion of food and water contaminated with oocysts from cat feces [3, 4]. Felids are the most important final host in the life cycle of *T. gondii* because they excrete environmentally resistant oocysts. Cats become infected with *T. gondii* by eating infected tissues from intermediate hosts. In developing countries toxoplasmosis is very frequent; in Turkey, IgG seroprevalence of *T. gondii* among pregnant women was 60% [5], while in India it was 45% [6]. Studies among Arab populations have reported the seroprevalence of Toxoplasmosis ranging from 22.9% in the United Arab Emirates [7], to 47% in Jordan [8]. Some studies have reported a correlation between *T. gondii* infection and other diseases; *T. gondii* may be associated with schizophrenia [9], and an association likely exists between *T. gondii* infection and some kinds of cancer.[10].

Toxoplasmosis is a severe disease when acquired in transplacentally and in immune-compromised persons especially those with defect in T-cell-mediated immunity such as those with hematologic malignancies, bone marrow and solid organ transplant or AIDS [11]. *Toxoplasma gondii* infection in free-rang chickens (FR) is considered important as FR chickens are one of the best indicators for soil contamination with *Toxoplasma gondii* oocysts because they feed from the ground , and tissues of infected chickens are considered a good source of infection for cats. Additionally, ingestion of infected chicken meat can be a source of infection for *T. gondii* infection in humans and other animal. Rarely toxoplasmosis can cause disease in chickens. [12, 13]. The objective of this study is to determine the seroprevalance of the disease and to assess the role of infected women chickens in the epidemiology of Toxoplasmosis in humans. [14]

Material and Methods:

Study populations:-The study was carried out on pregnant women aged 15-39 years in their first tri-master of pregnancy . They were recruited on their first prenatal visit to antenatal clinics care in certain regions in Baghdad city (Zayona , Baghdad Al-Jaded a, Al-Amine AL-Mashtal , AL-Sadder) , during September 2010 to July 2011 . A total of 850 pregnant

women were participated in this study by giving blood sample and answering questionnaire comprising personal information about the participant as the age , education level , term of pregnancy , presence of domestic animals as cats and chickens in their houses , consuming of raw or under-cooked meat , source of portable water and history of abortion .

Total anti- *T.gondii* Ab were evaluated by latex Toxo- Kit(Biokit Company – Spain) as a screening test , whereas the IgG and IgM antibodies isotypes in latex anti – *T. gondii* positive samples were measured by ELISA Toxo- Kit(IBL Germany) according to manufacturer instructions .

Statistical analysis: - All data were analyzed statistically for their p value by means of SPSS version 2005. Any difference in the study parameters between 2 comparing group was considered significant when p-value was less than 0.05 .

Result and Discussion:

A total of 850 samples (pregnant women) were screened for Toxoplasma infection with Latex - Toxo – kit. It was found that among the (850) samples, 520 (61.17%) were with seropositive result (Table 1).

Table (1): Distribution of latex result , among the study subjects according to Latex – Toxo – kit

Toxo-Latex result groups	No. of cases	%
Toxo-Latex +ve	520	61.17
Toxo-Latex -ve	330	38.82
Total	850	100

The distribution frequency of Toxo-latex results in pregnant women according to different regions in the city of Baghdad is shown in Table 2.

Table (2) : Distribution frequency of Toxo –latex results in pregnant women according to the regions of the city of Baghdad .

Groups according to the regions	Toxo –latex +ve Frequency (%)	Toxo –latex –ve Frequency (%)
Zayona (150)	50 (9.61)	100 (30.30)
Baghdad AL-Jadeda (200)	100 (19.23)	100 (30.30)
AL-Amine (150)	90 (17.30)	60 (18.18)
AL-Mashtal (150)	100 (19.23)	50 (15.15)
AL- Sadder (200)	180 (34.61)	20 (38.82)
850	520 (61.17)	330 (38.82)

Table (3) ,Shows that among 350 blood samples, 170(48.57%) were positive for *Toxoplasma gondii* IgG antibodies indicating past infection. 110(30.42%)patients were positive for both *Toxoplasma gondii* IgG and IgM antibodies indicating recent infection and 70(20.00%)were negative for both IgG and IgM indicate the absence of past contact with toxoplasma antigen . No case of IgM seroprevalence alone was diagnosed implying the absence of an indeterminate case of toxoplasmosis.

Table (3): Distribution of IgG and IgM anti-*Toxoplasma gondii* isotopes among the study subjects according to ELISA result.

ELISA results according to Ig isotopes	No. of cases	%
+ve IgG only	170	48.57
+ve IgG and IgM	110	31.42
-ve IgG and IgM	70	20.00
Total	350 (67.30 %)	100

Table (4) :Distribution frequency of IgG and IgM anti-Toxo Ab in pregnant women according to the regions of the city of Baghdad .

Regions among Baghdad city	+ve IgG only FR (%)	+ve IgG and IgM FR (%)	-ve IgG and IgM FR (%)
Zayona	20 (11.76)	10 (9.09)	20 (28.57)
Baghdad AL-Jadedea	30 (17. 64)	20 (18.18)	10 (14.28)
AL-Amine	20 (11.76)	20 (18.18)	10 (14.28)
AL-Mashtal	30 (17. 64)	20 (18.18)	15 (21.42)
AL- Sadder	70 (41.17)	40 (36.36)	15 (21.42)
	170 (48.57)	110	70

Table (5): Potential risk factors for *Toxoplasma gondii* IgG antibody seropositively in the five areas in Baghdad.

Demographic characteristic	No%	SD±
(1) Age group (year s)		
15 – 19	10(3.57%)	
20 -24	100(35.71%)	0.67±
25 – 29	105(37.5%)	0.7±
30 – 34	30(10.71%)	
35 - 39	35(12.5)	
Level of education 2)(
Non	50(17.85%)	
Primary	110(39.28%)	2.8±
Secondary	90(32.14%)	1.42±
University	30(10.71)	
(3) Term of pregnancy		
First trimester	80(28.57%)	0.9±
Second trimester	170(60.71%)	1.89±
Third trimester	30(10.71%)	
(4) Cats at home or in neighborhood		
Yes	160(57.14%)	1.72±
No	120(42.85%)	0.7±
(5) Chickens at home		
Yes	200(71.42%)	5.82±
No	80(28.57%)	3.22±
(6) Raw food or undercooked meat		
Yes	150(53.57%)	1.7±
No	130(46.42%)	0.89±
(7) Sources of potable water		
Tap (treated)	110(39.28%)	0.7±
Tanker	170(60.71%)	1.22±
(8) History of abortion		
Abortion	220(78.57%)	5.82±
No abortion	60(21.42%)	1.46±

This study showed an overall 67.30% seroprevalence of anti-toxoplasma antibody among pregnant women in all study regions of Baghdad ,which is similar to those reported from Palestine [15] and Saudi Arabia [16] , Brazil [17] and Sudan [18] , On the other hand , a lower seroprevalence of *Toxoplasma gondii* was reported in many countries in Jordan and Turkey [8& 19] .

This wide variability could be attributed to differences in climatic conditions, and personal hygienic practices feeding habits, socio-economic and literacy status of the study subjects[20]. In this study the variation in seroprevalences rates could be due to variation in age distribution and antibody profiles of the study population. Increased seropositivity of anti *Toxoplasma gondii* antibody was observed in age group 20-29 years which corresponding to peak fertility of reproductive life . The reason for increased prevalence with age might be increasing risk of exposure with age, which is in agreement with other pervious similar studies [21, 22]. This could be explained by the fact that older women are more likely to have

exposed to any one of the risk factors than younger women as result of longer exposure time .Contact with domestic cats is often mentioned as a risk factor, however , there are also contradicting reports. Our finding showed a significant association between *T. gondii* infection and the presence of domestic cats at home which was one of the predictors for *T. gondii* infection in this study [23]. The prevalence of the parasite among the domestic cats may depend on the type of cats (stray or pet cats) in different countries, as stray cats were reported to be more exposed to the parasite as compared to pet cats [24]. In the present study area stray cats were more common and it was expected that the prevalence would be higher; domestic cats that are not fed raw meat are not likely to acquire *T. gondii* infection and pose little risk to humans .Otherwise stray cats that defecate in gardens may pose the greatest risk of *T. gondii* infection for some people. [25]

In the present study, it was observed that 150 (53.57%) of pregnant women reported to eat under cooked meat but showed no significant association with Toxoplasma infection, which is consistent with studies from Turkey [19, 23] and France[26]. Contaminated drinking water is also a potential source *T. gondii* infection, there is an association between source of water for drinking and *Toxoplasma* infections [27]. In present study , it was shown a significant association between *T. gondii* infection and the presence of domestic free chickens . *Toxoplasma gondii* infection in free –rang (FR) chickens is considered important as FR chickens are one of the best indicators for soil contamination with *Toxoplasma gondii* oocyst because they feed on soil contained food , and accordingly tissues of infected chickens are considered a good source of infection for cats and human [28].

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