

## Evaluating the prior knowledge of toxoplasmosis among students of Ferdowsi University of Mashhad

Mansour Ebrahimi<sup>1</sup>, Amin Ahmadi<sup>2</sup>, Saeed Yaghfoori<sup>3</sup>, Maryam Rassouli<sup>4</sup>  
Mohammad Azizzadeh<sup>5</sup>

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### Brief Communication

Toxoplasmosis is an important infectious disease caused by *Toxoplasma gondii*, an obligatory intracellular protozoan parasite. Oocysts which are shedding by recently infected cats, as definitive hosts, are infective for intermediate hosts (all warm-blooded animals and humans) after taking short sporulation period in the environment (1,2). The other routes of transmission are congenital transmission and recently recrudescence on internal infections reported in sheep (3-8). Tachyzoites and bradyzoites are two forms of the parasite that were seen in the intermediate and definitive hosts that replicate fast and form tissue cysts, respectively. Carnivores and humans can also be infected by eating raw meats containing tissue cysts (3). Fetal loss and abortion is the most important problem that occurs in humans and some animals such as sheep and pigs (9, 10). Thus, the presence of cats at farms and houses increases the risk of infection for farm animals and pregnant women, respectively. Farm animals are also important as a source of food for humans and their infection increases the zoonotic

risk of this disease (8). One of the most useful preventive measures for toxoplasmosis is improving the knowledge of the public about this disease, particularly in more important social groups such as farmers, women, university students and teachers who can help to decrease the risk factors of this disease. The aim of this study was to understand the level of knowledge of toxoplasmosis among university students because they come from different places and have different cultural and scientific backgrounds.

This study was conducted in Ferdowsi University of Mashhad, which is one of the oldest universities in Iran. Currently, more than 19000 students are studying at this university. Five hundred and forty nine questionnaires were distributed among the students. The questionnaire consisted of three sections: section 1 which included questions about sex, education, permanent residence and whether the students had any pets; section 2 contained the following question: "Have you heard about toxoplasmosis disease?". Then, those students who answered "Yes" to this question were asked

1. (Corresponding author) PhD student, Department of Pathobiology, School of Veterinary Medicine, Shahid Chamran University of Ahvaz, Ahvaz, Iran. M-ebrahimi@phdstu.scu.ac.ir
2. PhD student, Department of Pathobiology, School of Veterinary Medicine, Shiraz University, Shiraz, Iran. Amin\_ahmadi@shirazu.ac.ir
3. PhD student, Department of Pathobiology, School of Veterinary Medicine, Ferdowsi University of Mashhad, Mashhad, Iran. Saeed.yaghfoori@gmail.com
4. Assistant Professor, Department of Pathobiology, Shahmirzad School of Veterinary Medicine, Semnan University, Semnan, Iran. mrdvmp@yahoo.com
5. Assistant Professor, Department of Clinical Science, School of Veterinary Medicine, Ferdowsi University of Mashhad, Mashhad, Iran. M-azizzadeh@um.ac.ir

to complete the third section of the questionnaire. The last section contained questions about the main information source, the ways of transmission, at risk populations and toxoplasmosis complications.

The relationship between explanatory variables and knowledge about toxoplasmosis was analyzed by Chi-square test. All analyses were conducted using SPSS software version 16.

Eighty six (15.7%) students had heard about toxoplasmosis, and 306 students (55.8%) reported that the most important source of their information came from books. Out of 86 students who heard about *Toxoplasma*, 52 (60.4%) had just one information source and others had more than one source, and 47 (54.6%) answered the main route of transmission (oral-fecal) correctly, and 55 students (64%) knew that cats were the definitive hosts and 51 students (59.3%) introduced house wives as the potential risk group. Forty one (47.7%) students had information about abortion induced by *Toxoplasma gondii*. Forty seven students (54.6%) answered the question about the congenital route of transmission correctly and 39 (45.4%) answered wrongly. Students who kept cats as pets had more information about toxoplasmosis compared to the group that did not ( $p < 0.001$ ). Students at different levels of scientific knowledge (BS, MSc and PhD) had different levels of information about toxoplasmosis. PhD students heard much more

about toxoplasmosis. Sex of the participants and place of residence were not associated with *Toxoplasma*-related knowledge ( $p > 0.05$ ) (Table1).

In this study, only a few of students had heard about toxoplasmosis (15.7%) and this was not similar to surveys done in the U.S. (11-13), Poland and Brazil (14, 15). The sources of information also differed from previously similar studies. Most of the students chose books as the source of information (55.8%) and very few students chose newspapers (2.3%). In California, newspapers may have been more important (13). In a study done by Jones et al. in 2003, it was found that most of the participants received their information from medical professionals and family/friends (11). Most students responded correctly (64%) to the questions about cats as definitive hosts. The responses of routes of transmission and potential sources of infection showed a misunderstanding among 45.3% and 65.1% of the students, respectively. Moreover, the question relating to the *Toxoplasma*-induced abortion (55%) produced the greatest number of wrong answers. The high percentage of the correct answers among those students with higher education level showed that education plays an important role in improving the knowledge of *Toxoplasma gondii* and ultimately in preventing infectious diseases. *Toxoplasma* seropositivity was reported from almost all parts of Iran and the parasite was isolated

Table 1. Characteristic of the Studied Population and the Relationship between Explanatory Variables and Having Heard about Toxoplasmosis among Ferdowsi University students

Variables		Number of Questioned People	Number of People who Heard about Toxoplasmosis (%)	p
Sex	Male	282(51.37)	49(17.35)	0.257
	Female	267(48.63)	37(13.85)	
Education	BD	444(80.87)	61(13.73)	$P < 0.001$
	M.Sc	82(14.94)	10(12.19)	
	PhD	23(4.19)	15(65.21)	
Pet owner	Cat	77(14.03)	25(32.46)	0.001
	No	472(85.97)	61(12.92)	
Permanent residence	Urban	412(75.05)	63(15.29)	0.823
	Rural	137(24.95)	23(16.78)	

from humans, domestic fowls, sheep, goats, chickens and ducks (16-19). *T. gondii* was as an important cause of ovine abortion (16), so medical professionals and veterinarians should continue to educate people about the risks of toxoplasmosis. According to the results, most of the students did not hear about *T. gondii* infection and even if they did, they mostly misunderstood the potential risks. As mentioned above, we chose university students because they came from different places and had different cultural backgrounds. However, no significant differences were observed between residents of rural and urban areas and the knowledge of this infection was low in both groups compared to developed countries. Therefore, educational measures should be developed and offered to the public in different ways.

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