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Gastrointestinal Parasites of Stray Cats in Bangkok Metropolitan Areas, Thailand

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ABSTRACT

Gastrointestinal (GI) parasites are among the most common pathogens in stray cats. Stray cats might represent potential reservoirs of helminthic parasites to domestic cats, especially during mating season. The objective of this study was to determine the prevalence of GI parasites in stray cats in Bangkok areas, particularly in monasteries. A total of 1,485 fecal samples were collected from stray cats resided in monasteries of 50 districts of Bangkok areas, performed ethyl-acetate centrifugation to identify parasites' eggs, cysts and oocysts and examined under light microscopy. Overall prevalence of GI parasites in stray cats was 11.9%. The study revealed that the parasite burdens in 94% (47/50) of Bangkok areas. Pathumwan and Don Muang district had the highest number (30%) of infections among 50 districts. No significant differences were associated with sex. Cats of less than 1 year were highly infected for 12.3 %. *Ancylostoma* spp., (9.9 %) *Toxocara* spp., (3.5 %) *Isospora* spp. (1.0 %) and *Dipylidium caninum* (0.1 %) were the most prevalent parasites in stray cats. The high incidence of parasitism of cats was due to the relative influence of behaviour and contaminated environment since these cats lived in the same environment as stray dogs. These results are indicative of the situation that stray cats were potential for zoonotic transmission of GI parasites to near by humans or animals.

Key words: gastrointestinal parasites, stray cats, Bangkok areas

INTRODUCTION

Parasites are among the most common causes of GI disease in cats. From the veterinary point of view, stray cats represent potential reservoirs of helminthic parasites to domestic cats, especially in urban areas. 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 studies demonstrated that stray cats present high frequency of parasites (McColm and Hutchison, 1980; Coman *et al*., 1981; Nichol *et al*., 1981; Calvete *et al*., 1998). Prevalence of GI parasites in cats worldwide is high variable. One study in Spain reported a prevalence of 89.7% (Calvete *et al*., 1998) while another study performed in the USA reported a prevalence of only 24.6% (Kirkpatrick, 1988). While previous studies on the prevalence of GI parasites in stray cats have yielded important results (Milstein and

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Goldsmid, 1997), it can not be assumed these results are indicative of the situation in domestic cats. When the population of stray cats was compared with the one of owned cats, the prevalence was higher in stray animals (Spain *et al*., 2001).

In Thailand, there were a few reports of GI parasites in stray dogs. Rojekittikhun *et al*. (1998) examined 112 stray dogs in Bangkok and found the most prevalent *T. canis* (22.5%). Sangvaranond and Paiboolratanawong (2001) found 70% of stray dogs were infected by *Ancylostoma* spp. at little information on the prevalence of GI parasites in stray cats is available. However, stray cats as the potential threat for zoonotic transmission of GI parasites and the human health risks associated with cat ownership are now being realized, it is important that this studies are conducted on stray cats in Metropolitan areas in order to determine the potential reservoir of infection for humans.

The objective of this study is to determine the prevalence of GI parasites in stray cats inhabiting the metropolitan areas of the city of Bangkok, Thailand and to compare parasites distribution among stray cats.

MATERIALS AND METHODS

Study areas

Bangkok metropolitan areas are divided into 50 geographical districts. Each district has at least 1 monastery. A monastery as a sanctuary for animals since its area is prohibited of killing any lives. For this reason, the animal population in monasteries is rising and causing more public health concern including some zoonoses.

One thousand four hundred and eighty five fecal samples of stray cats were sampling and collected between March and August 2005 from 150 Buddhist monasteries in 50 districts of Bangkok metropolitan areas where stray cats are lived. Stray cats were defined as cats that lived in the monasteries without the real owner. They were fed by leftover food by monastery caretakers or monks. These animals are not consistently vaccinated or dewormed as animal health's requirement. However, they shared the environment with stray dogs in some monasteries.

Fecal samples

Fresh fecal samples were collected from stray cats living in Buddhist monasteries from each district. Samples were put in plastic bags marked according to monastery, district, and date of collection and kept at 4C until processing, which was carried out within 12 hours. The ages of the cats ranged from 3 months to 10 years, however the history of these animals was not known. Demographic data including age, and gender were collected for all cats. All cats was thoroughly external examined by veterinarians and recorded for animal health.

Parasitological procedures

Fecal samples were examined individually for GI nematode, cestodes, and fluke' s eggs as well as protozoan cysts, trophozoites and oocysts. These samples were performed formalin-ethyl acetate centrifugal sedimentation. Briefly, fecal samples were mixed with normal saline and centrifuged at 500 G for 3-5 minutes. The sediment was separated and mixed with 10% formalin and ethyl acetate and centrifuged for 5 minutes at 500 G. Subsequently, the recovered sediment was examined under a light microscope. Due to Budhhist religion's scriptures, there are not allowed to necropsy stray cats from the Buddhist monasteries at the end of the study; therefore no comparative data are available on the components of the digestive tract and stages of identification.

Statistical analysis

For univariate analysis, χ^2-test was used to access for associations between positivity and risk factors such as sex, age and district. Odds ratio

(OR) and confidential interval of each risk factor were calculated using category with lowest prevalence as a baseline of comparison by epicalc 2000.

RESULTS

Prevalence of GI parasites

The overall prevalence of GI parasites in stray cats of Bangkok areas was 11.9% (Table 1). Infection with only one species of parasite was more common (9.5%) than multiple infections (2.4%). Cats less than a year were highly infected by GI parasites (12.3%) compared to cats with 1-3 years (11.9%) and cat more than 3 years (6.5%). Males (12.1%) had the higher rates of infection than females (11.7%). *Ancylostoma* spp. (9.9%) was the most prevalent parasite detected in stray cats and *Toxocara* spp. (3.5%) was the second mostly found in cats (Table 2).

Distribution of GI parasites in Bangkok areas

The study revealed that the parasite burdens in 94% (47/50) of Bangkok areas. Pathumwan and Don Muang district had the highest number (30%) of infections among 50 districts.

DISCUSSION

The study has found that the level of GI helminth and protozoan parasites in stray cats in

Table 1 Factors associated with GI-parasite infections of stray cats in Bangkok.

Factor	Category	Number examined	Number positive (%)	OR (95% CI)	*P*
Total		1,485	176 (11.9)		
Sex	Females	923	108 (11.7)	-	
	Males	562	68 (12.1)	1.04 (0.75,1.44)	0.883
Age	> 5 years	77	5 (6.5)	-	
	1-5 years	455	54 (11.9)	1.94 (0.75,5.01)	0.233
	<1 year	953	117 (12.3)	2.02 (0.80, 5.09)	0.184
Districts		50	47 (94)		
Infection	Mixed		35 (2.4)	-	
	Single		141 (9.5)		

Table 2 Parasites and their stages identified in stray cats of Bangkok.

Parasites	Stage of identification	Positive samples (%)
Nematodes		
Ancylostoma spp.	egg and larva	148 (9.9)
Toxocara spp.	egg	52 (3.5)
Capillaria spp.	egg	1 (0.07)
Trematodes		
Platynosomum fastosum	egg	1 (0.07)
Cestodes		
Dipylidium caninum	Egg capsules	2 (0.14)
Taenia spp.	egg	1 (0.07)
Protozoa		
Isospora felis	oocyst	15 (1.01)

Bangkok metropolitan areas was slightly moderate. The findings confirmed an evidence that enteric parasites are now the dominant pathogens affecting stray cats in Bangkok. Most cats in Thailand are raised either outdoors or both outdoors and indoors. Since infected stray cats shed oocysts or infective eggs around public places (Jittapalapong *et al*., 2003), healthy animals and humans may get infected due to the contaminated environment. This study also reinforces the role of stray cats as one of the potential sources of zoonotic parasites transmission to humans in Bangkok.

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 (Hill *et al*., 2000; Spain *et al*., 2001). The current study also found that the degree of contact that cats had with other cats and dogs significantly influenced the prevalence of parasitic infection.

Tradition fecal methods, such as microscopy, are commonly used by diagnostic facilities for identifying parasite stages in a fecal sample. However, small protozoan parasites can be difficult to detect using conventional microscopy. When only one fecal sample is collected, prepatent infections in cats as well as intermittent shedding of parasitic stages may lead to the underestimation of the prevalence of parasitic infections. Similarly, a low level of infection may go undetected when using traditional microscopy methods (McGlade *et al*., 2003). In a veterinary practice, the importance of molecular technique such as PCR must be considered in terms of the practicality and cost effectiveness of using such a technique for routine diagnosis.

Toxocara cati is known to be the most common intestinal roundworm in cats. In this study, it was the second most frequent species of helminth (29.5%; 52/176). This finding can be related with the age, since the examined animals had less than 1 year of age. This measure is important since *T. cati* is implied as causative agent of visceral larva migrans in human beings (Fisher, 2003), and therefore, care must be taken to diminish the risk of infection to animals and human beings. 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.

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