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POTENTIAL ZOONOTIC PARASITES OF DOGS FECES IN THE VICINITY OF SCHOOLS IN THE CITY OF CAPÃO DO LEÃO, RIO GRANDE DO SUL, BRAZIL

(PARASITOS POTENCIALMENTE ZOONÓTICOS EM FEZES DE CÃES NAS PROXIMIDADES DE ESCOLAS DO MUNICÍPIO DE CAPÃO DO LEÃO, RIO GRANDE DO SUL, BRASIL)

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RESUMO

O objetivo deste trabalho foi identificar a presença de formas evolutivas de parasitos com potencial zoonótico, em fezes de cães, encontradas nas proximidades de escolas urbanas do município de Capão do Leão, no Rio Grande do Sul. As amostras foram coletadas em sete escolas e analisadas através das técnicas coproparasitológicas de Willis Mollay, Faust e Hoffmann, Pons e Janer. Das amostras analisadas, 83,3% (25/30) foram positivas para algum gênero de parasito gastrintestinal. *Ancylostoma* spp. foi o gênero prevalente, sendo observado em 63,3% das amostras. Ainda foram observados, ovos de *Trichuris vulpis* (16,7%), *Toxocara* spp. (6,7%), *Spirometra* sp. (6,7%), *Dipylidium caninum* (3,3%), cistos de *Giardia* spp. (10%) e oocistos de *Cystoisospora* spp. (6,7%). Esses resultados evidenciam a necessidade de práticas que previnam e controlem as infecções parasitárias, acompanhado da guarda responsável dos animais domiciliados e controle dos semidomiciliados ou abandonados, de modo que diminuam a propagação destes agentes no ambiente, pois a presença de formas evolutivas de parasitos com potencial zoonótico caracteriza um risco para a população e outros animais.

ABSTRACT

The aim of this work was to identify the presence of evolutive forms of parasites with zoonotic potential, in dog's feces, found in the vicinity of urban schools in the city of

Capão do Leão, in Rio Grande do Sul. Samples have been collected from seven schools and analyzed using the coproparasitologico techniques of Willis Mollay, Faust and Hoffmann, Pons and Janer. Of the analyzed samples, 83.3% (25/30) were positive for some genus of gastrointestinal parasite. *Ancylostoma* spp. was the prevalent genus, being observed in 63.3% of the samples. There were still observed eggs of *Trichuris vulpis* (16.7%), *Toxocara* spp. (6.7%), *Spirometra* sp. (6.7%), *Dipylidium caninum* (3.3%), *Giardia* spp. (10%) and *Cystoisospora* spp. (6.7%). These results highlight the need for practices that prevent and control parasitic infections, followed by the responsible pet ownership and control of semi-domiciled or abandoned animals, in order to reduce the spread of these agents in the environment, once the presence of evolutive forms of parasites with potential zoonotic characterizes a risk to the population and other animals.

Keywords: Environmental contamination; zoonoses; companion animals; parasites.

INTRODUCTION

The human and animal relationship, mainly with cats and dogs, promotes countless psychological, physiological and sociological benefits for the tutors. It is estimated that 46.1% of the Brazilian houses possess at least one dog and 19.3% have cats (IBGE, 2020). However, infected animals are responsible for parasitic zoonoses dissemination, mostly through soil fecal contamination, representing a risk to human health (LIMA et al., 2017). As a consequence, it creates an important public health problem, correlated with economical, sociocultural and environmental factors (CASSENOTE et al., 2011; TELLES, 2014).

The most affected individuals by parasitic diseases are scholar and pre scholar children, due to countless factors such as: more contact with dirt and sand; walking shoeless and geophagy habits; precarity on maintaining personal hygiene practices and immune system immaturity (CAVAGNOLLI et al., 2015; COOPER et al., 2011). The occurrence of parasitic diseases in infants can create nutritional deficiency nutrition, leading to gastrointestinal disorders, with the presence of chronic diarrhea. So, it directly affects the children's physical and intellectual development besides interfering with school yield (NAVONE et al., 2017; PEDRAZA, 2014).

Dogs and cats perform an important role as definitive hosts of countless parasites, eliminating helminth eggs, cysts and oocysts of protozoans through feces, leading to environmental contamination and aiding zoonosis dissemination. Among the factors that

collaborate for soil contamination stands out the presence of semi-domiciled and walking dogs and cats in urban areas and the absence of the tutor's habits on collecting the dejects of their animals (CASSENOTE et al., 2011).

It is evident that infected dogs and cats represent a relevant problem of public health, due the possibility of zoonoses transmission, as cutaneous *larva migrans* (CLM) and visceral *larva migrans* (VLM), caused by helminths *Ancylostoma* spp. and *Toxocara* spp., respectively (CASSENOTE et al., 2011; SANTOS et al., 2009); besides the giardiasis infirmity caused by the zoonotic protozoan *Giardia* spp. (SAVIOLI, 2006).

It is relevant to highlight, the cutaneous *larva migrans*, also known as "geographic worm", is caused by the penetration of infective larvae of *Ancylostoma* spp. on the epithelial layer of human skin, triggering a self-limited cutaneous inflammation, with serpiginous, erythematous and pruritic injuries on inferior limbs, buttocks and hands, mainly (SANTARÉM, 2004). As for the visceral *larva migrans* occurs by the migration of *Toxocara* spp. larvae on the tissues of non-habitual hosts, as human, and triggers inflammatory injuries on viscera, which can cause damage on important organs such as liver, brain and eyes (SANTOS et al., 2009).

In that way, the aim of this work was to identify the presence of evolutive forms of parasites with zoonotic potential, in dog's feces, found in the vicinity of urban schools at the city of Capão do Leão, in Rio Grande do Sul, Brazil.

MATERIALS AND METHOD

Feces samples have been collected in the vicinity of seven urban schools in the city of Capão do Leão (Latitude: 31º45'48" S, Longitude: 52º29'02" W), located in the South region of the state of Rio Grande do Sul. The city has an estimated population of 25.462 people (IBGE, 2021). All of the samples collected were fresh and were packed in individual plastic bags, identified and stored in isothermal boxes for further analysis at the Laboratory of Parasites Diseases (LADOPAR) at the Veterinary College of Federal University of Pelotas (UFPel).

The coproparasitologico techniques used for the analysis of the samples were: Willis-Mollay (1921), which consists on the flotation of light eggs of helminths on supersaturated solution; Faust (1938), a centrifuge technique on 33% zinc sulfate solution, used to search for cysts and oocysts of *Giardia* spp. and the spontaneous sedimentation technique of Hoffmann, Pons and Janer (1934), for the research of heavy eggs, as cestodes and trematodes. The general differentiation of enteroparasites, was

given through the morphological characteristics of eggs, cysts and oocysts, visualized on optical microscopy, on 100x and 400x magnification.

RESULTS

Of the 30 samples analyzed, 83.3% (25/30) were positive for at least one genus of enteroparasites. Of those, 16 (64%) presented monoparasitisim and 9 (36%) contained association of parasites. *Ancylostoma* spp. eggs were the most prevalent, being observed in 63.3% (19/30) of the samples (Table 1). There were still found eggs of *Toxocara* spp., *Trichuris vulpis*, *Dipyidium caninum* and *Spirometra* sp., oocysts of *Cystoisospora* spp. and cysts of *Giardia* spp. The association of *Ancylostoma* spp. + *Giardia* sp. was the most observed (10%) (Table 2).

Table 1. Prevalence of parasites found on dog's fecal samples in the vicinity of urban schools in the city of Capão do Leão (RS).

Parasite	Positive samples n(%)
Ancylostoma spp.	19(63.3)
Trichuris vulpis	5(16.7)
Giardia spp.	3(10.0)
Toxocara spp.	2(6.7)
Cystoisospora spp.	2(6.7)
Spirometra sp.	2(6.7)
Dipylidium caninum	1(3.3)

Table 2. Frequency of multiparasitism on dog's fecal samples, collected in the vicinity of urban schools in the city of Capão do Leão (RS).

Parasite	Prevalence n(%)
Ancylostoma spp. + *Giardia* spp.	3(10.0)
Ancylostoma spp. + *Trichuris vulpis*	2(6.7)
Ancylostoma spp. + *Toxocara* spp.	1(3.3)
Ancylostoma spp. + *Spirometra* sp.	1(3.3)
Trichuris vupis + *Spirometra* sp.	1(3.3)
Ancylostoma spp. + *Dipylidium caninum*	1(3.3)

DISCUSSION

Dogs can host several genera of enteric parasites and most of them present transmission potential to humans, representing a public health problem (TRAVERSA, 2014). In that way, several studies are being carried out to determinate the prevalence of zoonotic parasites on dog's fecal samples collected in public places, such as Bricarello et al. (2018) in beaches of Florianopolis (SC), Providelo et al. (2020) in public parks of Botucatu (SP) and Ribeiro et al. (2013) in parks of the city of Esteio (RS).

Ancylostoma was the most prevalent genus, being observed in 63.3% of the samples. Other authors also report the predominance of this parasite on their studies, like Campos Filho (2008) at Bahia (47.9%), Bricarello et al. (2020) in Santa Catarina (42.2%) and Coronato et al. (2012) in Rio de Janeiro (91.9%). *Ancylostoma* spp., is a nematode of great importance in public health, because it is the agent responsible for the parasitic zoonosis named cutaneous *larva migrans*, commonly known as "geographic worm", that occurs by skin penetration of third-stage larvae (infective form) of the parasite. After the penetration on the epidermis, the larvae migrate on the subcutaneous tissue, promoting serpiginous eruptions, mostly on the locations with greater contact with the contaminated mean, such as feet, legs, buttocks and hand (ALMEIDA et al., 2007). Araújo et al. (2000), reported the occurrence of cutaneous *larva migrans* in children of an infant education school at Campo Grande, MS, where of the 16 students that attended the school, 37.5% (6/16) acquired this parasite infirmity through the contact with contaminated sand by the cat's feces on recreational areas.

Toxocara spp. eggs were found in 6.7% of the samples. The presence of the eggs of this parasite indicates human visceral *larva migrans* and ocular *larva migrans* syndrome infection, which occurs by the ingestion of eggs containing the infective larvae of the parasite and further migration on different organs (OVERGAAUW and VAN KNAPEN, 2013). Scaini et al. (2003) reported the presence of this parasite in 9.3% of the fecal samples collected in Balneario Cassino, Rio Grande do Sul, a percentage slightly higher than our study. An inferior prevalence was observed by Bricarello et al. (2018) in Florianópolis (SC) e Matesco et al. (2006) in Porto Alegre (RS) that found a positivity of 0.9% and 0.8% respectively for this genus of parasite.

Cysts of *Giardia* spp. were found in 10% of the samples. This protozoan also possesses a zoonotic potential, being a source of infection for human beings and other animals. (SILVA and ARAÚJO, 2013). The infection occurs from the ingestion of infected cysts present on contaminated water and food. The World Organization of Health, estimates that around 280 million people around the world are stricken each year by this protozoan, mostly children (FRASSON et al., 2010). In Ribeirão Preto/SP, Zagui et al. (2017) on a study of intestinal parasite diseases in children of a philanthropic institution diagnosed that 21.2% (14/66) of the children were infected by *Giardia* spp.

Trichuris vulpis was observed in 16.7% of the samples. Alves et al. (2014) also reported the presence of *T. vulpis* eggs in fecal samples from public parks of Pindamonhangaba (SP) and Leite et al. (2013) in public ways of Guarapuava (PR), that

found, respectively 3.1% e 11.9% of positive samples. This nematode parasitizes the large intestine of dogs, causing, mostly on animals with high parasite load, anemia, diarrhea, bloody diarrhea, vomit, pain, abdominal distention and some dogs can present rectal prolapse (SHERDING and JOHNSON, 2008). The infection occurs through the ingestion of eggs containing the infectant larvae present on the soil or contaminated food with the infected animals feces (DI CESARE et al., 2012). Although it is low described, some works report the infection by *T. vulpis* in humans, indicating its zoonotic potential, as Márquez-Navarro et al., (2012) that reported a case in a kid in Mexico and Dunn et al. (2002) that reported a case of *T. vulpis* in a woman with duodenal ulcer and chronic diarrhea.

Dipylidium caninum, a cestode that has fleas and lice as intermediate hosts, was found in only one sample (3.3%). Low percentages were also evidenced by Rosales and Malheiros (2017) in Pantanal and Junior et al. (2015) at the city of Natal (RN), where both found 1.7% of positive samples. The low prevalence of *D. caninum* can be justified by the fact that the ovigerous capsule of the parasite are hardly found during the coproparasitological exam, and the best way to diagnose is through the visualization of the proglottids on fresh feces or the founding of adult forms on necropsies (GENNARI, 1999). Some reports describe human infections by *D. caninum*, mainly in children (JIANG et al., 2017; NARASIMHAM et al., 2013).

Spirometra sp. eggs and *Cystoisospora* spp. oocysts were present in 6.7% of each sample. Other authors also reported the presence of these parasites in their works (FERRAZ et al., 2021, ROSALES and MALHEIROS, 2017). *Spirometra* sp., is a cestode that attacks the small intestine of several mammals, as dogs and cats, being able to also parasite humans. It is responsible for the parasitic zoonosis named Sparganosis (TANTALEAN et al., 2005). As for the *Cystoisospora* spp., although does not present zoonotic potential, can cause intestinal injuries on the host, leading to diarrhea and impaired nutrient absorption cases, especially in puppies (BARUTZKI et al., 2013).

The adoption of sanitary measures, besides being beneficial to animal health, also has a great importance for public health, as there will be a reduction of spread of zoonotic parasites. In this way, it is necessary to emphasize the importance of sanitary care and responsible pet ownership, once the unfamiliarity of the population on the risks involved it is one of the main factors that trigger these diseases (PERUCA et al., 2009). Research shows that the majority of Brazilian citizens are unfamiliar with the risks to health related to dog's feces left on public soils (PEREIRA et al., 2016; SIMONATO et al., 2019).

CONCLUSION

It was observed the high prevalence of the parasites with zoonotic potential in the vicinity of schools of the city of Capão do Leão. These results highlighted the need to adopt preventive sanitary measures, such as responsible pet ownership, as well the control of semi-domiciled and abandoned cats and dogs, always focusing on the well-being and quality of life of all animals.

It is also extremely important to carry out scientific studies that aim to document the risks involving parasitic diseases in the most diverse urban locations, avoiding the spread of those.

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