

Short notes

Prevalence of intestinal helminth parasites of stray dogs in Shendi area, Sudan

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ABSTRACT. Three hundred and sixty fecal samples of stray dogs were collected between July and December 2018, from open grounds of Shendi city and two suburbs (Gulia and Musiab), River Nile State, Sudan, and were examined for helminthic infections. The results showed 43 (11.9%) of the samples were positive for at least one species of helminth. A total of four helminth species were identified, including two nematodes (*Ancylostoma caninum* and *Trichuris vulpis*) and two cestodes (*Dipylidium caninum* and *Taenia* spp.). *Taenia* spp. was found to be the most common helminth infection in stray dogs (6.7%) followed by *D. caninum* (3.1%), while the least was the nematode, *A. caninum* (0.8%). The prevalence of infection among stray dogs in the suburbs was found to be higher than those in the city; however, there was no statistical significance ($P = 0.07$). In conclusion, stray dogs in Shendi area were found to be harboring several important zoonotic helminthes such as *A. caninum* and *Taenia* spp.; this shows the necessity of stray dog population management in this area as they present a health risk to the community.

Keywords: Intestinal helminthes, prevalence, stray dog, Sudan

Introduction

Dogs and other canids are vulnerable to be infected by various helminths, include *Echinococcus granulosus*, *Toxocara canis*, *Dipylidium caninum*, *Taenia hydatigena*, *Taenia ovis*, *Taenia multiceps*, *Ancylostoma caninum* and *Trichuris vulpis* [1,2]. Stray or free-living dogs are common animals in urban and suburban areas of developing countries; their living habitat are normally in close proximity with human dwellings which poses a threat to the public health for being reservoirs of causative agents for various zoonotic diseases [3].

Infective stage of helminths is commonly transmitted via direct or indirect fecal-oral route, which can be highly prevalent in tropical and subtropical regions, where the environmental condition are more suitable [4,5]. Receiving an infective stage of helminths can lead to several pathogenesis, depending on the type of helminth, such as hydatidosis [6], trichinellosis [7], ocular and visceral larva migrans [8]. Due to the capability of

transmitting numerous zoonotic diseases and their living habitat, epidemiological studies of dog parasites are important in order to develop and implement optimal control to combat the diseases [9].

In Sudan, some previous studies have shown that dogs are infected with various species of helminth parasites [10]. However, due to the considerable number of stray dogs and of lack of data concerning their parasites, this study was conducted to evaluate the current status of intestinal helminths infecting stray dogs in Shendi area of the River Nile State.

Materials and Methods

This study was conducted in Shendi as a city and two of its suburbs (Gulia and Musiab). The study area located on the east bank of the River Nile, between 16°40'52" N and 33°25'7" E; it has semi-arid climatic features with a brief rainy period in August (mean precipitation 29.3 mm), and temperatures within 28–41°C. The main source of

Table 1. Prevalence of intestinal helminth infections in stray dogs according to the sampling sites. ND = no data.

Helminth species	Dogs of Shendi City (n=170)		Dogs of suburbs (n=190)		χ^2	P-value
	No. of infected dogs	Prevalence %	No. of infected dogs	Prevalence %		
Nematodes						
<i>Trichuris vulpis</i>	3.0	1.8	2.0	1.1	2.2	0.13
<i>Ancylostoma caninum</i>	0.0	0.0	3.0	1.6	ND	ND
Cestodes						
<i>Taenia</i> spp.	11.0	6.5	13.0	6.8	2.9	0.09
<i>Dipylidium caninum</i>	5.0	2.9	6.0	3.2	2.9	0.09
Overall	19.0	11.2	24.0	12.6	3.3	0.07

income in this area is agriculture and crops trading.

A total of 360 fecal samples of stray dogs were collected between July and December 2018, from different open spaces of the study area (around slaughterhouses, streets, playgrounds and public parks) in appropriately labeled leakproof containers and transferred to the Laboratory of Zoology, University of Shendi in ice-cooled boxes. Samples collected were either immediately examined for helminth eggs, or stored refrigerated (4°C) for up to one day at the maximum before processing. The samples were processed using sedimentation and floatation techniques [11]. Under a microscope, helminth eggs were identified based on morphological characteristics previously described [12,13].

The prevalence of infection for each parasite was calculated as follows ($P = n/Z \times 100$), where: n = number of samples infected and Z = total number of samples examined. The difference in the prevalence of infection between the study sites was analyzed using a Chi-square test and SPSS software; values were considered significant when $P < 0.05$.

Results

Out of the 360 fecal samples examined, 43 (11.9%) were found positive for at least one helminth species. A total of four helminths were identified, including two nematodes (*Ancylostoma caninum* and *Trichuris vulpis*) and two cestodes (*Dipylidium caninum* and *Taenia* spp.). The most frequent helminth found was the cestode, *Taenia*-type (6.7%) followed by *D. caninum* (3.1%), while the lowest was the nematode, *A. caninum* (0.8%). The prevalence of infection among stray dogs in the suburbs was found to be higher than those in the city area; however, this difference was not statistically

significant ($P = 0.07$), (Table 1).

Discussion

In this study, the overall prevalence of intestinal helminth species parasitizing the stray dogs in Shendi area was 11.9%. This contrasts with a previous finding from the western part of Sudan that stray dogs had a high prevalence of intestinal helminth infections [10]. Globally, studies have shown a considerable high prevalence of intestinal helminth in stray dogs [14,15]. This study finding can be explained by the fact that the climate in Shendi area is a semi desert, where temperatures are high with low humidity which will slow or suppress the development of parasite eggs, and thus a decrease in the spread of infections. In addition, the collected fecal samples were not completely fresh and may reduce detecting the diagnostic stage in the fecal samples; moreover, diagnostic techniques could also reduce the chance of detecting the parasite.

The most prevalent helminth found in the present study was the cestode *Taenia* spp., however, the rate of infection is lower compared to a previous report from western Sudan stray dogs [10]. *Taenia* spp.-infected dogs may become a source of infection for livestock and other animals, which will result in massive economic losses [16]. This risk can persist due to the ability of *Taenia* spp. eggs as they are highly resistant to extreme weather conditions making them challenging parasites to eradicate from contaminated environments.

The second most prevalent helminth found was the cestode *D. caninum*. This rate of infection is higher than that previously reported from western Sudan stray dogs [10]. Dipylidiosis is an approved

zoonosis; infection in human can occur by accidentally swallowing adult fleas that containing the infective stage larva [17]. This parasitic infection is mostly found in children [18].

Furthermore, five fecal samples were found infected with the canine whipworm, *T. vulpis*. This species of nematode infects canine globally [14,19], however, it has also been reported to infect human [20]. In previous study, the eggs of this nematode have been recovered from soil samples surrounding playgrounds and fecal matter from other public places [21]; these eggs have a great ability to resist extreme environmental conditions and infections are acquired only through ingestion of embryonated eggs previously shed in infected feces.

In this study, the least prevalent helminth detected was the nematode *A. caninum*. However, a previous study showed a high prevalence of this nematode infection among Sudanese stray dogs [10]. Globally, *A. caninum* has been reported as the most widespread hookworm [22,23]. *Ancylostoma* spp. are the most common parasite, infecting dogs worldwide, especially in the tropical and subtropical regions causing severe anemia that often leads to death [24,25].

Despite the higher prevalence of intestinal helminth infection found in this study among stray dogs in the suburbs compared to those in the city; however, this difference was not statistically significant. Not surprisingly, the prevalence of parasitic infections in stray dogs increases because they have easy access to animal carcasses that may carry different stages of parasites. Moreover, poor sanitary conditions in the suburbs, as well as the presence of intermediate or reservoir hosts such as rodents, can be one of the reasons for the increased prevalence.

In conclusion, stray dogs in Shendi area were found to be infected with some important zoonotic such as *A. caninum* and *Taenia* spp.; which indicate how dangerous those animals are to public health. Thus, it is necessary to control the presence of stray dog populations as well as holding appropriate public health education for residents in this area.

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