

Prevalence of Intestinal Helminth Parasites of Dogs in Lagos, Nigeria

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(received September 10, 2004; revised January 15, 2005 accepted May 16, 2005)

Abstract. A survey of 310 dogs (164 males and 146 females) for infections with intestinal helminth parasites was carried out in Lagos, Southern Nigeria. Out of these, 175 were pet dogs and were routinely checked by veterinary doctors, while the remaining 135 were strayed-dogs, which did not receive medical check-up. Strayed-dogs were significantly more infected (77.8%) than the pet dogs (12.0%) at $P < 0.1$. The analysis of infection pattern, by age, revealed that among the strayed dogs, 92.2%, 76.6% and 59.5% of the puppies, young and adult dogs, respectively, were found infected. Corresponding prevalences among the pet puppies, young and adult dogs were 21.5%, 7.1% and 5.0%. Helminth ova recovered from the strayed-dogs included *Toxocara canis* (47.6%), *Ancylostoma caninum* (41.9%), *Dipylidium caninum* (37.9%) and *Trichuris vulpis* (20.9%). Helminth ova recovered from the care-receiving dogs were *Toxocara canis* (5.8%), *Ancylostoma caninum* (3.2%) and *Dipylidium caninum* (2.1%). Female strayed-dogs, with a prevalence of 89.7%, were significantly more infected than their male counterparts (70.9%). Strayed-puppies, with an infection rate of 92.2%, were significantly more infected than strayed young and adult dogs. Public health implications of these results, with particular reference to zoonotic transmission, was highlighted.

Keywords: intestinal helminths, dog intestinal parasites, helminth ova, infected strayed-dogs, helminths of dogs

Introduction

Dogs have remained among the closest associates of human beings since ancient times. The usefulness of dogs for hunting, anti-crime and security purposes, food, religious rituals, and as companion have endeared them to man. However, in spite of the listed usefulness, the dogs, especially the free-roaming types, have been incriminated in the transmission of zoonotic diseases, such as cutaneous larva migrans (Dryden, 2002; Schantz, 2002; Kagira and Kanyari, 2000; Kazacos, 2000; Burnham, 1998; Blagburn *et al.*, 1997; 1996; Hendrix *et al.*, 1996). There is paucity of data on the endoparasites of dogs in Nigeria. The existing information is limited to the studies carried out in Ibadan (Olufemi and Bobade, 1979; Idowu *et al.*, 1977; Oduye and Olayemi, 1977; Oduye and Otesile, 1977), in Zaria (Dada and Belino, 1979; van Veen Schillhorn and Adeyanju, 1979), and in Abeokuta (Mafiana *et al.*, 1993). Legislation on the free-roaming animals is not enforced in Nigeria. The flooding of Nigerian towns and streets with these animals, therefore, continues unabated. The objective of the present study was to determine the prevalence of helminth parasitic fauna of dogs in the Lagos area, thus adding to the existing information. Enumeration of the dangers associated with free-roaming dogs and the strategy to promote public enlightenment on the dangers of strayed-dogs are highlighted. The need to emphasize medical atten-

tion for domestic animals, by taking them for appropriate veterinary care, is suggested.

Materials and Methods

Some private houses located in different parts of Lagos city were visited to solicit the cooperation of dog owners. These dogs were given serial numbers, and the information on their age, sex, breed, degree of restriction and the type of treatment each dog had received during the last one year was obtained. Faecal collections of the dogs that had strayed and received no treatment for the past one year and of the non-strayed dogs kept under medical-care were obtained. For the ease of collection and for obtaining fresh samples, the city was divided into sections. The schedule of faecal collection was conveyed to each section, prior to the day of visit by the official. Dog owners were asked to restrict their dogs at night before the day of visit. This ensured that the faeces collected corresponded to the dog for which information was obtained. Faecal samples of 135 free-roaming dogs were obtained. Some private veterinary clinics were contacted and faecal samples of 175 non-roaming dogs, brought-in for routine check-up, were obtained. Relevant informations, as stated above, were obtained for each dog. For both groups of dogs, efforts were made to examine the faecal samples immediately after collection. Whenever not feasible, however, samples were refrigerated and examined within two days. Information was obtained,

through a questionnaire, on the levels of education, socio-economic status and public awareness of dog owners about the implications of their intimacy with dogs.

Age classification of dogs. The dogs were classified into various age groups as follows: (a) puppies of less than six months; (b) young dogs between six months and two years; and (c) mature/adult dogs above two years.

Examination of faecal samples. Faecal samples were examined using the test tube floatation method (Hansen and Perry, 1990). Faeces weighing approx 3 g were put into a beaker containing 50 ml floatation fluid (sodium chloride, 400 g; water, 1000 ml; sugar, 500 g; specific gravity, 1.280) and stirred thoroughly. The resulting faecal suspension was strained into another beaker and then poured into a test tube in a rack, filled to the brim. The tube was covered for about 20 min. The cover was lifted and the strained faecal suspension was immediately placed on a slide and examined under the microscope for ova.

Results and Discussion

Results of the examination of stool samples of 310 dogs in the two categories, 135 strayed-dogs and 175 regularly treated dogs, are shown in Tables 1 and 2, respectively. The strayed-dogs consisted of 51 puppies, 47 young, and 37 adults. In the strayed-dogs category, of the 86 males, 61 (70.9%), and of the 49 females, 44 (89.7%) were detected positive for helminth ova (Table 1). The female strayed-dogs were significantly more infected than the male strayed-dogs ($P < 0.01$). Strayed-puppies which had an infection rate of 92.2%, were significantly more infected than the strayed young and adult dogs ($P < 0.01$). The four helminth ova recovered from the strayed-dogs were: *Toxocara canis* (49.5%), *Ancylostoma caninum* (47.6%), *Dipylidium caninum* (41.9%) and *Trichuris vulpis* (20.9%).

The dogs that had received regular treatment consisted of 65 puppies, 70 young and 40 adults. The infection pattern by sex in this group showed that out of the 78 males, 9 (11.5%), and of the 97 females, 12 (12.4%) were detected positive for helminth ova (Table 2). The overall prevalence of non-strayed dogs with helminth ova was 12.0%. Medically treated puppies had significantly higher infection rate (21.5%) than the medically treated young (7.1%) and adult dogs (5.0%) at $P < 0.01$. All the dogs were cross- and pure-breeds, and each had a record of regular veterinary clinic attendance. The ova of the three helminth species detected from the treated dogs were *Toxocara canis* (5.8%), *Ancylostoma caninum* (3.2%) and *Dipylidium caninum* (2.1%). Infection with helminth ova was significantly higher in the strayed-dogs (77.8%), than the medically treated dogs (12.0%) at $P < 0.01$. Response to questions by the dog owners revealed that only 40% were aware of diseases transmissible between dogs and man. Rabies was the infection generally mentioned, even though 90% of them were educated and 60% were employed in the upper salary scales.

This survey revealed a relatively high prevalence of intestinal helminths among dogs in the Lagos State, especially among the free-roaming ones. The public health implications of this cannot be overemphasized, particularly in connection with the transmission of zoonotic diseases (Samuel *et al.*, 2001; Kazacos, 2000; Prociv and Croese, 1990; Schantz, 1989; Little *et al.*, 1983). In spite of the fact that dogs provide meat delicacy, security, hunting, social and economic benefits, their role in the spread and transmission of zoonotic diseases, such as cutaneous larva migrans, rabies, echinococcus and myiasis cannot be overlooked (Dryden, 2002). The free-roaming dogs, that cross the roads at random, are causative agents of fatal accidents on Lagos streets. Owing to the immense benefits of dogs to man and the lack of awareness among the dog owners about the dangers of intimacy with dogs, the public at

Table 1. The prevalence of helminth ova* in different age groups and the sex in strayed-dogs, Lagos, Nigeria

Age group	Males		Females		Total	
	number examined	number infected	number examined	number infected	number examined	number infected
Puppies (< 6 months)	34	31 (91.2)	17	16 (94.1)	51	47 (92.2)
Young (> 6 months - 2 years)	28	19 (67.9)	19	17 (89.5)	47	36 (76.6)
Adult (> 2 years)	24	11 (45.8)	13	11 (84.6)	37	22 (59.5)
Total	86	61 (70.9)	49	44 (89.7)	135	105 (77.8)

*values within paranthesis are percentage of the total number of dogs examined in the respective age-group category

Table 2. The prevalence of helminth ova* in different age groups and the sex in dogs which received regular veterinary care, Lagos, Nigeria

Age group	Males		Females		Total	
	number examined	number infected	number examined	number infected	number examined	number infected
Puppies (< 6 months)	30	6 (90.0)	35	8 (22.9)	65	14 (21.5)
Young (> 6 months - 2 years)	25	2 (8.0)	45	3 (6.7)	70	5 (7.1)
Adult (> 2 years)	23	1 (4.3)	17	1 (5.9)	40	2 (5.0)
Total	78	61 (11.5)	97	12 (12.4)	175	21 (12.0)

*values within paranthesis are percentage of the total number of dogs examined in the respective age-group category

large, particularly the dog owners especially those involved with children, should be educated on the risks associated with keeping dogs. The need to take the dogs on regular visits to veterinary clinics for routine check-up and treatment must be duly emphasized. This suggestion was also made by Schantz (2002), Kagira and Kanyari (2000), and Blagburn *et al.* (1997). During this study, *Toxocara canis* and *Ancylostoma caninum* were detected as the most highly prevalent helminth ova. This is in agreement with the results of Samuel *et al.*, (2001), Payne-Johnson *et al.* (2000), Blagburn *et al.* (1996), Dada and Belino (1992), and Olufemi and Bobade (1979). *Dipylidium caninum* and *A. caninum* have been reported as the principal cause of canine anaemia (Schantz, 2002; Dryden *et al.*, 1995; Nolan and Smith, 1995; Hansen and Perry, 1990; Olufemi and Bobade, 1979; WHO, 1979; Oduye and Otesile, 1977).

Fenwick (2000) had noted that *D. caninum* is one of the principal causes of dog diarrhoea. The reports of this study showed that puppies, among the different groups, were the most vulnerable to infection. Kagira and Kanyari (2000) made similar observations in their study in Kenya. Possible explanation for this may be transplacental, resulting in prenatal infection, and may also be through the lactogenic source (Payne-Johnson *et al.*, 2000; Payne and Ridley, 1999; Burke and Roberson, 1985). The results of this survey showed that the cross- and pure-breeds of non-strayed dogs, with records of regular veterinary clinic attendance, had very low helminth ova infection in all the age groups. Possible genetic resistance to infection due to the exotic breeds coupled with restricted feeding on special diet, regular veterinary clinic check-ups, and vaccinations may together account for the very low rate of parasitic infections in these dogs. On the other hand, the free-roaming dogs were more exposed to infection through indiscriminate feeding and the lack of veterinary attention. A similar trend was observed by Mafiana *et al.* (1993) in Abeokuta, Ogun State, Nigeria.

In a telephone survey in Atlanta, Georgia, USA, Fontaine and Schantz (1989) noted that only 63% of the household heads believed that diseases of pets could be transmitted to humans, while few could recognise specific zoonotic infections other than rabies. The result of the survey conducted during the present study also followed a similar trend in that only 40% of the dog owners were aware of diseases transmissible between dogs and man, other than rabies. Higher educational standard and income group did not seem to influence the understanding of most respondents. This suggests the need for creating public awareness on the zoonotic diseases of dogs (Schantz, 2002). Some scientists have listed the following as zoonotic diseases of dogs to be of significance: ticks and tick borne diseases (such as, babesiosis and ehrlichiosis), rabies, distemper, trypanosomiasis, hookworm and tumbu fly infections (Bowmann, 1999; van veen Schillhorm and Adeyanju, 1979) ringworm, infectious diarrhoea, intestinal helminthes (such as, *Toxocara*, toxoplasmosis, heartworm, and parvovirus) (Kazacos, 2000; Fontaine and Schantz, 1989). The occurrence of large numbers of infected stray-dogs, dirty environmental conditions, which perpetrate the development and spread of these helminthes, intimacy between man and dogs, and non-challant attitude of dog owners with regards to veterinary care demand strict legislative measures, which should be strictly adopted by the government, particularly in the areas of free-roaming dogs.

Acknowledgements

The author is grateful to the directors and staff of the following veterinary clinics, Petervet Veterinary Clinic Services, Abule Egba; Harmony Projects, Amuwo Odofin; Unity Veterinary Clinic, Egbeda; Alphavet Veterinary Centre, Surulere; and Hillcrest Veterinary Clinic, Alagbado for their cooperation and assistance during this study. Thanks are also due to different households within Ojo, Surulere and Alagbado areas.

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