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Gastrointestinal Helminth Infections in Dogs Detected by Stool Examination in Isparta Province

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ABSTRACT

This study was carried out to determine the prevalence of gastrointestinal helminth infections in dogs in Isparta province according to feces examination. For this purpose, 139 owned dogs feces were examined macroscopic, then examined microscopically for helminth eggs with saturated saline flotation technique. At least one helminth species was identified in 48 of the 139 dogs (34.5%) that were observed. The most common species were *Toxocara canis* (18.7%), followed by *Ancylostoma spp.* (6.5%) *Uncinaria spp.* (6.5%), *Toxascaris leonina* (5.75%), *Taenia spp.* (3.5%). In female dogs, 1.2 times more helminth infection was detected than in males. Although the infection rate in dogs older than 1 year was 1.2 times lower than the infection rate in dogs between 0 and 1 year, there was no statistical difference ($p > 0.05$). As a consequence of this study, it has been thought that it is important to establish the existence of Echinococcus granulosus by using serological or molecular techniques to distinguish the *Taenia spp.* eggs. This situation is important in terms of one world, one medicine and one health, which is a new concept accepted in the world. As a result, the presence of zoonotic helminths in the dogs in the Isparta region poses a risk for human and animal health.

Keywords: Isparta, Dog, Zoonose, Helminth

Isparta İlinde Sahipli Köpeklerde Dışkı Bakısı ile Tespit Edilen Gastrointestinal Helmint Enfeksiyonları

ÖZ

Bu çalışma, Isparta yöresinde sahipli köpeklerde bulunan gastrointestinal helmint enfeksiyonlarının dışkı bakısına göre yaygınlığının belirlenmesi amacıyla yapılmıştır. Bu amaçla, 139 sahipli köpek dışkısı önce makroskobik olarak, daha sonra doymuş tuzlu su flotasyon tekniği ile helmint yumurtaları yönünden mikroskobik olarak incelenmiştir. Bakısı yapılan 139 köpekten 48'inde (%34.5) en az bir helmint türü tespit edilmiştir. En yaygın tür *Toxocara canis* (%18.7) olup, bunu sırasıyla *Ancylostoma* spp. (%6.5) *Uncinaria* spp. (%6.5), *Toxascaris leonina* (%5.75), *Taenia* spp. (%3.5) izlemiştir. Dişi köpeklerde erkeklere göre 1.2 kat fazla helmint enfeksiyonu belirlenmiştir. Bir yaşından büyük olan köpeklerde enfeksiyon oranı, 0 ile 1 yaş arasındaki köpeklerdeki enfeksiyon oranından 1.2 kat düşük bulunmasına rağmen, istatistiksel olarak anlamlı bir fark saptanmamıştır ($p>0.05$). Sonuç olarak, Isparta yöresinde köpeklerde zoonoz karakterdeki helmintlerin varlığı, insan ve hayvan sağlığı açısından risk oluşturmaktadır.

Anahtar kelimeler: Isparta, Köpek, Zoonoz, Helmint

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INTRODUCTION

Cats and dogs are animals that are directed and domesticated to live with people. Today, many families have cats or dogs in their homes or gardens. Especially in developed countries, there are many cats and dogs roaming the streets. For centuries, people have benefited from close friendship relations with dogs. Inadequate and inaccurate practices in the prevention, control, diagnosis or treatment of certain diseases increase the potential for transmission of zoonotic diseases, especially since dogs, (*Canis familiaris*) are closely related to humans and other domestic animals. Among these, parasitic infections, especially helminthic infections, are a major threat to animal and public health, as well as economic problems (Fuentes et al. 1981).

As a result of the studies carried out in street dogs and owned dogs in Turkey, the presence of helminths of cestode species such as *Diplydium, Taenia, Mesocostoides* and *Echinococcus*, nematode species such as *Toxocara, Toxascaris, Ancylostoma, Uncinaria, Trichuris* and *Spirocerca* species were determined (Orhun et al. 2006, Yaman et al. 2006, Kozan et al. 2007, Yildirim et al. 2007, Balkaya and Avcıoğlu 2011). Helminth species of species such as *Toxocara, Ancylostoma*, *Uncinaria, Echinococcus* are zoonotic and cause serious diseases that threaten Public Health (Macphersen et al. 2012).

In various studies made in Turkey between 19.4-100% helminth infection rates have been reported in dogs (Saygı et al. 1990, Umur and Arslan 1998, Orhun and Ayaz 2006, Kozan et al 2007, Yıldırım et al. 2007, Balkaya and Avcıoğlu 2011, Isik et al. 2014, Gürler et al. 2015, Sayın-İpek and Koçhan 2017, Öge et al. 2017).

The aim of this study was to determine the prevalence of gastrointestinal helminth infections in dogs in Isparta region and to determine possible risk factors in terms of public health.

MATERIALS and METHODS

This study was carried out between February and May of 2017 on owned dogs hosted in the Isparta house or garden. Dog owners were informed about the study and the age and sex of the animals were recorded. A total of 139 dogs (77 male, 62 female dogs) feces collected and were kept at +4 °C in lid stools until examination. Dogs are divided into two groups, 0-1 years old and over 1-year-old. (Table 1)

Stool specimens were first examined macroscopically in the laboratory of the Department of Parasitology, Faculty of Veterinary Medicine, Afyon Kocatepe Univesity and then microscopically examined with respect to helminth eggs with a saturated saline flotation technique (Maff 1986).

In the study, the chi-square test was used for statistical analysis of infection status in animals according to age groups and sex. A value of $P < 0.05$ was considered significant. Statistical Package for the Social Sciences for Windows 16.0 (SPSS Inc .; Chicago, IL, USA) package program was used for the analysis of the data.

RESULTS

139 dogs were examined in this study, and 48 dogs (34.5%) were infected with at least one helminth species. Helminth eggs were found in 23 (37.1%) of 62 examined female dogs and 25 (32.5%) of 77 male dogs. Adult and development forms of heminths were not seen during macroscopic examination. When evaluated according to age groups; helminth infections were detected in 10 dogs (40%) of 25 dogs in the first group and 38 (n:114) of the dogs in the second age group. 139 dogs were examined and infection rates of helminth species were given in Table 2.

The statistically significant difference between males and females with regard to the appearance of helminth infections was found to be insignificant by the chi-square test. In female dogs, 1.2 times more helminth infection was detected (Table 2). Although the rate of infection in dogs over the age of 1 was 1.2 times lower than in dogs between 0 and 1 years, there was no statistically significant difference between the chi-square test in these two age groups (Table 3).

Table 1. Distribution of dogs examined by gender and age groups

	Age Groups	
Gender	0-1 years old (First group)	Over 1-year old (Second group)
Male (n:77)	11	66
Female (n:62)	14	48
Total (139 Dog feces)	25	114

Table 2. Distribution of infecting species by gender and age groups.

Helminth species	Female (n:62)	%	Male (n:77)	%	First age group(n:25)	%	Second age group (n:114)	%	Total number (n:139)	%
Toxocaracanis	13	21	13	6.9	6	24	20	17.5	26	18.7
Toxascarisleonina	5	8.1	3	3.9	1	4	7	6.1	8	5.5
Taeniaspp.	2	3.2	4	5.2	1	4	5	4.4	6	4.3
Ancylostomaspp.	1	1.6	4	5.2	1	4	4	3,5	5	3.3
Uncinariaspp.	4	6.5	5	6.5	2	8	7	6.1	9	6.5
Ancylostomaspp. +Uncineriaspp.	0	0	1	1.3	0	0	1	0.9	1	0.7
T. canis+ T. Leonina	2	3.2	2	2.6	0	0	4	3.5	4	2.9
Ancylostomaspp.+T. Canis	0	0	1	1.3	1	4	0	0	1	0.7

Table 3. Associated with the prevalence of helminth infections in dogs in Isparta province statistical analysis of risk factors

				Confidence interval		
Parameters	Categories	χ2	Probability Ratio	Lower limit	Upper limit	P Value
Gender	Female	0.32	1.22	0.60	2.47	0.568
	Male		0.9	0.72	1.19	
Age groups	0-1	0.40	1.33	0.54	3.24	0.526
	1↑		1.07	0.90	1.27	

DISCUSSION and CONCLUSION

In Turkey, dogs live in homes and gardens, free in villages (especially shepherd dogs), homeless in the streets, and also in shelters. People train dogs for hunting, guard, herd management, search-rescue, ornamentation and guidance (Atasoy and Kanlı 2005).

In different studies based on fecal and autopsy findings in order to determine the prevalence of gastrointestinal helminth infections in dogs around the world; 50% in Hungary (Fok et al. 2001), 72.8% in Japan (Asano et al. 2004) and 26% in Greece (Papazahariadou et al. 2007).

According to studies conducted in different regions of Turkey; In Ankara, 80%, in Van, 41% in Aydın, 73.8% in Kars, 46% in Afyon, 37.7% in Konya, 33.6% in Eskişehir, 28.4% in Samsun, , 19.4% in Sivas, 100% and 32.7% in Diyarbakır. (Saygı et al. 1990, Çerçi 1992, Güçlü and Aydenizöz 1995, Umur and Arslan 1998, Orhun and Ayaz 2006, Kozan et al. 2007, Ünlü and Eren 2007, Yıldırım et al. 2007, Gürler et al. 2015, Sayın- Silk and Koçhan 2017). In this study, 34.5% of the dogs reported helminth infection was diagnosed and this finding was found to be lower than the rates reported in Ankara, Van, Aydın, Kars, Afyon, Sivas and higher than the rates reported in Diyarbakır, Eskişehir, Konya and Kayseri, Samsun. These differences may be due to differences in animal numbers, drug use, and regional differences in socioeconomic conditions.

In a study conducted in Nigeria, 56.6% of male dogs and 54.6% of females had gastrointestinal helminth infection (Idike et al. 2017). In another study, 57.8% of male dogs and 58.3% of females detected general helminth infection (Naz 2014). In

our study, the infection rate was determined in close proximity in male and female according to the above findings.

In the study conducted by Sowemimo and Ayanniyi (2017), 39.5% of the dogs in the 0-6 age group and Giselasie et al. (2013) in the other researches reported helminth infections in 93.8% in young dogs and 80.9% in adults. In this study, the infection rates detected in adult and young dogs are compatible with the above studies.

Toxocara is a canine parasite. People take the parasite by accidentally.. The larval form of *T. canis* is found in the tissues of all dogs, in many birds and other mammals. Dog or canid host is a definite host and only in definite hosts, *T. canis* can develop from the larval form to adult form. When *T. canis* is in a host, the name of the disease is called Toxocariasis. Many animals, such as mice, rabbits, and monkeys, can serve as parasites host. It is very important for the health of the people and causes the internal organ larva migrans in humans. In studies on the prevalence of *T. canis* in dogs, 28% (Öncel 2004) in Istanbul, 31.4% (Nas 2014) in Siirt, 9.38% (Öge et al. 2017) in Ankara, 36.2% in Afyon, 47.8% (Kozan et al. 2007) in Eskişehir and 20.3% (Balkaya and Avcıoğlu 2011) in Erzurum were reported. The rate of 18.7% obtained in this study was found to be low in the above-mentioned ratio but it was found higher than that of Öge et al. (2017) in Ankara. As a result, it was evaluated that the majority of the animals in the stool were due to age resistance against parasite due to the presence of older animals (Oge et al. 2017).

Studies in Turkey, *T.leonina* rate 1 – 60.9 % (Ünlü and Eren 2007, Kozan et al. 2007), the proportion of hook worms 1.1-59.4% (Yıldırım et al. 2007, Kozan et al. 2007), *Uncinaria* spp. the ratio was reported 2.8 -57.1% (Naz 2014, Umur and Arslan 1998). In this study, *T. leonina* 5.5%, *Ancylostoma* spp. 3,3% and *Uncinaria* spp. 6.5% was detected. It is thought that these different proportions of the spread can be derived from the methods used and ecological differences.

Cystic echinococcosis (CE) is an important zoonosis caused by *Echinococcus granulosus* in the Taeniidae family, which causes significant problems in both human and animal health in endemic areas. In the spread of hydatid cyst, which adversely affects the country's economy and public health, dogs play an important role as the final host. This disease causes people to lose their economic, social and labor parameters. On the other hand, expenses for diagnosis of the disease, operating costs, hospitalization, maintenance and medical costs, transportation costs in terms of serious economic costs and labor and productivity losses, while reducing the life-long productivity of many vital activities such as reducing (Thompson et al. 1995). In dogs, *Taenia* spp. , 28% in Muş (Acıöz 2008), 12.5% in Ankara (Öge et al. 2017), 3.8% in Diyarbakır (Sayın-İpek and Koçhan 2017), 23.9% in Eskişehir (Kozan et al. 2007) and 40% in Kars (Umur and Arslan 1998) respectively. *Echinococcus granulosus* eggs look like other *Taenia* spp eggs. It is not possible to distinguish microscopically from eggs. This distinction can only be demonstrated by studies carried out at the serological and molecular level. Öge et al. (2017) reported that the results of a microscopic study of dog feces in the study conducted by Taenia spp. found that 51.8% of the eggs they identified belonged to *E. granulosus* by copro-PCR and that this situation threatened public health. For this reason, *Taenia* spp. when considering that eggs may also be E. granulosus eggs, it is an indispensable element in informing animal owners or breeders about conservation and control programs.

As a result; dogs in the Isparta province need to be treated with appropriate anthelmintics to struggle against these diseases, as the presence of helminths in the zoonotic character can create risk potential for human and animal health and may also cause economic loss. It is also very important for local veterinarians and the public to make awareness of the protection and control programs.

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