A COPRO INVESTIGATIVE STUDY OF PARASITES IN STRAY DOGS AND CATS IN RURAL, SEMI-RURAL AND URBAN AREAS OF BERBERA CITY OF SOMALILAND (NORTHERN OF SOMALIA)

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ABSTRACT

The present study was conducted during the period from October 2008 to April 2009 at Berbera city of Togdheer district of Somaliland at the northern part of Somalia where living conditions are particularly poor in these rural communities with large numbers of stray dogs and cats that have no access to any veterinary services. A total of 41 stray dogs and 28 stray cats were randomly selected from rural, semi-rural and urban places and subjected to qualitative coprological examinations to identify the major parasites involved in parasitic burden. Stray cats and stray dogs are not consistently vaccinated or dewormed as animal health's requirement. For dogs, the result revealed that the prevalence was 65.9% (27/41). Protozoal Giardia cysts were more prevalent 31.7% (13/41) followed by nematode infestations 31.7% (13/41) where, Toxocara canis was detected in 26.8% (11/41) and Anchylostoma caninum 4.9% (2/41) whereas Cestodes infestation, Taenia spp. showed the lowest prevalence 2.4%

(1/41). For Stray cat, the prevalence was 32.1% (9/28). Nematode infestations were more prevalent 21.4% (6/28), where Toxocara spp. were detected in 17.9 % (5/28) and Anchylostoma spp. in 3.6% (1/28) followed by Protozoal Coccidian oocysts 7.1% (2/28) and finally Cestodes infestations, Taenia spp. 3.6% (1/28). Monoparasitism and poly-parasitism analysis has revealed that 53.7% (22/41) of dogs, were infected with a single species of parasites and 12.2% (5/41) were harboring more than one parasite species, whereas, in cats revealed that 25.0% (7/28) of cats were infected with a single parasite species while7.1% (2/28) were harboring more than one parasite species. Recommendations were given.

Key Words: Stray dogs, stray cats, gastrointestinal nematodes

INTRODUCTION

Uncontrolled population of stray dogs in close proximity to increasing densities of human population in urban environments is a common fact in developing countries, which, in conjunction with the lack of veterinary attention and zoonotic awareness, increases the risks of disease transmission ***(Traub et al., 2005)***. The gastrointestinal parasites in particular constitute a major source of diseases for dogs in the tropics and have been recognized as an important public health problem in several parts of the world ***(Coggins, 1998)***. In different countries of the world, several studies show high prevalence of intestinal parasites in stray and domesticated dogs ***(Labruna et al., 2006); El-Seify and Nabih (1998, 1998a); El-Seify et al., (1998, 1998a),*** as well as high rates of environmental contamination with eggs and larvae of canine intestinal parasites ***(Castro et al., 2005)***. A well-known and important zoonotic diseases are cutaneous and visceral larva migrans, hydatid disease and taeniasis ***(Dakkak, 1992; Heukelbach et al., 2002; Heukelbach et al.,***

2003; Akao and Ohta, 2007); Savioli et al., 2006) Hasslinger et al., (1993). There is an increasing evidence in support of the zoonotic potential of canine *Giardia* with a growing number of studies identifying potentially zoonotic genotypes of *Giardia* in dogs and humans from both developed and disadvantaged communities worldwide ***(Traub et al., 2004; Eligio-Garcia, et al., 2005; Lalle, et al., 2005).*** *Toxocara canis*, which causes the visceral and ocular larva migrans syndromes, and *Ancylostoma spp.* which causes cutaneous larva migrans among others, ***(Ciarmela et al., 2002; Hendrix et al., 1996)*** are found among these zoonotic important species.

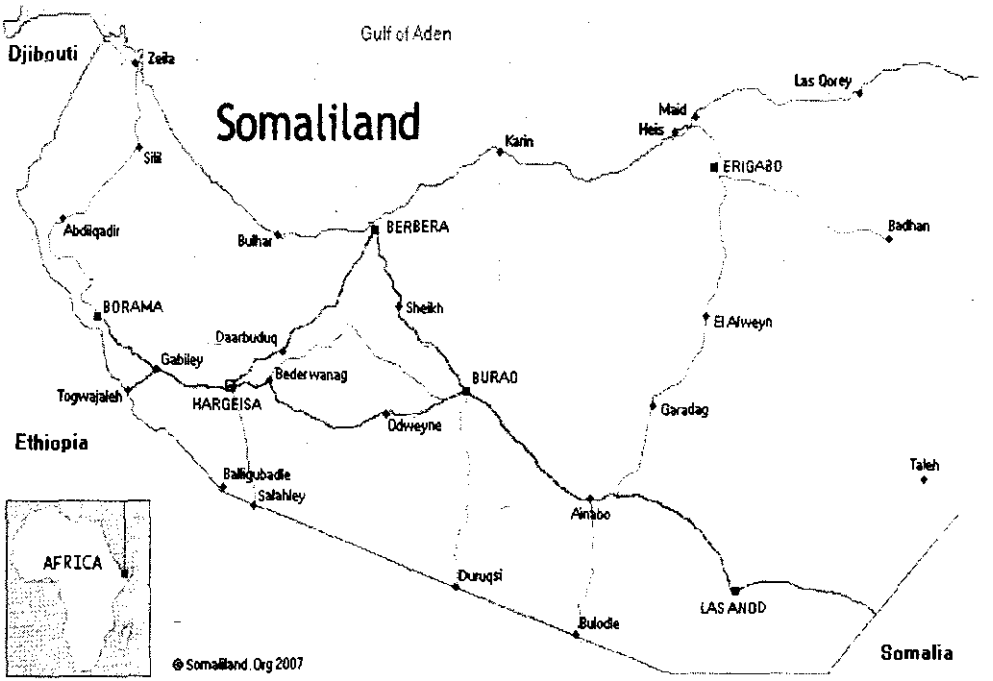
The impact on the environment is more evident for stray, roaming cats than for dogs. Cats are opportunistic predators which eat small birds. mammals and lizards. Rural cats prowl in urban and rural regions near residential areas. Excretion of large quantities of faeces by rural cats, presents a health hazard to the human population especially children. They are reservoir of many zoonotic infestations such as hookworm and ascariasis ***(Fisher, 2003; Laberthe et al., 2004)***. Several epidemiological studies demonstrated that stray cats contained high frequency of parasites ***(McColm and Hutchison, 1980; Coman et al., 1981; Nichol et al., 1981; Calvete et al., 1998); Abu-Madi et al., (2008).*** All diseases included in the World Health Organization (WHO) especially Neglected Diseases Initiative (NDI) have a common link with poverty and as the current view is to take a an approach to some of these diseases. The attention given by Governmental and non-Governmental organizations to stray dogs and stray cats has been far below to what it deserves. Despite the considerable numbers and the neglected importance of stray dogs and cats in the Somaliland economy, knowledge about the health problems affecting their welfare is unknown as far as we know for most parts of the country.

Therefore, the objectives of this study were to determine spectrum of species and prevalence of major parasites involved in stray dogs and cats in addition to determine the species of gastrointestinal helminthes parasites in the same animals from a rural area of Berbera city of Somaliland.

MATERIALS AND METHODS

Study Area:

The present study was conducted during the period from October 2008 to April 2009 at Berbera city of Togdheer district of Somaliland at the northern part of Somalia. (Figure 1).



Study animals and protocol

A total of 41 stray dogs and 28 stray cats were randomly selected from rural, semi-rural and urban places of Berbera city and subjected to qualitative coprological examinations to identify the major parasites involved in parasites burden.

Fecal samples

Fecal samples were examined individually for Gastrointestinal (GI) nematode, cestodes, and trematodes eggs as well as protozoan cysts, trophozoites, cysts and oocysts of protozoa. Fresh faecal samples were taken directly from the ground when dogs and cats were seen defecating. For stray dogs and cats samples were collected during early morning visits to the randomly chosen places and were collected immediately after spontaneous elimination for observation of the presence of parasites and placed in air and water tight sample vials, and then brought to the laboratory of the gulf international quarantine management company in Berbera city of Somaliland without preservation within 30-60 minutes after collection and kept at 4C until processing .

Parasitological procedure

All parasites were identified using the keys of ***Yamaguti, (1959)*** and ***Soulsby, (1982).*** The faecal samples were carefully examined microscopically using the 10 × objective. 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. Sedimentation and floatation techniques were used for detection of parasitic stages ***(Urquhart et al., 1996; Soulsby, 1982).*** Faecal samples were examined using flotation technique in saturated sodium chloride solution ***(Willis, 1921).***

RESULTS

Concerning stray dogs, the prevalence was 65.9% (27/41). *Giardia spp.* was the most prevalent 31.7% (13/41) followed by nematodes 31.7% (13/41). *Toxocara canis* had higher prevalence 26.8% (11/41) followed by *Ancylostoma spp.* 4.9% (2/41). Cestodes *Taenia spp.* 2.4% (1/41) (Table 1). Single infection and mixed infection analysis has revealed that 53.7% (22/41) of dogs were infected with a single parasite and 12.2% (5/41) were harboring more than one parasite species (Table 2).

Corresponding stray cats, the prevalence was 32.1% (9/28) with highest prevalence with nematodes (6/28) 21.4% as *Toxocara spp.* (5/28) 17.9% and *Ancylostoma spp.* (1/28)3.6%. Protozoal *Coccidian oocysts were detected in* (2/28) 7.1% while the cestode, *Taenia spp.*, was detected in only (1/28) 3.6% of examined cats. (Table 1). Single infection and mixed infection analysis has revealed that 25.0% (7/28) of cats were infected by a single parasite while 7.1% (2/28) of them were harboring more than one parasite species (Table 2).

Table (1): Prevalence of Gastrointestinal Parasites in dogs and cat

Species	Total animals examined	Parasites	+	%
Stray dogs	41	*Toxocara spp.*	11	26.8
		Ancylostoma spp.	2	4.9
		Taenia spp.	1	2.4
		Giardia spp.	13	31.7
Stray cat	28	*Toxocara spp.*	5	17.9
		Ancylostoma spp.	1	3.6
		Taenia spp.	1	3.6
		Coccidian oocysts.	2	7.1

Table (2): Prevalence of gastrointestinal parasites in dogs and cat regarding single infection and mixed infection.

Species	Total animals examined	Type of parasites (%)		
		Total prevalence	Single infection	Mixed infection
Stray dogs	41	65.9 (27/41)	53.7 (22/41)	12.2 (5/41)
Stray cats	28	32.1 (9/28)	25.0 (7/28)	7.1 (2/28)

DISCUSSION

The present study provides the first assessment on qualitative estimates of parasites in stray dogs and cats in Berbera city of Somaliland. The urban area of Berbera is surrounded by rural villages with rarely agricultural-based economy. Living conditions are particularly poor in these rural communities, and a substantial proportion of the villages with large numbers of stray dogs have no access to veterinary services. Therefore, most dogs have never been treated for any parasitic diseases prior to the study. In addition, all dogs were not vaccinated. Stray cats and stray dogs were defined as that lived in the environment without a real owner. They were fed by leftover food by people or dead animals, prey including rats, rabbits, chickens, birds, and reptiles.

The results showed that intestinal helminth species were abundant, and the prevalence of infection was high. Analysis of the encountered helminthosis revealed that the prevalence was 65.9% in dogs and 32.1 % in cats. This is an indication for presence of very high level of infection

that requires an effective anti-parasite control program. However, these data differ from data showed by other studies ***(Ramirez-Barrios, 2004; Barutzki and Schaper, 2003).*** In our study, the overall prevalence of intestinal helminths of stray dogs (65.9 %) was similar to that reported from different ecological and epidemiological settings in Nigeria ***(Anene et al., 1996; Omudu and Amutu, 2007)*** and Spain ***(Martinez-Moreno et al., 2007).*** Higher prevalences was recorded in South Africa (76%), Mexico (85%) and Morocco (100%) ***(Minnaar et al., 2002; Eguia-Aguilar et al., 2005; Pandey et al., 1987).*** Some factors such as geographical location, status of animal ownership, sampling protocols, demographic factors, anthelmintic usage, and diagnostic techniques are responsible for the wide range of endoparasite prevalence. The predominance of helminthic upon enteric protozoan infections in dogs observed here is similar to other recent observations in Brazil ***(Oliveira-Sequeira et al., 2002; Labruna et al., 2006)***, other countries of Latin America ***(Ramı´rez-Barrios et al., 2004; Ponce-Macotela et al., 2005; Fontanarrosa et al., 2006)***, and other places in the *world* ***(Inpankaew et al., 2007; Martı´nez-Moreno et al., 2007).*** *Giardia spp.* was the most frequent protozoan found in stray dogs (31.7%), which was higher to what had been registered in Brazil ***(Gennari et al., 1999; Oliveira-Sequeira et al., 2002)*** and in developed countries ***(Bugg et al., 1999; Palmer et al., 2008).*** In Australia, *Giardia spp.* is the most frequent intestinal parasite in dogs ***(Bugg et al., 1999).*** These findings highlight

that zoonotic transmission could represent a public health problem in developing countries, especially in communities that are socioeconomically handicapped. Humans become infected with *Toxocara spp.* when they accidently ingest embryonated eggs, usually through contaminated soil. Although, most people infected with *T. canis* do not develop overt clinical disease, three clinical syndromes, namely visceral larva migrans, ocular larva migrans and covert toxocariasis in humans have been reported ***(Irwin and Traub, 2006)***. The overall frequency of *T. canis* (26.8%) obtained here is comparable to those obtained in previous studies performed in Brazil 5.54% ***(Oliveira-Sequeira et al., 2002)***. This parasite contribute decisively for a cumulative environmental contamination, representing a higher risk of human infection than suggested by the infection rate of dogs ***(Oliveira-Sequeira et al., 2002)***. The prevalence of larval stages of hookworms *(Anchylostoma spp.)* is relatively lower than other detected parasites, however, its presence in soil may infect humans with exposed unprotected skin, manifesting primarily as cutaneous larva migrans. *Ancylostoma spp.* has been referred to as one of the most frequent intestinal parasite of dogs in Brazil ***(Oliveira-Sequeira et al., 2002; Labruna et al., 2006)*** and other countries ***(Bugg et al., 1999; Minnaar et al., 2002; Blazius et al., 2005; Wang et al., 2006)***. Similarly, human infection by adults of *A. caninum*, already reported in other countries ***(Prociv and Croese, 1996)***.

The parasitic infection rate (number of cats infected by at least one species of helminths) in this study (32.1%) was lower to that reported in earlier studies where it was 98.5% in Isfahan (Iran) ***Dalimi and Mobedi, (1992)*** and 89.7% in Spain ***(Calvete et al., 1998)*** and 89.6% in Brazil ***(Laberthe, et al., 2004)***. Several studies on the prevalence of endoparasites, as determined at autopsy, in stray cats in Iran have been reported ***(Jamshidi, et al., 2002); Bahadori, et al., 2004); Navidpour, 2007)***. The present study indicated that nematode infestations were the highest prevalent parasites (21.5%) detected in examined stray cats. This is higher than the estimated prevalence previously found in Iran (7%) ***(Bahadori et al., 2004)***, and in Iraq 18% ***(Nihad et al., 1988)***. *Toxocara cati* is the most frequent species detected (17.9%). *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. *Toxocara cati* prevalence of 26.8 % found in the current study was higher to that of other studies in Iran 8.3% in Ahvaz ***(Navidpour, 2007)***, 16% in Tehran, ***(Bahadori et al., 2004)***, Iraq (15%) ***(Nihad et al., 1988)***. However the prevalence encountered in this study was far lower than Spain (55.2%) ***(Calvete et al., 1998)***, England (53.3%) ***(Nichol et al., 1981)***, Greece (66.7%) ***(Haralabidis, 1988).)*** and Denmark (79%) ***(Engbaek et al., 1984)***. The other nematode isolated from cats was *Ancylostoma spp.* with a prevalence of 3.6%, which was lower than that detected in Spain (29.3%) ***(Calvete et al., 1998)***, and in Brazil (8.9%) ***(Laberthe et al., 2004)***. In other studies, the estimated prevalence in the north of Iran was 45.4%. ***(Dalimi and Mobedi, 1992)***. The *Taenia spp.* prevalence (3.6 %) was nearly similar to that found by in Tehran as (0.95%) ***Navidpour, (2007)*** and in Iraq as 4% ***(Nihad et al., 1988)***.

Our study shows that parasites of importance for human health were highly prevalent in Somaliland stray dogs and cats and so, intervention measures are necessary to reduce the risk of transmission of parasites to humans, which should focus on health education provided to livestock owners and urban people and the establishment of a program based on zoonotic diseases.

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