

Prevalence of intestinal parasites in dogs and cats under veterinary care in Porto Alegre, Rio Grande do Sul, Brazil

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Abstract

Intestinal parasitism is an important cause of disease in pets. Fecal samples from pets from different neighborhoods in Porto Alegre, Rio Grande do Sul, Brazil, were used to investigate the prevalence of intestinal parasites. These samples were sent to Laborvet (Veterinary Laboratory) on the period of January, 2002 through December, 2004. The aim of this study was to determine the prevalence of intestinal parasites in dogs and cats under veterinary care. The total amount of examined samples was 1,761, being 1,473 (83.6%) from dogs and 288 (16.4%) from cats. Positive results with the presence of at least one parasite corresponded to 26.6% (392) for dog samples and to 20.5% (59) for cat samples. In both hosts, *Ancylostoma* spp., *Toxocara* spp., *Isospora* spp. and *Giardia* spp. were the more frequent parasites. Animals that were zero to six months-old showed high intestinal parasite infection, revealing the rates of 39.5% for dogs and 29.5% for cats. Highest infection rates were diagnosed for *Isospora* spp. and *Toxocara* spp. Summer was the season, with the highest prevalence rate, with 30% of infected dogs and 27.6% of infected cats. When monoparasitism was compared to poliparasitism, the presence of a single parasite species was more frequent in dogs and cats (23.8% and 19.4%, respectively). Importantly, our findings showed the prevalence of intestinal parasites in dogs and cats that cause zoonotic diseases. It is essential to keep domestic animals under veterinary care to avoid the spread of intestinal parasite infections among pets and humans.

Key-words:

Parasitic diseases.
Dogs.
Cats.
Feces (sample).
Intestinal diseases,
parasitic.
Prevalence.

Introduction

Dogs and cats are domestic animals frequently infected by intestinal parasites. In Brazil, these parasites represent an important public health problem¹. With the increasing number of guide animals, mainly in the urban centers, there is more contact between domestic animals and people, exposing humans to zoonotic agents². Although dogs and cats are often considered family members by their owners, it is important to emphasize that they may be vectors of intestinal parasites³.

The transmission of zoonotic agents

could be through indirect contact with animal secretions and excretions, infected water and food, and through direct contact with the animal⁴. Thevenet et al.⁵ and Ragozo et al.⁶, demonstrated the presence of pathogenic and zoonotic parasites in fecal samples from dogs and cats from public areas. Several factors such as geographic region, season, habitat, animal age, and lack of veterinary care contribute to increase the parasite infections in population^{1,7}.

Parasitized animals show a variety of symptoms, depending on the parasite species and density. These symptoms include intestinal disorder, anorexia, low weight,

anemia and dehydration. Severe cases could be fatal⁸.

Among zoonotic diseases, visceral and cutaneous *larva migrans* are probably the most emergent. These infections are caused respectively by *Toxocara* spp. and *Ancylostoma braziliense*, both species occur in dogs and cats. Other parasite infection commonly found in humans is giardiasis caused by *Giardia lamblia* (syn. *G. intestinalis* and *G. duodenalis*). This protozoan presents similarity with close species found in animals, indicating the possibility of transmission among different host species², although recent review by Hunter and Thompson⁹ showed that evidences do not, in general, support zoonotic transmission as a major risk for human infections.

Taking in account the importance of parasite infections in pets, we have determined the prevalence of intestinal parasites in dogs and cats under veterinary care, in Porto Alegre, RS, Brazil. It is important to emphasize that this is the first study regarding parasite infections in pets in this city.

Material and Methods

Samples

From January 2002 to December 2004 1,761 fecal samples from dogs (1,473) and cats (288) were examined regarding intestinal parasites presence. All samples were from animals from Porto Alegre, Rio Grande do Sul, Brazil that received veterinary care. Samples were appropriately collected and sent to Laborvet (Veterinary Laboratory), including animal data such as age, sex, and breed.

Parasitological Procedure

Fecal samples were examined using flotation technique in saturated sodium chloride solution¹⁰, centrifuge-flotation technique in zinc sulphate solution, density 1.18 g/mL¹¹, and centrifuge-flotation technique in sucrose solution¹². One sample of each animal was examined, and the result was considered as positive when at least one parasite egg or cyst was observed in one of each employed technique.

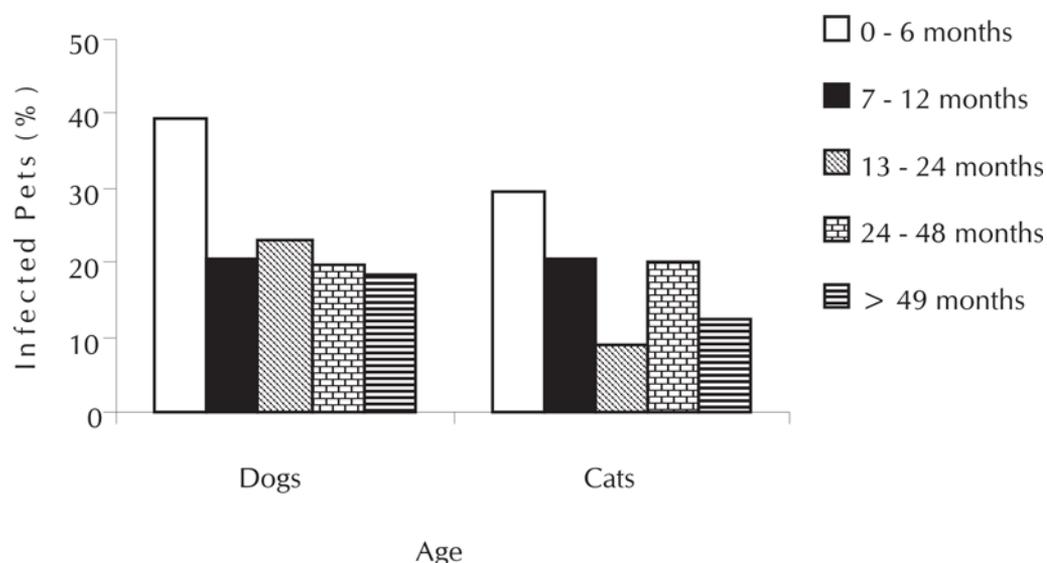


Figure 1 - Relationship between age and prevalence of intestinal parasites in 1,304 pets from Porto Alegre, during January 2002 to December 2004. * Significant difference among data ($P < 0.05$)

Statistical Analysis

Statistical analysis was conducted by Z Test for two proportions using Minitab Version 14.

Results

The present study investigated the prevalence of intestinal parasite infections in

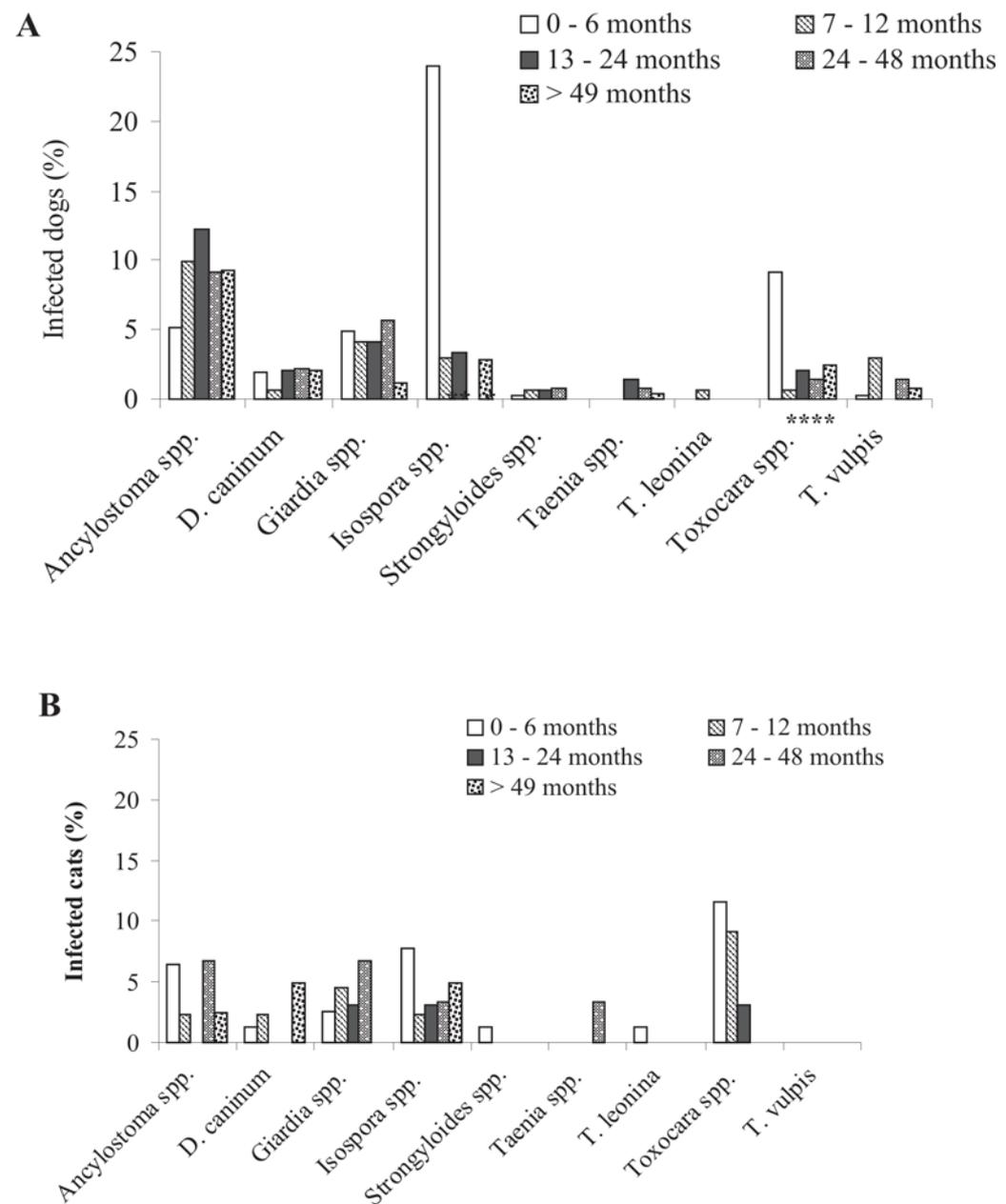


Figure 2 - Relationship between age and prevalence of intestinal parasites in 1,078 dogs (Part A) and in 226 cats (Part B) from Porto Alegre, during January 2002 to December 2004. * Significant difference among data ($P < 0.05$)

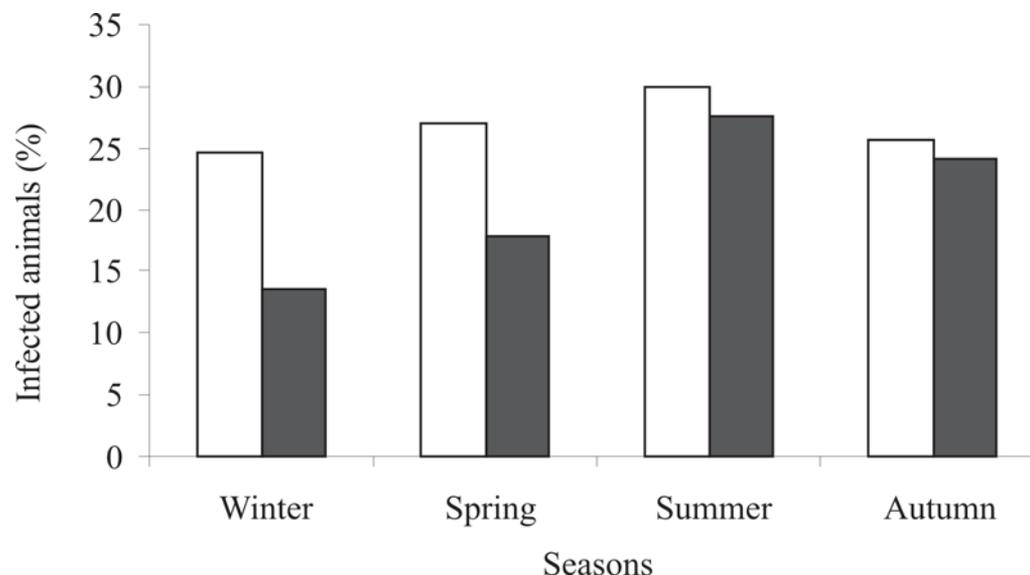


Figure 3 - Prevalence of infected pets considering season variation, in Porto Alegre, during January 2002 to December 2004. Data represent the prevalence of intestinal parasites on dogs (white bars) and cats (black bars)

Table 1 - Prevalence of intestinal parasites in 1,761 samples from dogs and cats, in Porto Alegre, from January 2002 to December 2004

	Total of examined samples	Positive Samples	Negative Samples
Dogs	1,473 (83.6%)	392 (26.6%)	1,081 (73.4%)
Cats	288 (16.4%)	59 (20.5%)	229 (79.5%)
Total	1,761 (100%)	451 (25.6%)	1,310 (74.4%)

dogs and cats from Porto Alegre, from January 2002 to December 2004. The total amount of examined samples was 1,761, being 1,473 (83.6%) from dogs and 288 (16.4%) from cats. Positive results with the presence of at least one parasite corresponded to 26.6% (392) for dog samples and to 20.5% (59) for cat samples (Table 1).

Considering helminthes, specific distribution of intestinal parasites in canine population showed high rates for *Ancylostoma* spp. (9.2%), and *Toxocara* spp. (4.1%). The frequencies for protozoa species were *Isoospora* spp. (8.5%), and *Giardia* spp. (4.5%). For the feline population, high rates of infections were found to be caused by *Toxocara* spp. (5.9%) and *Isoospora* spp. (5.6%). Nine different parasite species were observed in dog samples, and eight species were detected in cat samples, as shown in

table 2.

Monoparasitism and poliparasitism analysis has significantly differed between dogs and cats (Table 3). Considering dogs, 23.8% (350) were infected by a single parasite and 2.9% (42) were harboring more than one parasite species. Among cats, 19.4% (56) revealed only one parasite species while 1.0% (3) was found to be infected by more than one parasite species. For canine samples, the most frequent association was helminthes plus protozoa (1.5%) and for feline samples, it was helminthes plus helminthes (0.7%). These associations were composed by *Ancylostoma* spp. plus *Isoospora* spp. (16.7%) and *Ancylostoma* spp. plus *Toxocara* spp. (14.3%), performing 42 cases in dog samples and 3 cases in cat samples (Table 4).

To investigate the relation between prevalence of parasite infections and age of animals, 1,304 samples were examined (1,078

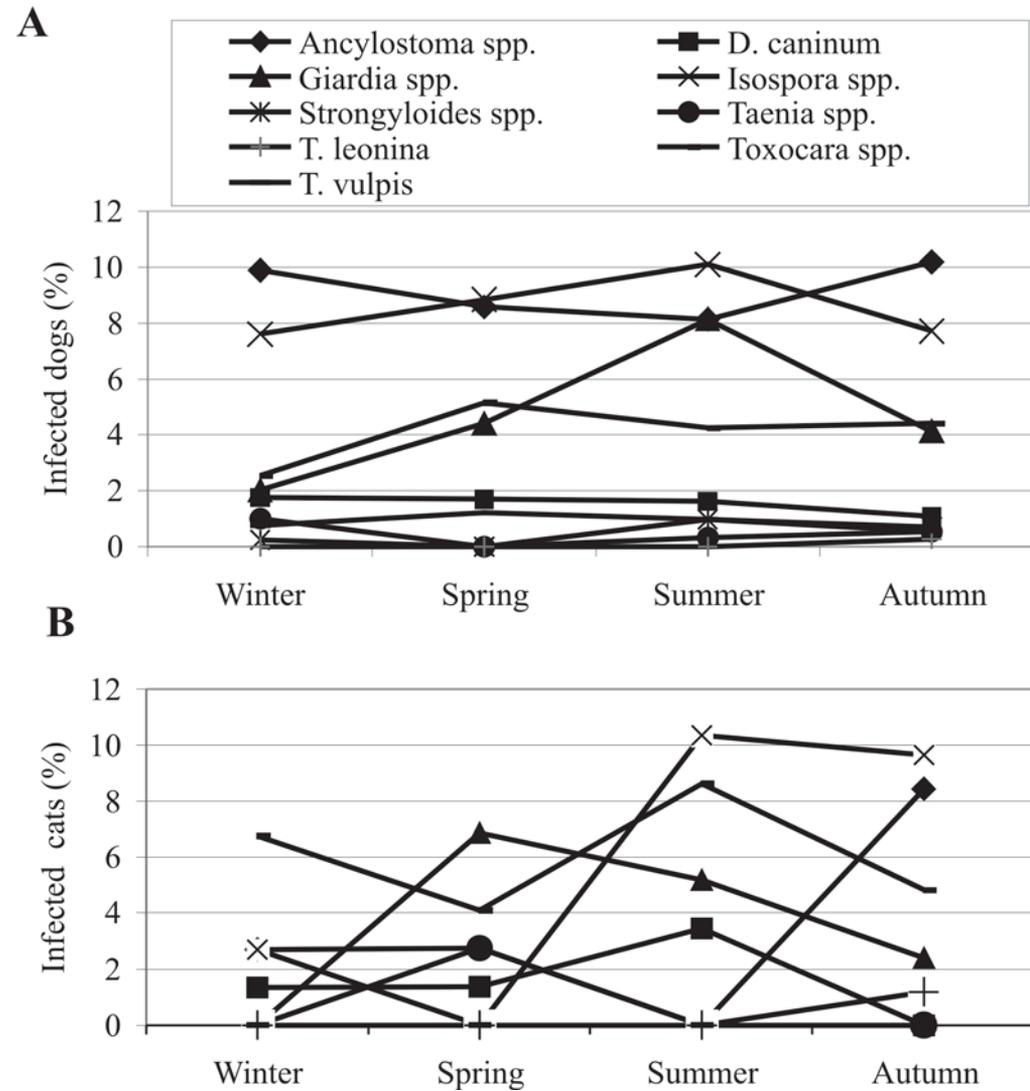


Figure 4 - Influence of season on prevalence of intestinal parasites in dogs (Part A) and cats (Part B) from Porto Alegre, during January 2002 to December 2004

from dogs and 226 from cats). Samples without enough information were excluded. Animals that were 0-6 months-old showed a high prevalence of intestinal parasites infections: 39.5 and 29.5% for dogs and cats, respectively (Figure 1). We found statistically significant difference between young and older dogs. For feline population, there was statistically significant difference only between de age of 0-6 months and 13-24 months and more than 49 months. Fecal samples from cats and dogs 0-6 months-old were

diagnosed infected with *Isospora* spp. and *Toxocara* spp. (Figures 2A,B).

Considering the canine population investigated, summer was the season with highest prevalence of parasitized animals (30%), followed by spring (27.0%), autumn (25.6%) and winter (24.6%), although there was not statistically significant difference among seasons (Figure 3). Also, higher numbers of infected cats were found in summer (27.6%), followed by autumn (24.1%), spring (17.8%) and winter (13.5%).

Table 2- Distribution of intestinal parasites among 1,761 fecal samples from pets in Porto Alegre, from January 2002 to December 2004

Parasites	Freq.	Dogs		Cats		
		(n = 392) (%) Positive ^a	(n = 1,473) (%) Positive ^b	Freq.	(n = 59) (%) Positive ^a	(n = 288) (%) Positive ^b
<i>Ancylostoma</i> spp.	136	34.7%	9.2%	11	18.6%	3.8%
<i>Dipylidium caninum</i>	23 *	5.9%	1.6%	4 *	6.8%	1.4%
<i>Giardia</i> spp.	66 *	16.8%	4.5%	10	17.0%	3.5%
<i>Isospora</i> spp.	125	31.9%	8.5%	16	27.1%	5.6%
<i>Strongyloides</i> spp.	6 *	1.5%	0.4%	1 *	1.7%	1.7%
<i>Taenia</i> spp.	7 *	1.8%	0.5%	2 *	3.4%	0.7%
<i>Toxocara leonina</i>	1 *	0.3%	0.1%	1 *	1.7%	0.4%
<i>Toxocara</i> spp.	60 *	15.3%	4.1%	17	28.8%	5.9%
<i>Trichuris vulpis</i>	13 *	3.3%	0.9%	0	zero	zero
Total ^c	437			62		

^a Percentage was calculated based on total of infected animals divided by total of infected animals for each species (392 for dogs and 59 for cats).

^b Percentage was calculated based on total of infected animals divided by total of infected animals (1,473 for dogs and 288 for cats).

^c Total of infected parasites is higher than 392 for dogs and it is higher than 59 for cats because of poliparasitism.

* Significant difference among results (P < 0.05)

Table 3. Number of cases of intestinal monoparasitism and poliparasitism among pets in Porto Alegre, from January 2002 to December 2004^a

	Positive cases	Number of monoparasitism cases	Number of poliparasitism cases	Associations		
				Helminth + Helminth	Helminth + Protozoan	Protozoan + Protozoan
Dogs	392 (26.6%)	350 * (23.8%)	42 * (2.9%)	17 (1.2%)	22 (1.5%)	3 (0.2%)
Cats	59 (20.5%)	56 * (19.4%)	3 * (1.0%)	2 (0.7%)	1 (0.4%)	zero

^a Number of fecal samples examined: dogs (1,473) and cats (288).

* Significant difference among results (P < 0.05)

Figure 4 (part A and B) shows the effect of season variation on prevalence of intestinal parasites. Summer was the season with the highest prevalence of parasites: 30% for dogs and 27.6% for cats. *Isospora* spp. was the most frequent parasite in this period, found in 10.1 and 10.4% of canine and feline samples, respectively.

Discussion

The prevalence of intestinal parasites found in the present study was 26.6% for dogs and 20.5% for cats, in accordance with data showed by other studies^{7,8}. The parasites

species most frequent were *Ancylostoma* spp., *Toxocara* spp., *Isospora* spp. and *Giardia* spp. This finding is important for public health since *Toxocara* spp. and *Ancylostoma* spp. are zoonotic agents, constituting a risk on contact between humans and pets. In general, our data reflect results found in other Brazilian regions, where *Ancylostoma* spp. is the most prevalent parasite^{1,7}.

Currently, there is the tendency to diminish the animal parasitic infections due to anti-helminthic drugs administration^{13,14}. Indeed, care with human and animal health includes parasitic diseases control, especially because of children, the most susceptible

Table 4- Associations of more frequent intestinal parasites in poliparasitism cases in dogs and cats from Porto Alegre, from January 2002 to December 2004

	Dogs	Cats
	Number of cases / (%)	Number of cases / (%)
Helminth + Helminth		
<i>Ancylostoma</i> spp. + <i>Strongyloides</i> spp.	2 (4.8%)	1 (33.3%)
<i>Ancylostoma</i> spp. + <i>Taenia</i> spp.	2 (4.8%)	0
<i>Ancylostoma</i> spp. + <i>Toxascaris leonina</i>	0	1 (33.3%)
<i>Ancylostoma</i> spp. + <i>Toxocara</i> spp.	6 (14.3%)	0
<i>Ancylostoma</i> spp. + <i>Trichuris vulpis</i>	4 (9.5%)	0
<i>Dipylidium caninum</i> + <i>Toxocara</i> spp.	2 (4.8%)	0
<i>Toxocara</i> spp. + <i>Trichuris vulpis</i>	1 (2.4%) *	0
Protozoan + Protozoan		
<i>Giardia</i> spp. + <i>Isospora</i> spp.	3 (7.2%)	0
Helminth + Protozoan		
<i>Ancylostoma</i> spp. + <i>Isospora</i> spp.	7 (16.7%)	0
<i>Ancylostoma</i> spp. + <i>Isospora</i> spp. + <i>Toxocara</i> spp.	3 (7.2%)	0
<i>Dipylidium caninum</i> + <i>Giardia</i> spp.	1 (2.4%) *	0
<i>Dipylidium caninum</i> + <i>Isospora</i> spp.	1 (2.4%) *	0
<i>Giardia</i> spp. + <i>Strongyloides</i> spp.	1 (2.4%) *	0
<i>Giardia</i> spp. + <i>Taenia</i> spp.	1 (2.4%) *	0
<i>Isospora</i> spp. + <i>Strongyloides</i> spp.	1 (2.4%) *	0
<i>Isospora</i> spp. + <i>Toxocara</i> spp.	6 (14.3%)	1 (33.3%)
<i>Isospora</i> spp. + <i>Trichuris vulpis</i>	1 (2.4%) *	0
TOTAL	42 (100%)	3 (100%)

* Significant difference among results (P < 0.05)

population¹⁴. However, the rates of prevalence of parasites in dogs and cats show that we need to improve our care to control the spread of these infections.

In our study, the rates for monoparasitism were more frequently found than the rates for poliparasitism. These data are in accordance with those of other studies^{3,6,7}.

Considering the animals age, the prevalence for intestinal parasites is higher in young animals than in the older ones^{7,13,15}. Oliveira-Siqueira et al.¹³ and Ramirez-Barrios et al.⁷ suggest that this could be due to the immature immune system of young animals and also because of maternal milk, the major route infection.

Season influence on intestinal parasites transmission in regions that present weather variations, mainly affecting temperature and humidity, conditions that are crucial for free-living stages of some parasites¹⁶. In tropical regions, those conditions should be not enough to determine increase or reduction on transmission rates of intestinal parasites in dogs and cats. However, we showed that there was an increase on *Giardia* spp. in dogs during summer. In cats, *Isospora* spp. presented high rate of infection during summer and autumn. Also the occurrence of *Ancylostoma* spp. was higher during autumn for both dogs and cats. All findings are in agreement with literature data^{7,13,15}.

The risk for human infections by dog and cat feces contamination develops an important role in epidemiology of these diseases. Education, prevention and control methods are efficient in reducing environmental contamination with zoonotic parasites. Veterinary doctors have the task in showing to pet owners the importance in adopting hygiene care such as keeping animal feces in appropriate places and medicines usage, diminishing environmental contamination. Treatment of young animals is an important strategy in combating the parasitic diseases. However, this strategy is not totally effective because adult animals greatly contribute for contamination.

Although, *Trichuris* spp., *Toxascara leonina*

and *Strongyloides* spp., showed lower rates of infection in this study, these findings emphasize the importance of epidemiologic studies on pets, mainly cats, since the number of owners of this animal species has increased due to their adaptation in apartments. Finally, veterinary professionals have the important task on giving information to pets' owners, showing them the risks for infection, and the ways for prevention and reduction on zoonotic diseases transmission.

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Prevalência de parasitas intestinais em cães e gatos sob cuidado veterinário em Porto Alegre, Rio Grande do Sul, Brasil

Resumo

O parasitismo gastrointestinal é uma das principais causas de doenças em animais domésticos. Para o estudo da prevalência de enteroparasitos foram utilizadas amostras fecais de animais de diferentes áreas da cidade de Porto Alegre, Rio Grande do Sul, Brasil, as quais foram enviadas ao Laborvet (Laboratório Veterinário Ltda), durante o período de janeiro de 2002 a dezembro de 2004. O objetivo deste estudo foi determinar a prevalência de parasitos gastrintestinais em cães e gatos, submetidos aos cuidados de médicos veterinários. Em 1761 amostras examinadas, 1473 (83,6%) eram de cães e 288 (16,4%) de gatos. Resultados positivos, nos quais foram encontrados pelo menos um parasito, foram de 26,6% (392) para amostras de cães e 20,5% (59) para as de gatos. Em ambos hospedeiros, *Ancylostoma* spp., *Toxocara* spp., *Isospora* spp. e *Giardia* spp. foram os parasitos mais encontrados. Animais de 0 a 6 meses obtiveram uma alta infecção por parasitos intestinais com 39,5% para cães e 29,5% para gatos. *Isospora* spp. e *Toxocara* spp. foram os parasitos mais diagnosticados. O verão foi a estação que apresentou a maior prevalência de parasitos com 30% para cães e 27,6% para gatos. Quando comparou-se o monoparasitismo com o poliparasitismo, a presença de um único parasito foi mais freqüente em cães e gatos (23,8% e 19,4% respectivamente). Nosso estudo demonstrou a prevalência de parasitos intestinais causadores de zoonoses presentes em cães e gatos. É essencial manter animais domésticos sob cuidados do médico veterinário para evitar infecções por parasitos intestinais entre animais de estimação e o homem.

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Palavras-chave:

Doenças parasitárias.
Cães.
Gatos.
Fezes (amostra).
Enteropálios parasitários (prevalência).

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