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PREVALENCE OF GASTROINTESTINAL PARASITES OF DOMESTIC CATS AND ITS ZOONOTIC IMPORTANCE IN TABRIZ CITY, IRAN

***Garedaghi Yagoob¹ and Firouzivand Yaghuob²**

¹*Department of Veterinary Parasitology, Collage of Veterinary Medicine, Tabriz Branch, Islamic Azad University, Tabriz, Iran*

²*Department of Veterinary Medicine, Collage of Veterinary Medicine, Malekan branch, Islamic Azad University, Malekan, Iran*

**Author for Correspondence*

ABSTRACT

In order to study prevalence of Protozoa and Gastrointestinal Helminthic parasites A total of 100 samples were collected randomly from both male and female of domestic cats (*Felis catus*) including 50 faecal samples from male and 50 faecal samples from female of pet cat, in Tabriz city, North-west region of Iran. This study was conducted in the period between July and December 2013. The overall prevalence was 41%. The results of this study reported five helminth species: *Toxocara cati* (13%), *Ancylostoma tubaeforme* (4%), *Physaloptera preputialis* (8%), *Dipylidium caninum* (16%), *Taenia taeniformis* (7%), four protozoal species: *Toxoplasma gondii* (6%), *Sarcocyst* spp. (11%), *Isospora* spp. (14%) and *Giardia* spp. (9%) and one arthropod species; mites eggs (12%). The overall prevalence of intestinal parasites may continue to rise due to lack of functional veterinary clinics for cat care in Iran. Therefore, there is a need to plan adequate control programs to diagnose, treat and control gastrointestinal parasites of companion as well as domestic cats (*Felis catus*) in the region.

Keywords: *Gastrointestinal Parasites, Domestic Cats, Tabriz, Iran*

INTRODUCTION

The cat (*Felis catus*), also known as the domestic cat or housecat to distinguish it from other felines and felids, is a small domesticated carnivorous mammal that is valued by humans for its companionship and its ability to hunt vermin and household pests. Cats have been associated with humans for at least 9,500 years. Cats can suffer from a wide range of health problems, including infectious diseases, parasites, injuries and chronic disease. Vaccinations are available for many of these diseases, and domestic cats are regularly given treatments to eliminate parasites such as worms and fleas (Hendrix and Blagburn, 1983). Gastrointestinal parasites are the main causes of morbidity in domestic cats (Hendrix and Blagburn, 1983). In Iran and other parts of the world these parasites cause great public health problems. Several factors affect the frequency of a species of parasite in a population. The prevalence of intestinal parasites can vary due to geographical region; presence of veterinary care; habits of the local animal populations; season of the year and the cat population composition. Several epidemiological surveillance studies reported that feral/stray and domestic cats present high frequency of parasites (Calvete *et al.*, 1998; McColm and Hutchison, 1980). The parasites that cats can get are externals and internals. The external cat parasites are most commonly fleas and ticks. However, cat can get other external parasites like ear mites and lice. The internal cat parasites are primarily in the form of a worm. And unfortunately for cats, these worms come in a variety of shapes and sizes as well as bring a number of different health issues too (Dryden *et al.*, 2005). *Giardia* is a common cat parasite. Symptoms may include foul-smelling stools that may contain mucus, loss of appetite and weight loss. *Hookworms*, *tapeworms*, *roundworms* and *whip worms* attach to the intestinal wall of the cat and can cause serious illness if not treated (Faust *et al.*, 1938).

Gastrointestinal parasitism is a common problem in cats, with prevalence rates as high as 45 percent. The parasites can be wormlike (*e.g.*, *stomach worms*, *roundworms*, *hookworms*, *tapeworms*) or one-celled (*e.g.* *Isospora*, *Giardia*, *Toxoplasma*) organisms. The signs associated with parasite infections are fairly nonspecific, such as a dull hair coat, coughing, vomiting, diarrhea, *mucoïd* or bloody feces, loss of

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appetite, pale mucous membranes, or a pot-bellied appearance. The vomiting, diarrhea, anemia, and dehydration caused by intestinal parasites will weaken a cat, making it more susceptible to viral and bacterial infections and diseases; thus robbing your cat of good health. Furthermore, some parasites have the potential of infecting humans (Sharif *et al.*, 2010; Barrientos and Antunes, 2003).

Internal parasites that are fairly common in cats include eye worms (worms found in the eye of cats that need to be removed only under anesthesia), flukes (worms that get into the lungs and liver of cats), and urinary worms (parasites that are difficult to diagnose but cause an infection in cat's bladder], (El-Shabrawy and Imam, 1978).

The aim of this study is to determine the prevalence of protozoa and gastrointestinal helminthes parasites in pet cats of Tabriz city and its surrounding area.

MATERIALS AND METHODS

Sample Collection

Over the period between July and December 2013, 100 fecal samples (50 from male and 50 from female) of pet cats were collected in a weekly pattern from different veterinary pet animal clinics representing Tabriz city, defined as the North-west part of the Iran.

Approximately 100 gm. of cat feces were collected freshly per rectum into clean polythene bags and the remainder discarded hygienically. Then samples transported to the Department of Veterinary Parasitology, Faculty of veterinary medicine, Islamic Azad University, Tabriz branch, Iran for the Laboratory Diagnosis. Animal data such as age, sex, and breed was also being collected.

Coprological Examination

Fecal samples were collected freshly per rectum into clean polythene bags using simple random sampling method from 100 cats and All fecal samples were initially examined macroscopically for the presence of tapeworm proglottids or nematodes.

Flotation centrifugation methods were applied using zinc sulphate and saturated salt solution (specific gravity 1.2) as described (Dryden MW, Payne PA, Ridley RK, Smith V, 2005). Quantitative examination was done by counting eggs per grams (EPG) of faeces using Mc Master Technique. Maximum effort was made to characterize and classify the different eggs observed under 10x magnifications to the level of genera or species (Soulsby, 1982).

Fecal smears were prepared and stained with modified Ziehl Neelsen staining and Trichrome method for presence of *Cryptosporidium* oocyst and other gastrointestinal protozoa as described by Henricksen and Pohlenz, (1981). Identification of parasite species was performed based on egg and cyst morphology for the well documented species (Soulsby, 1982).

RESULTS AND DISCUSSION

Results

Description of the fecal parasite infections indicated that the overall infection rate was 41%. The individual prevalence of infections is shown in Table 1. The positively infected samples were infected with protozoa (40%), cestodes (23%), nematodes (25%), arthropods (12%). Table 2 present the type of the infection as 39%, 31% and 12% were infected with single (mono-infection), two to three (poly-infection) or more species of endoparasites, respectively.

The reported parasites were five helminth species: *T. cati* (13%), *A. tubaeforme* (4%), *Physaloptera preputialis* (8%), *D. caninum* (16%), *T. taeniformis* (7%), four protozoal species: *T. gondii* (6%), *Sarcocyst* spp. (11%), *Isospora* spp. (14%) and *Giardia* spp. (9%) and one arthropod species; mites eggs (12%; Table 1). Cats less than a year were highly infected by GI parasites (48%) compared to cats with 1-3 years (38%) and cat more than 3 years (25%). Males (44%) had the higher rates of infection than females (38%; Table 3).

Research Article**Table 1: Prevalence of gastrointestinal parasites of pet cats in Tabriz city of Iran (n = 100 fecal samples)**

Parasites	Infected samples (n = 100)	Prevalence%
<i>Toxoplasma gondii</i>	6	6%
<i>Isospora spp.</i>	14	14%
<i>Giardia spp.</i>	9	9%
<i>Sarcocyst spp.</i>	11	11%
All protozoal infections	40	40%
<i>Taenia taeniformis</i>	7	7%
<i>Dipylidium caninum</i>	16	16%
All cestode infections	23	23%
<i>Toxocara cati</i>	13	13%
<i>Physaloptera preputialis</i>	8	8%
<i>Ancylostoma tubaeforme</i>	4	4%
All nematode infections	25	25%
<i>Mites eggs</i>	12	12%
All arthropod infections	12	12%

*The total for each type (e.g.; Cestodes, Protozoa, etc) is sometimes lesser than the sum of individual infections

Table 2: Types of different mixed infections with gastrointestinal parasites of pet cats in Tabriz city of Iran (n = 100 fecal samples)

Mixed infection	Prevalence (n = 100)	%
Single species infection	39	39
Two species infections	31	31
Three or more species infections	12	12
All infections	82	82

Table 3: Factors associated with Gastrointestinal-parasite infections of Domestic cats in Tabriz city of Iran (n = 100 fecal samples)

Factor	Category	Number examined	Number positive (%)	OR (95% CI)	P-Value
Total		100	41(41%)	-	-
Sex	Females	50	19(38%)	-	-
	Male	50	22(44%)	1.21 (0.34,1.22)	0.651
Age	> 3 years	4	1(25%)	-	-
	1-3 years	63	24(38%)	1.66 (0.34,3.12)	0.131
	<1 year	33	16(48%)	1.11 (0.63, 2.11)	0.137

Discussion

This study estimates a 41% prevalence of intestinal parasites in domestic cats, and this figure is in general agreement with published reports of stray cats in northern Iran (90% prevalence; Sharif *et al.*, 2010); mid-Ebro Valley, Spain (90%; Nichol *et al.*, 1981); and Rio de Janeiro (90%; Labarthe *et al.*, 2004). However, comparison of the present study with published surveys indicated that great differences in prevalence were observed for particular parasite species; perhaps due to regional, environmental or climatic

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variations. *T. taeniformis* was the dominant tapeworm reported in examined fecal samples of domestic cats in Tabriz city of Iran with a prevalence rate of 7% which is lower than that reported in Doha, Qatar (74%; Abu-Madi *et al.*, 2010). However, it is more or less in the same range as that recorded in Cairo, Egypt (30%; El-Shabrawy and Imam, 1978) and that in Iran (18%; Morsy *et al.*, 1980). While the prevalence rate of *T. taeniformis* in the current research is higher than that recorded in Jordan (3.8%; Morsy *et al.*, 1980) and in Iran (5%; Zibaei *et al.*, 2007). *D. caninum* was encountered with low prevalence (16%) in comparison with other surveys. For example, *D. caninum* was harboured in 51% and 45% of the wildcats, *Felis catus*, necropsied in studies performed in Britain (Hutchison, 1956) and Egypt (El-Shabrawy and Imam, 1978), respectively. *T. cati* was found to be the frequent nematode eggs in the current study, however, the overall *T. cati* prevalence was relatively low (13%) in comparison with the prevalences encountered in Denmark (79%; Haralampidis, 1977), in Spain (55%; Calvete *et al.*, 1998), in Greece (67%; Haralampidis, 1977) and in England (53%; Nichol *et al.*, 1981). *Ancylostoma tubaeforme*, was the other nematode species found in the present survey, with lower prevalences. For example, *A. tubaeforme*, in other studies, the estimated prevalences were 40% in Israel (Lengy *et al.*, 1969), 39.5% in Belgium (Thienpoint *et al.*, 1981) and 41% in the Republic of South Africa (Baker *et al.*, 1989). Mite eggs and sometimes mites larvae were found in 12% of examined fecal samples. In the present study, mite infection in the domestic cats was evident and due to the cat's grooming habits, the mite eggs were swallowed and dropped with faeces (Sohn and Chai, 2005).

In the current study, the all protozoan infections recovered was 40% which included *T. gondii* (6%), *Isospora* spp. (14%), *Giardia* spp. (9%) and *Sarcocystis* spp. (11%). The most dominant protozoal infection was *Isospora* spp. in domestic cats recorded in the present study was generally within the reported results from the Middle East which revealed a range of Isosporosis in stray and domestic cats from 2.5% to 48.2% (Hossain *et al.*, 1986). The age of the cat was found to be an important risk factor associated with parasitic infection, with cats less than 1 year old being more likely to be parasitized than older cats. These findings are similar to those obtained in previous studies (Mircean *et al.*, 2010). The zoonotic character of some parasites found in this study must serve as an alert to public health agencies, veterinarians and nearby people. Veterinarians in practice are often the only source of information about zoonoses for pet owners. Education has an important role to play in reducing the prevalence of infections with potentially zoonotic parasites in pets and their owners. It is important that methods for prevention and control of the parasites be implanted and executed in order to reduce the environmental contamination with infective eggs and larvae (Garedaghi, 2011; Rossignol, 2010).

Conclusion

High prevalence rate of cats with a wide range of parasitic organisms in the studied area suggests that inhabitants face risk of parasitic infections through contact with infected cats and their excretion. Therefore, both animal and human health education are recommended in the developed communities. As well the veterinarians and physicians should play an important role in increasing the degree of awareness of feline zoonotic parasites, which could be helpful to prevent or minimise zoonotic transmission.

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