

PARASITIC INFECTIONS FOUND IN PET AND STRAY DOGS IN IPOH, MALAYSIA

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ABSTRACT. A study carried out on the presence of parasites, both internal and external, in 29 stray and 38 pet dogs in Ipoh, Perak indicated that four species of ectoparasites and four species of endoparasites were identified. Samples collected were diagnosed at the Veterinary Research Institute (VRI) whereby it was found that a higher percentage of stray dogs were infected (76%) with parasites as compared to pet dogs (16%) that were presented at the government veterinary clinic. Parasitic infections in dogs are especially important as *Demodex* sp., *Giardia* sp., *Toxocara* sp. and *Ancylostoma* sp. are zoonotic and can cause skin infections, mange, diarrhoea and anaemia in humans. Regular screening of pets is important to stave off unwanted infections. As for stray dogs, strict enforcement to control stray dog population and public awareness campaigns on uncontrolled breeding of dogs needs to be emphasised.

Keywords: parasitic infections, pet and stray dogs

INTRODUCTION

In Malaysia, dogs are common pets in many households. However, stray dogs in urban areas also pose a problem as enforcement on stray dog management by local authorities has its limitations. Up to a few years ago, stray dog population was controlled by shooting but due to increased awareness of animal ethics, this archaic law has been modified and now stray dogs are caught and placed in shelters or the Society for the Prevention of Cruelty to Animals (SPCA) or adopted by good samaritans. The Veterinary Research Institute (VRI) is committed to monitor baseline incidences of diseases which are important such as those harboured by the canine population, both pets as well as strays. Some of these diseases are zoonotic such as mange by *Demodex canis*, visceral larval migrants by *Ascaris* sp. and diarrhoea by *Giardia* sp. Humans and their pets have a close physical relationship, and it is known to be beneficial with regards to socialisation, mental health and even physical wellbeing (Paul *et al.*, 2010).

However, dogs are competent reservoir hosts of several zoonotic pathogens and can serve as a readily available source of nutrition for many blood-feeding arthropods (Menn *et al.*, 2010). The clinical signs of parasitic infection are variable and occasionally some infected animals will be asymptomatic. However, severe clinical cases in young dogs will lead to diarrhoea, anaemia and death (Bowman, 1999; Cordero del Campillo and Rojo, 1999).

Ectoparasites are a common and important cause of pruritic and non-pruritic skin disorders in carnivores (Razmjoo *et al.* 2013). Ectoparasites that live on the surface of the host can transmit various types of diseases in animals. However, most carnivores with ectoparasites have no clinical symptoms (Bahrami *et al.* 2012). Common ectoparasites that are found in dogs are ticks, mites, fleas, flies and lice. Canine endoparasites consist of heartworms, tapeworms, hookworms, whipworms, roundworms, coccidia, giardia and flukes. According to Szabova *et al.* (2007), the developmental stages of the endoparasites (cysts, sporocysts, eggs and larvae) can survive in the environment for a long time and represent a risk factor for animals and also for the human population.

In Bangkok, stray dogs are found roaming the streets, fresh open markets, public places and Buddhist monasteries (Jittapalapong *et al.* 2003). These stray dogs act as sources of many zoonotic diseases such as rabies, ehrlichiosis and toxoplasmosis (Jittapalapong *et al.* 2007).

Previous studies have shown that intestinal parasites are common in pet dogs with reported prevalence estimates ranging from 3.1% to 8% for ascarids, 0.8% to 39% for hookworms and 0.8% to 12.3% for whipworms (Nolan and Smith 1995; Hackett and Lappin 2003). A prevalence study by Mukaratirwa and Singh (2010) and Bowman (1999) shows that intestinal parasites infection is usually high in puppies, mainly due to the fact that certain modes of transmission are exclusive to the newly whelped or neonates and also, because young dogs have not yet acquired immunity to parasites. Canine hookworm infection is endemic in Southeast Asian countries with a prevalence ranging from 70% to 100%, with zoonotic transmission representing a potentially significant public health concern (Mahdy *et al.* 2012). However, there are limited data available on the prevalence of canine hookworms in Malaysia.

A previous study by VRI on the incidence of parasites in pet dogs and cats was conducted from year 2009 until 2011. The species of ectoparasites and endoparasites were identified from routine diagnostic tests done on blood, faecal and skin scrape samples collected from local dogs and cats. Results indicated that there was 1 positive case of *Babesia gibsoni* found each year. Besides, 5 positive cases of microfilaria *Dirofilaria immitis* were recorded in 2009. 1 case of *Ehrlichia canis* and *Ancylostoma* sp. was recorded in 2010. Subsequently, *Ascaridia* (2 cases), *Toxocara* sp. (1 case) and *Babesia canis* (1

case) were identified in year 2011. Whereas, for cat samples only 3 parasite species were found which is mite (1 case) in 2009, 8 positive cases of *Toxoplasma gondii* in 2010 and 5 cases of *Ancylostoma* sp. in 2011 (VRI Annual reports 2009-2011).

The present study was conducted to determine and compare the number of ectoparasites and endoparasites found in stray and pet dogs around Ipoh between 2012 and early 2013. The aim of this study is to elucidate any significant zoonotic parasites. This is part of a more extensive study involving viral and bacterial disease monitoring in canines. Knowledge on current disease scenario of dogs, in both pets and strays will enable more structured control programmes for these diseases, thereby safeguarding the human population against outbreaks of zoonotic diseases.

MATERIALS AND METHODS

Samples

In 2012, a total of 38 pet dogs from various small animal clinics around Ipoh were sampled. These dogs were brought to the clinics for routine examination, vaccination or treatment for some ailments. As such the owners were cooperative in permitting the collection of blood, faecal and skin scrapings for routine screening of any disease that the dogs may have. Information on the medical history of each pet dog such as breed, age and sex was available from records at the clinic.

An interview was conducted with the pet's owner about the feeding and management of each animal. As for stray dogs, the Local Ipoh Municipal Council was routinely catching stray dogs found roaming in urban areas, partly from complaints of residents and general public, and these were sent to the VRI for a full post-mortem as well as a rabies surveillance programme conducted by the Department of Veterinary Services. Adult dogs which were old, weak or normal in appearance were used in this study, whereas puppies were advised to be sent to an animal shelter for adoption. During the period of January to April 2013, 29 stray dogs were caught and sampled, whereby samples including faeces, whole blood, intestine, skin scrapings and nasal swabs were collected from strays dogs and processed to isolate any possible presence of parasites. Details of the dogs' sex, age and clinical body conditions were recorded.

Parasitology techniques

All samples collected were tested immediately on submission to the laboratory. Individual faecal samples were screened microscopically by floatation method using saturated sodium chloride solution to identify helminth eggs. Each observed egg or ova was identified by analysing their morphological characteristics. A dog was classified as positive for helminthiasis if at least one egg was observed. Blood sample from each dog was collected in the EDTA tubes for haematological study including stained thin blood smear for differential

white blood cell count, complete blood parameter evaluation using a haematology reader (VetABC) and identification of blood parasites. The blood samples were subjected to thin blood smear examination which were to fixed with methanol then stained with Giemsa solution. Packed Cell Volume (PCV) values of blood samples were obtained using a microhaematocrit tube and reader, which establishes the level of anaemia in animals. All the blood samples were also subjected to buffy coat examination for trypanosomiasis. In addition, skin scraping method was performed and mite or tick specimens were mounted on a glass slide to examine microscopically.

RESULTS

Results obtained are shown in Table 1.

A total of 38 pet dogs were screened for endoparasites and ectoparasites whereby six isolations of parasites were found from four animals. The parasites found were *Demodex canis* in one dog, *Ancylostoma* sp. and *Ascaris* sp. ova in two and three dogs respectively.

From January to April 2013, 29 stray dogs were examined and 14 dogs showed positive result for endoparasites and/or ectoparasites. The result obtained was one positive case for *Demodex canis*, while seven dogs had *Rhipicephalus sanguineus*. One positive case was identified for *Ancylostoma* sp., *Toxocara canis*, *Giardia* sp. and *Rhipicephalus microplus*. Whereas, *Ctenocaphalides canis* was found in four

dogs and *Ancylostoma* egg in six stray dog samples. The result shows that, stray dogs have more parasite infections compared to pet dogs as 14 out of 29 dogs were infected with at least one parasite.

A total of 22 positive isolations from 29 stray dogs with eight parasite species of helminths, protozoa and ectoparasites were observed in stray dog samples. *Rhipicephalus sanguineus* was the most frequently detected ectoparasite that was found in seven stray dogs. Whereas, the most common parasite in pet dogs was *Ascaridia* sp. ova found in the faeces of three dogs.

Parasites found from the skin scrapping and gastrointestinal contents are shown in Figure 1. As the stray dogs were post-mortem, adult worms of *Ascaridia* and *Ancylostoma* were found. Skin scrapping showed the presence of *Ctenocephalides*, *Rhipicephalus* and *Demodex* sp.

The VRI also conducted a screening programme for pet dogs in 2009 to 2011. Samples of blood(187), faeces(6), organ (19), skin (8), intestine (22), specimen (1), serum (1) and others(2), were diagnosed to identify parasitic infections in pet dogs. It was found that a total of 14 positive isolations with seven parasite species were identified in various samples collected from the pet dogs (Table 2). Ectoparasite found in pet dogs was *Demodex* sp. in two dogs. Whereas, endoparasites found in pet dogs were detected from blood sample which contain blood protozoa such as *Microfilaria* (5), *Babesia canis* (1), *Babesia gibsoni* (1) and *Ehrlichia canis* (1). Parasites found in

Table 1. Ectoparasites and ectoparasites identified in stray and pet dogs in 2012 and 2013

Parasite species	No. of dogs positive Jan-Apr 2013 (n=29 Stray dogs)	No. of dogs positive 2012 (n=38 Pet dogs)
Ectoparasites		
<i>Demodex canis</i>	1	1
<i>Rhipicephalus microplus</i>	1	-
<i>Rhipicephalus sanguineus</i>	7	-
<i>Ctenocaphalides canis</i>	4	-
Endoparasites		
<i>Ancylostoma</i> sp. (Adult worm)	1	-
<i>Ancylostoma</i> sp. ova	6	2
<i>Toxocara canis</i> worm	1	-
<i>Giardia</i> sp.	1	-
<i>Ascaris</i> sp. ova	-	3
TOTAL no. of isolations	22 (76%)	6 (16%)

Table 2. Parasites identified in pet dogs from 2009-2011

PARASITE species	Total no. of samples received (n= 246) 2009-2011
Ectoparasite	
<i>Demodex</i> sp.	2
Endoparasites	
<i>Babesia gibsoni</i>	3
Microfilaria	5
<i>Ehrlichia canis</i>	1
<i>Babesia canis</i>	1
<i>Ancylostoma</i> sp. ova	1
<i>Toxocara</i> sp. ova	1
TOTAL no. of isolations	14

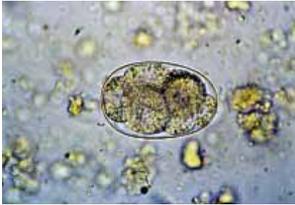
<p><i>Ancylostoma</i> sp. (ova) from small intestine of stray dog.</p>	 <p>20x</p>
<p><i>Ascaridia</i> sp. (tail)</p>	 <p>10x</p>
<p><i>Ctenocephalides canis</i> from skin scraping.</p>	 <p>4x</p>
<p><i>Demodex</i> sp. from skin scraping.</p>	 <p>10x</p>
<p><i>Rhipicephalus sanguineus</i> from skin scraping.</p>	 <p>4x</p>

Figure 1. Parasites found stray and pet dogs

faecal samples were *Ancylostoma* sp. ova and *Toxocara* sp. ova in one dog each (VRI Annual report, 2009-2011).

DISCUSSION

As dogs are generally kept outdoors, common parasitic infections can be rampant as transmission is facilitated from animal to animal in the cages, floors and living area contaminated with infective stages of parasites. The common symptoms of parasitic infection in dogs are coughing which may be caused by the advanced stage of heartworms infection or with hookworms and roundworms. Dogs that have worms will often vomit. Roundworms can sometimes be seen in a dog's vomit. Soft stools and canine diarrhoea can be the result of worms. In addition to diarrhoea, dogs with hookworms (*Ancylostoma* sp.) may have blood in their faeces. Dogs that are lethargic and less active than normal may be showing symptoms of having worms. If a dog starts to appear pot bellied or bloated, it may have contracted worms. This is commonly seen in puppies that have picked up worms such as *Toxocara* sp. from their mother. Dogs that are infected often lose their appetite. As worms steal a dog's nutrients, a dog with worms may also show a sudden increase in hunger. If a dog shows signs of rapid weight loss, he may have a tapeworm or a whipworm. A healthy dog should have a shiny thick coat. If the dog's coat begins to dull and dry out, he may have a worm infection. Loss of hair or the appearance of rashes

can also denote worms. Dogs that show signs of skin irritation may have a severe infestation of worms or skin parasites which burrow into the skin. Dogs with worms will occasionally rub their rear ends on the floor in order to relieve themselves of the itch due to worms in the area. Some worms, such as tapeworms may appear as small moving segments in the fur or area around dog's anus. Roundworms can often be seen in a dog's stools. If left untreated, worms can damage a dog's internal organs such as the liver and intestines, and lead to loss of blood and death. Anthelmintics and acaricides are effective in treating parasitic infections in dogs. (<http://www.cesarsway.com>)

As parasites of dogs are common worldwide, results obtained from this study can be construed as typical with stray dogs harbouring more parasites transmitted as a result of poor hygiene and management. Pet dogs having owners can be concluded as having fewer parasites especially the tick *Rhipicephalus sanguineus*, where most owners are able to observe and remove it mechanically. Pet dogs are also managed well as they are given baths, fed regularly and housed in kennels or kept indoors. The close human contact inadvertently ensures that the dogs are well taken care.

The results of this study showed that stray dogs are reservoirs for zoonotic intestinal protozoan and helminth parasites and ectoparasites, and should be considered important to public health. Stray dogs may have an important role in the transmission of some diseases and understanding

the pathogenicity and epidemiology of potential zoonotic agents in this and other animals closely associated with human is fundamental to public health. So, it is imperative for humans to avoid faecal contamination in streets, public gardens and parks. Also sick stray dogs should be euthanised in dog population control programmes and a viable system should be in place to adopt or maintain stray dogs. Client awareness programmes to educate new pet owners should be carried out as a community programme. With this, zoonotic diseases can be minimised.

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