Toxoplasmosis among Random Sample of Blood Donors in Baghdad City

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Abstract

Background: *Toxoplasma gondii*, Hepatitis B virus and Human immunodeficiency virus infections and blood donors could represent a risk for transmission in blood recipients.
Objective: To scarce information about the epidemiology of *T. gondii*, HBV and HIV infections in blood donors in Iraq. Therefore, prevalence of *T. gondii*, HBV and HIV infections and associated socio-demographic characteristics at Baghdadis needed.
Patients and Methods: The present study were carried out on 142 the blood donors attending National Blood Bank in Baghdad city between October 2013 to October 2014. Volunteers were males, females, different age groups, and different race. Information's about there, previous surgical operations, living with cats at home, samples were taken from different geographical areas in Baghdad. Serological tests were using for investigating of *Toxoplasma gondii*, Hepatitis B virus and HIV antibodies.
Results: The results reported that(78.17%) of the blood donors were in direct contact with stray cats,(29.5%) showed antibodies for Toxoplasma by Latex test, results of the blood samples ELISA -IgM showed that only (1.5%) were positive to *Toxoplasma gondii* while (28.2%) showed ELISA- IgG positive for *Toxoplasma gondii*.
Conclusion: All tested samples were negative for HIV (0%), only one sample was found to be positive for Hepatitis B virus (0.7%).
Key words: Toxoplasma, volunteer, Blood Bank, Transplant recipients, Asymptomatic.
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Received: 5th June 2016
Accepted: 23th October 2016

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Introduction

Millions have donated and accepted blood and several diseases have been transmitted by blood transfusion including hepatitis viruses, HIV and toxoplasmosis [1] Toxoplasmosis is caused by the protozoan parasite Toxoplasma gondii which recorded in various places throughout the world, it has been shown that up to 95% of some populations have been infected with Toxoplasma [2]. Most of Toxoplasma infections are asymptomatic or benign, but may cause sever or fatal consequences in immune deficient patients, transplant recipients and in the fetus. Infection is often highest in areas of the world that have hot, humid climates and the transmission of the disease may occur by eating uncooked meat or contaminated vegetables, blood transfusion, organ transplantation and across the placenta from mother to the fetus [3]. *Toxoplasma gondii* infection in blood donors could represent a risk for transmission in blood recipients [4].

Hepatitis B and hepatitis C (HCV) viruses are the most common cause of diseases caused by blood transfusion [5]. Hepatitis B transmit through contact with

the blood or body fluids (semen, vaginal fluids, and saliva) of a person who has the virus ,Symptoms will go away in a few weeks to months if your body is able to fight off the infection. Some people never get rid of the HBV. This is called chronic hepatitis B [6]. All blood transfusions were at increased risk for transmitting HIV infection. In 1985, however, an HIV test became available, and screening of all blood donations rapidly became universal. The U.S. blood supply is now among the safest in the world.

Therefore, we sought to determine the prevalence of Hepatitis B, AIDS and *T. gondii* among blood donors in Baghdad city in Iraq by different tests using for investigation of Toxoplasma antibodies and the crossing results obtained by ELISA-IgG and- IgM with the Latex agglutination tests [5].

Patients and Methods

The present study was carried out on142 blood donors attending National Blood Bank in Baghdad city between October 2013 to October 2014. Demographic information was collected from the donors at the time of blood collection. Volunteers were males, females, different age groups, and different race. Information on their surgical operations, living with cats at home, and from different geographical areas were collected as well, serological tests were using for investigation *Toxoplasma gondii* antibodies included:

Latex agglutination test

A drop of serum were mixed with latex coated Toxoplasma antigens (MDSS GmbH-Schiffgraben, Hanover, Germany) for 2-3 minutes and examined for the formation of coagulates. Results were reported as positive with coagulation and negative for no coagulation [6].

Enzyme Linked Immunosorbent Assay (ELISA) for detection of specific IgG and IgM to Toxoplasma: Micro-wells coated with purified Toxoplasma antigens (BioCheck, Inc.CA, USA) were used to detect both specific Toxoplasma IgG and IgM in the serum of blood of the donors. ELISA reader (Humareader HS, Germany) was used to measure the Optical Density (O.D.) after stopping the reaction. Titers of IgG and IgM were calculated according to the manufacturer of the ELISA kit. Results were recorded in a raw data sheet for further statistical analysis [4].

Blood samples analysis

The collected blood samples were subjected to blood grouping and RH factor examination to test the possible relationship between Toxoplasma infection and blood group.

Statistical analysis

An interface program was created on SPSS (Statistical Package for Social Sciences), and all row data from this study was entered to this application. Frequency tables with percentage were performed to test the significance of results obtained from this work. All tables reported in this study were generated using SPSS application [7].

Results

A total of 142 samples were collected then grouped into 2 main categories with 10 years intervals (26-35 and 36-45years). The remaining samples were grouped into people who are just under 26 years or people who are above 46 years of age.

Results showed that blood donors in (26-35) age were most frequently (48.59%), followed by (36-45) with a donation contribution that reached (23.24%). The younger group of people (up to 25 years) showed a contribution of (19.01%). sixty four years and more showed a contribution of donation that reach only (9.15%).

Table (1): Demographic categories of blood donors included in this study.

Parameter	People categories	Frequency	Percent
Gender	Male	129	90.85%
	Female	13	9.15%
	Total	142	100.00%
Marital Status	Married	98	69.01%
	Single	44	30.99%
	Total	142	100.00%
Age groups	up to 25 years	27	19.01%
	from 26 to 35 years	69	48.59%
	from 36 to 45 years	33	23.24%
	from 46 and up	13	9.15%
	Total	142	100.00%
Ethnicity	Arabic	136	95.77%
	Kurdish	6	4.23%
	Total	142	100.00%

Table (1) showed clearly that males were predominantly donor the blood (90.85%) than females (9.15%). The results also showed that male to female ratio for voluntarily donation of blood were 10:1. Married people voluntarily donate blood as much as single people (69.01% versus 30.99%).

Table (2): Distribution of blood donors according to directly related to contacts with cats, Previous Toxoplasma infection.

Parameter		Frequency	Percent
Contacts with cats	yes	111	78.17%
	no	30	21.13%
	don't recall	1	0.70%
	Total	142	100.00%
Previous Toxoplasma infection	no	131	92.25%
	don't know	11	7.75%
	Total	142	100.00%

The results reported in table 2 showed (78.17%) of the blood donors were in direct contact with stray cats, only 21.13% of blood donors responded with no physical contacts with cats. The results also showed that 92.25% of the blood donors responded had no previous infection with toxoplasma. More realistic answered that they didn't know (7.75%).

Table (3): Results of the donors with routine hepatitis and HIV tests.

Diseases	Results	Frequency	Valid Percent
Hepatitis B	Negative	141	99.30%
	positive	1	0.70%
	Total	142	100.00%
HIV test	Negative	142	100.00%

The standard routine tests for Hepatitis and HIV virus were reported in the table 3. Results showed that all tested samples were found to be negative for HIV (0%), only one sample was found to be positive for Hepatitis B virus (0.7%).

Table (4): Results of the blood grouping and RH factor of the donors.

Parameter		Frequency	Percent
RH Factor	Positive	129	90.85%
	negative	13	9.15%
	Total	142	100.00%
Blood group without RH factor	AB	12	8.46%
	A	42	29.57%
	B	42	29.57%
	O	46	32.40%
	Total	142	100.00%
Blood group with RH factor	AB+	11	7.74%
	AB-	1	0.70%
	A+	39	27.46%
	A-	3	2.15%
	B+	38	26.76%
	B-	4	2.81%
	O+	40	28.16%
	O-	6	4.22%
	Total	142	100.00%

Testing of all blood samples showed a distinct pattern in term of RH factor, only 13 samples out of the 142 (9.15%) were found to be RH negative,(90.85%) were found to be RH positive. Results of the ABO system testing showed that most donors (32.40%) were have group "O" while only one sample (0.70%) was AB group .Both blood groups "A" and "B" were found to be at exact same percentage (29.57%).

Combining the RH factor to the blood group gave complete different pattern of blood grouping. The results show that AB- blood group was the lowest in prevalence(0.70%) followed by A- (2.15%), B- (2.81%) and O- blood group (4.22%) respectively. However the largest prevalence was found to be associated with O+ (28.16%) followed by A+ (27.46%), B+ (26.76%) and AB+ with (7.74%) respectively.

Table (5): Donors answers about health status history.

Parameter		Frequency	Percent
Have surgery before	yes	53	37.32%
	No	89	62.68%
	Total	142	100.00%
Had blood transfusion before	Yes	5	3.52%
	No	137	96.48%
	Total	142	100.00%

Donors health status history and if they had any surgery or received blood transfusion at any stage of their life. Results were categorized and presented in table 5. It was appeared that (37.32%) of donors had surgery at certain point of their life, however (3.52%) reported to had previous blood transfusion.

Table (6): Crossing results obtained with ELISA IgG and IgM and Latex agglutination results.

Results	Latex		ELISA IgM		ELISA IgG	
Positive	**No.**	**%**	**No.**	**%**	**No.**	**%**
	42	29.5	2	1.5	40	28.2
Negative	**No.**	**%**	**No.**	**%**	**No.**	**%**
	100	70.5	140	98.5	102	71.8
Total	142	100%	142	100%	142	100%

All blood samples were subjected to Latex and ELISA for IgG and IgM. Very unique patterns of results detected with the use of latex agglutination test, or ELISA test for both IgG and IgM. [29.5%] showed antibodies of Toxoplasma by Latex test, results of the blood samples ELISA -IgM showed that only [1.5%] were positive Toxoplasma while [28.2%] showed positive ELISA- IgG.

Discussion

The current study documented that the most blood donor were between 26-35 ages. The results also showed that male to female ration for voluntarily donation of blood were 10:1. Married people voluntarily donate blood as much as single people, male and female blood donors showed comparable prevalence's and this result does not support previous observations that showed a higher prevalence of male blood donors than female blood donors[1].

The results showed that most blood donor shad no previous infection with toxoplasmosis. The fact that cats at home were associated with infection indicates that *T. gondii* infection in our infected population might have occurred by ingesting parasite oocysts in contaminated food or water [10].

The result of the current study also documented that there was no HIV virus infection in Iraq ,this was agree with the previous study by Amany and Najah 2010, who decided that only long exposure to blood and blood products is may be with high risk for the infection with HIV infection[1].

The present results found that HBV infection was significantly lower complaining of liver diseases and this is inconsistent with other studies [11][12].

The low prevalence of sera positivity for *T. gondii* found ELISA- IgM sensitivity of the tests was very good and the results were reliable of acute infection, itwas documented that prevalence in Baghdad city also much lower than those reported in blood donors in other Arab countries [13, 14, 15].

In conclusion, all tested samples were negative for HIV, only one sample was found to be positive for Hepatitis B virus. Further studies with large sample size to indicate same results.

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