

## Occupational Infections in Veterinarians

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### Summary

This study was carried out to evaluate the frequency of some occupational infections in veterinarians. The study was performed in 2005. A hundred and eight (80.6%) of 134 veterinary doctors working in Kayseri agreed to be involved in this study. From each of them, a questionnaire consisting of 19 questions was answered by the volunteers and 5 ml venous blood sample was taken for serological analysis. Hydatidosis, toxoplasmosis and brucellosis were evaluated in the samples. All of the volunteers were negative for hydatidosis. Among them, 39.8% were positive for *Toxoplasma* IgG and 0.9% for *Toxoplasma* IgM, while Rose Bengal test was positive in 24.1% of them. The tube agglutination test was performed on Rose Bengal positive samples, and in 2 volunteers the titration was determined to be over 1/160. Whereas Rose Bengal test positivity was higher among male volunteers, toxoplasmosis seropositivity was higher among non-surgeons, and brucellosis seropositivity was higher among surgeons. Toxoplasmosis seropositivity rates were found to be increasing with age. Symptoms like fever, sweating, weight loss, and loss of appetite were higher in Rose Bengal positive volunteers. Brucellosis and toxoplasmosis were more frequent in veterinarians so which it will be beneficiary for the health of people working in this profession to be more sensitive about the occupational infections and protection ways from them.

**Keywords:** *Brucellosis, Hydatidosis, Occupational infections, Toxoplasmosis, Veterinarian, Zoonosis*

## Veteriner Hekimlerde Mesleki Enfeksiyonlar

### Özet

Bu çalışma, veteriner hekimlerde bazı mesleki enfeksiyonların görülme sıklığını değerlendirmek amacıyla yürütülmüştür. Kayseri'de çalışmakta olan 134 veteriner hekimden 108'i (%80.4) araştırmaya katılmayı kabul etmiştir. Katılımcılara 19 soruluk bir anket uygulanmış, serolojik analiz için 5 ml venöz kan alınmıştır. Alınan kanda hidatidoz, toksoplazmoz ve bruselloz yönünden inceleme yapılmıştır. Araştırma grubunun tamamında hidatidoz negatif bulunmuştur. *Toxoplasma* IgG %39.8'inde, IgM %0.9'unda, Rose Bengal testi %24.1'inde pozitif bulunmuştur. Rose Bengal testi pozitif bulunan kişilerde bakılan tüp aglütinasyonu testinde 2 kişide 1/160 ve üzerinde titrasyon saptanmıştır. Rose Bengal testi pozitifliği erkeklerde daha yüksektir. Toksoplazmozis seropozitifliği cerrahi uygulayanlarda; brusellozis seropozitifliği ise cerrahi işlem uygulayanlarda daha yüksek bulunmuştur. Yaşla birlikte toksoplazmozis seropozitifliği artmaktadır. Ateş, terleme, kilo kaybı ve iştahsızlık gibi bazı semptomların Rose Bengal testi pozitif bulunan kişilerde daha yüksek oranda görüldüğü saptanmıştır. Sonuç olarak veteriner hekimlerde brusellozis ve toksoplazmozis daha yüksek oranda görülmektedir. Bu meslek grubunun mesleki enfeksiyon hastalıkları ve korunma yolları konusunda daha duyarlı davranmaları, kendi sağlıkları açısından yararlı olacaktır.

**Anahtar sözcükler:** *Brusellozis, Hidatidozis, Meslek hastalığı, Toksoplazmozis, Veteriner hekim, Zoonoz*



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## INTRODUCTION

Most of the world population (58%) spends 1/3 of their adult life at work places. While the favorable factors at work places affect person's health in a positive way, unfavorable factors can have negative effects <sup>1</sup>. International Labor Organization defined occupations such as farmers working in animal ranches and workers in animal clinics and laboratories as occupations dealing with animals. This profession, which also includes veterinarians is faced with the occupational health risks such as traumas, non ergonomic work conditions, occupational chemicals and infections that can be transferred from animals to humans <sup>2</sup>. In a study, the most common occupational health problems in veterinarians were defined as wounding caused by animals and animal bites <sup>3</sup>. These kinds of wounding and bites are main sources of infections that can be transferred from animals to humans. In a study it stated that veterinarians are the profession group who carry the highest risk of brucellosis. The risk is 31 times higher than that of other occupations <sup>4</sup>. The aim of this study was to evaluate the frequency of hydatidosis, toxoplasmosis and brucellosis, which are most common occupational infections in veterinarians.

## MATERIAL and METHODS

The study protocol was supported by Erciyes University Research Projects Foundation, and approved by local ethics committee of Erciyes University. The study was performed during February - March 2005. It aimed to evaluate 134 veterinarians working in private or public institutions in Kayseri. Kayseri, a city at the center of Turkey, has approximately one million populations and agriculture is common especially in rural areas. The volunteers were contacted via the help of Veterinarian Labor Organization's and City Agriculture Department. All volunteers were informed about the aim and methods of the study and written informed consents were obtained. The volunteers who gave their consent were asked to fill a 19 - item questionnaire and to give 5 ml venous blood for serological evaluation. The bloods transported at optimum conditions to Erciyes University Medical Faculty and evaluated for hydatidosis and toxoplasmosis in Parasitology Department and for brucellosis in Microbiology Department. Specific anti-*Echinococcus granulosus* antibody levels were measured by IHA method for hydatidosis evaluation.

The commercial kit (Hydatidose, Fumouze Laboratoires, France) was used for this purpose. Brucella antibody positivity was measured by Rose Bengal method (Seromed, Turkey). The samples that were positive with Rose Bengal test were reevaluated by tube agglutination method (Seromed, Turkey). The data were evaluated by using computer; numbers and percentages were presented in tables. Chi square and Fischer exact test were used for statistical analysis.

## RESULTS

Of the target population, 108 (80.6%) consented to be involved in this study. The group consisted of 89.8% males and 10.2% females. The mean age was  $35.8 \pm 8.5$  years; the mean duration of working in that occupation was  $11.9 \pm 8.8$  years. Among them, 71.3% were college graduates and 75.9% were working on cattle. Of the volunteers 22.2% were slaughtering, 58.3% were performing surgery, 59.3% involved in obstetrics, and 46.3% were vaccinating the animals (such as brucellosis vaccination). When the use of protective materials was evaluated, 29.6% were using gloves, 55.6% were wearing laboratory coat, 2.8% were using mask, and 28.7% were using disinfectants continuously. Half of the volunteers had their daily milk delivered by a local dairyman, which may carry risk of contiguous diseases. Of the research group, either themselves (18.5%) or one of the family members (7.4%) had brucellosis diagnosis in their medical history. Hydatidosis was negative for all volunteers. Among the serological tests, Toxoplasma IgG was positive in 39.8%, IgM was positive in 0.9%, and Rose Bengal test was positive in 24.1% of the research group. Of the Rose Bengal - positive volunteers, tube agglutination test titration was higher than 1/160 in 2 (1.9%). When the sero-positivity was compared among genders, Rose Bengal test was negative in all of the female volunteers, which was significantly different compared to males (Fisher exact  $P=0.041$ ). However, there was no significant difference between genders regarding Toxoplasma IgG positivity (Fisher exact  $P=0.109$ ). Toxoplasma IgG and Rose Bengal positivity rates according to age groups are shown in *Table 1*. Although there was a tendency in toxoplasmosis seropositivity to increase with aging, this did not reach a statistically significant level. On the other hand, brucellosis seropositivity was the highest in the age group of 31-40 years. Toxoplasmosis and brucellosis seropositivity

rates compared to performing surgery are presented in Table 2. While toxoplasmosis seropositivity was higher among people that were not involved in surgery, brucellosis seropositivity was higher among volunteers performing surgery. The difference between groups was statistically significant ( $X^2=4.108$ ,  $P<0.05$  for toxoplasmosis;  $X^2=4.869$ ,  $P<0.05$  for brucellosis). Being involved in slaughtering and obstetrics did not have a significant impact on seropositivity of toxoplasmosis and brucellosis. Seropositivity rates and presence of some symptoms are shown in Table 3. There was no significant difference between the *Toxoplasma* positive and negative volunteers regarding presence of symptoms. However, in Rose Bengal positive volunteers symptoms were significantly higher than negative ones ( $X^2=4.101$ ,  $P<0.05$  for fever;  $X^2=4.514$ ,  $P<0.05$  for sweating;  $X^2=4.478$ ,  $P<0.05$  for weight loss;  $X^2=8.159$ ,  $P<0.05$  for lack of appetite). Of the Rose Bengal positive volunteers, 62.5% were admitted to a health center for this cause. The health center admission rate was higher Rose Bengal positive group than in negative group and the difference was found to be statistically significant ( $X^2=15.173$ ;  $P<0.01$ ). There was no significant difference between *Toxoplasma* IgG positivity and admission to a health center.

**Table 1.** Toxoplasmosis and brucellosis seropositivity according to age groups

**Table 1.** Yaş gruplarına göre toksoplazmozis ve brusellozis seropozitifliği

Age groups (years)	Toxoplasma IgG				Rose Bengal			
	Positive		Negative		Positive		Negative	
	Number	% *	Number	% *	Number	% *	Number	% *
≤30	9	29.0	22	71.0	7	22.6	24	77.4
31-40	20	38.5	32	61.5	15	28.8	37	71.2
41-50	8	53.3	7	46.7	3	20.0	12	80.0
≥51	6	60.0	4	40.0	1	10.0	9	90.0
Total	43	39.8	65	60.2	26	24.1	82	75.9
$X^2$	4.388				1.906			
$P$	>0.05				>0.05			

\* Satır yüzdesi alınmıştır

**Table 2.** Seropositivity rates according to performing surgery

**Table 2.** Cerrahi uygulama durumuna göre seropozitiflik oranları

Tests	Performing surgery	Negative		Positive		$X^2$	$P$
		n	%	n	%		
Toxoplasma IgG	Yes	43	68.3	20	31.7	4.108	<0.05
	No	22	48.9	23	51.1		
Rose Bengal	Yes	43	68.3	20	31.7	4.869	<0.05
	No	39	86.7	6	13.3		

**Table 3.** Seropositivity rates and frequency of some symptoms  
**Table 3.** Bazı semptomların seropozitiflik oranı ve sıklığı

Symptoms	Tests	Negative		Positive		$X^2$	$P$
		n	%	n	%		
Fever	Toxoplasma IgG	12	63.2	7	36.8	0.085	> 0.05
	Rose Bengal	11	57.9	8	42.1		
Sweating	Toxoplasma IgG	16	64.0	9	36.0	0.198	> 0.05
	Rose Bengal	15	60.0	10	40.0		
Weight loss	Toxoplasma IgG	3	42.9	4	57.1	0.938	> 0.05
	Rose Bengal	3	42.9	4	57.1		
Lack of appetite	Toxoplasma IgG	8	53.3	7	46.7	0.341	> 0.05
	Rose Bengal	7	46.7	8	53.3		

## DISCUSSION

Brucellosis and toxoplasmosis seropositivity are seen in high rates in people who have animal related jobs. In the study of Vasconceles that evaluated veterinary school workers and students, brucellosis seropositivity was 6.3%<sup>5</sup>. In the same study *Toxoplasma* IgG positivity was found to be 9.2% and seropositivity was determined to be higher in older students<sup>5</sup>. Van Soesst et al.<sup>6</sup> evaluated veterinary nursing students and found zoonotic infection rate in this group to be 22.5%. Of these infections 4% was toxoplasmosis and 1% was brucellosis<sup>6</sup>. Ajay Kumar et al.<sup>7</sup> found the brucellosis prevalence in veterinary school students to be 1.14%. As all of the above mentioned studies evaluated students, it is reasonable to have lower infection rates that in this study. Jeyaretnam et al.<sup>8</sup> showed that zoonotic infection rate was 8% in veterinarians and 4% in other people that work in animal related jobs. Rana et al.<sup>9</sup> found in their study performed in India that *Brucella* was positive in 27.7% of the veterinarians. Thakur et al.<sup>10</sup> reported that brucellosis seropositivity was 17.39% in veterinarians working in the field. In another study conducted in Saudi Arabia brucellosis prevalence was 8.9% in butchers and 5.4% in veterinarians and supporting personnel<sup>11</sup>. The study performed in Eritre revealed brucellosis prevalence as 4.5%<sup>12</sup>. The *Brucella* seropositivity results of Rana and Thakur's studies are similar to the findings of this study<sup>9,10</sup>. However, seropositivity rates of other studies are lower than the result of this study, which may be related with country-specific differences<sup>11,12</sup>. In a study performed in North Jordan, brucellosis seroprevalence was found to be elevating by increasing of age, especially in the age group of 34-43 years<sup>13</sup>. Seropositivity was the highest in the age group 31-40 years and the lowest in 21-30 years<sup>8,10</sup>. In our study, the seropositivity rate was highest in the age group of 31-40



years. Toxoplasmosis is a greater risk for veterinarians dealing with household pets. Although most of the volunteers of this study were working on cattle Toxoplasma IgG positivity rate was 40%. The reason of this may be explained with the fact that in our country the borders of veterinary practice are not clear enough and veterinarians deal with all kind of animals. There are no other studies from our country, which evaluated Toxoplasma seropositivity in veterinarians. However in studies evaluating other populations, the rates were found to be 40.5% in diabetics<sup>14</sup> and 43-59.2% in pregnant women<sup>15-17</sup>. As these rates are similar to the results of this study, we cannot say that veterinary occupation line brings extra risk regarding toxoplasmosis. In several other studies toxoplasma seropositivity was found to be 4% in Australia by van Soesst<sup>5</sup>, 9.2% in Brasil by Vasconceles<sup>6</sup> and 22.5% in USA by Montoya<sup>18</sup>. The Toxoplasma seropositivity rates are higher in our country compared to others<sup>5,6,18</sup>. This high seropositivity rates may be related to the fact that veterinarians do not take enough precautions while working. Most commonly used preventive tool is laboratory coat, however only half of this study population were found to be wearing laboratory coat while working. Moreover, gloves and disinfectants were used only by 1/3 of the study population. Although there was no difference in toxoplasma seropositivity among genders, the rate was found to be increasing by age, and it was higher in warm climates than in cold regions<sup>18</sup>. In a study performed in Şanlıurfa area of Turkey, which has a very warm climate, Toxoplasma gondii was found in 69.6% of the all-women study population<sup>19</sup>. In this study, we did not determine a significant difference between genders regarding Toxoplasma sero-positivity either. However, seropositivity rate was increasing with aging and the rate was as high as 60% in people aged 50 years and over. Montoya<sup>18</sup> reported that Toxoplasma seropositivity rate can increase to 75% at 4th decade in El Salvador, which is consistent with our results. Although echinococcosis positivity was not determined in this study, this may be a result of limited study area. Another study evaluating veterinarians located in three different cities showed that echinococcosis seropositivity was 2.15%<sup>20</sup>. As the prevalence of this disease is low, in general, our sample size may not be sufficient to make any decision.

In conclusion, brucellosis rates were higher in veterinarians. It will be beneficiary for the health of people working in this profession to be more

sensitive about the occupational infections and protection ways from them.

### Study limitations

As study group contained veterinarians living in Kayseri, the results can not be generalized to whole Turkey. Veterinarians that did not join this study may alter the results.

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