

Prevalence of Gastrointestinal Parasites of Dogs (*Canis familiaris*) in Maiduguri, Northeastern Nigeria

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Abstract: Two hundred faecal samples of dogs were examined for eggs (ova) and cysts of gastrointestinal parasites in Maiduguri Metropolis of Borno State using formol ether concentration technique. Out of the 200 faecal samples of dogs examined, 45 (22.5%) harboured various species of intestinal parasites. *Ancylostoma* spp. had the highest prevalence of 10%. Other species prevalent included *Strongyloides* larva (0.5%); *Taenia* (2%); *Ascaris* ova (1%); *Entamoeba* (5%) cysts; and *Hymenolepis nana* (4%). The location with the most prevalent parasite species is Mairi village (40%), followed by Maimalari Barracks with 32%, while Mammy market (Custom area) has the least with 12%. This study has shown that gastrointestinal parasites are endemic in Maiduguri metropolis, which has significant public health importance.

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1. Introduction

Dogs are present in almost all human settings and may share the human home as well. For some, they replace the children who have grown and moved away or perhaps were never born, and for others, they are play mates for children still at home. In the USA, more than half of families that have dogs also have children at home. At the very least, for some people, dogs afford increased opportunities to meet other people. We are beginning to understand this complex bond between pets and people, two species with the common goal of surviving and enjoying life together (Breck and Catcher, 1996).

People with good human contact are healthier than those that are isolated from others because pet animals, especially dogs, are perceived as members of the family, pet ownership is one way people can be protected from the ravages of loneliness (Breck and Catcher, 1996). Unlike talking to other humans, people experience a decrease of blood pressure talking to pets, indicating that they are more relaxed with them than with people. Even in the presence of unfamiliar dogs, people experience a temporary decrease in blood pressure. The psychological response to association with animal appears to manifest themselves when people are asked to describe the perceived benefits for having a dog. More than 95% of dog owners list "companionship" and nearly half list "good for the family health" as their reasons for ownership, nearly three quarters include "fun to watch" and "like a child or family member" and 64% report that dog is a source of "security". Dogs providing a sense of security or safety appear to be especially appreciated

for older adults (Erikson, 1985 and Norris et al 1999). But this person's subjective perception appears to be founded in objective findings in 1980. There was the first epidemiological report documenting the value of pet ownership. Problems associated with animals in populated area concerns the major issues associated with dogs in cities which include animal bite, environmental damage, potential diseases and humane considerations for the animals themselves. These are real issues but there are also real solutions. It is important to distinguish straying pets from ownerless strays, because they cause different problems for society and are managed or controlled by different means (Breck, 1974). Straying pets are best managed by encouraging and enforcing responsible ownership, while strays are controlled by capture & alterations of the environment, for example the boarding-up of vacant building and clearing dumps & urban lots (Breck, 1981). Despite the usefulness of dogs/they may be infected with pathogens that are dangerous to man and other domestic animals. Such parasites include endoparasites such as helminths of the gastrointestinal tract (Soulsby, 1982).

Dogs harbour a variety of intestinal parasites, some of which can also infect humans. In view of this, some of the dog parasites, such as *Toxocara canis* and *Ancylostoma* spp are reported to be a significant public health problem, especially in developing countries and communities that are socioeconomically disadvantaged. In these communities, poor levels of hygiene and overcrowding together with lack of veterinary attention and zoonotic awareness, exacerbate the risk

of disease transmission (Hinz, 1980 and Major et al, 1996).

Gastrointestinal helminths belong to two large phyla in the animal kingdom. The phylum platyhelminthes consists of the flatworm (cestodes) and flukes (trematodes), while the phylum nemathelminthes consists of the roundworms or nematodes. Common nematodes of dogs include the hookworms (*Ancylostoma*) and *Uncinaria* spp roundworms (*Toxocara* and *Ascaris* spp) the whipworms (*Trichuris* spp) and the oesophageal worms (*Spirocerca* spp). Common cestodes of dogs include the species in the genus *Taenia* and *Echinococcus*. The close contact between dogs and humans harbours the risk of transmitting zoonotic agents. Thus, the worm *Toxocara canis* is considered to be one of the most frequent canine parasites that has a worldwide distribution, including countries with high hygienic standard. It is common to observe intestinal parasites in canines of all ages, but the prevalence of infection is usually high in puppies, mainly due to the newly whelped or neonates and also because young dogs have not yet acquired immunity to parasites (Bowman, 1999 and Ramirez-barrios et al, 2004).

Surveys on *Toxocara* infection in human resulted in seroprevalence of 2.7-6.5%. Other zoonotic intestinal helminths in dogs prevalent in central Europe include tape worms and *Echinococcus*, (Eckert & Deplzes, 2004) other helminths that can be detected upon coprological analysis in soil may affect the health status of the infected dogs, include *Trichuris vulpis* or *Ancylostoma caninum* where as others exhibit only minor pathological potential, e.g., *Uncinaria Stenocephala*, *Capillaria* spp and *Diphyllothrium latum*.

The aim of this study is to determine the prevalence of intestinal parasites in dogs privately owned and public dogs in Maiduguri, Borno State.

2. Materials and Methods

2.1. Study area

The study areas were wards and streets in Maiduguri Metropolis. The areas of sample collection are:

- a. Maimalari Barracks
- b. Mammy Market (Custom area)
- c. Gwange III
- d. Mairi Village
- e. University Campus

2.1.1. Sample collection

Faecal samples were collected from a total of 200 dogs comprising 105 females and 95 males. All faecal samples collected were from five areas in

Maiduguri during the rainy season. Three groups of samples were from privately owned dogs, while two came from dogs slaughtered in Maimalari barracks and Custom Mammy market in Maiduguri.

Sample collections were achieved by training the dogs owners on collection. Early morning dog faeces were collected using polythene leather and then transferred into sterile universal container for immediate analysis in the laboratory.

2.1.2. Macroscopic Examination

In macroscopic examination of the stool sample, consistency, presence or absence of adult worm or segment were noted; reaction, odour, colour and amount were noted.

2.1.3. Sample processing by Formol-Ether concentration method and Microscopic Examination

About 1 gram of faeces was placed in a universal bottle and 5mls of anaesthetic ether was added. A glass rod was used to break the faeces. The medium was then sieved into a centrifuge tube more floatation medium was added until a convex meniscus was formed. A cover slip was placed gently on the meniscus and allowed to stay for 5 minutes. The slides were examined under low power (x10), and high dry power (x40). In the formol ether method, 1 gram of faeces was emulsified in 7mls of 10% formol ether in a test tube and was strained through wire gauze and the filtrate was collected into a centrifuge tube. 3ml of ether was added and the mixture was vigorously shaken for 1 minute and then centrifuge at 1500 revolutions per minute for 5 minutes. Fatty debris was cleaned up from the upper part of the tube and the supernatant was decanted, the sediment was put on glass slides covered with cover slip and examined microscopically under low and high dry power. A sample would be declared negative where the two procedures did not detect an egg (ovum), cyst or larva in it.

3. Results

A total of 200 faecal samples of dogs were collected at random in most of the areas in Maiduguri Metropolis. These areas include Maimalari barracks, Mammy market (Custom area), Gwange III, Mairi village and University of Maiduguri (UNIMAID) staff quarters. The result of this study revealed that out of 200 dogs examined, 45 (22.5%) harboured intestinal parasitic infection (Table 1). The highest (10%) infection rate was observed in Mammy market, with lowest in Mairi village and the University staff quarters with 1% each.

Table 1. Overall prevalence of parasite ova/cysts /larva in the study areas

Rate(%)	Location	No examined	No infected
4	Maimalari	37	12
10	Mammy Market	83	10
5	Gwange III	53	14
1	Unimaid	17	5
1	Mairi	10	4
22.5	Total	200	45

Table 2 shows the prevalence of parasite species in relation to the site of collection. *Ancylostoma* spp. (10%) constitutes the most prevalent species of parasites in the study area. This is followed by *E. histolytica* with 5%. The location with the most prevalent parasite species is Mairi village (40%), followed by Maimalari Barracks with 32% ,while Mammy market has the least with 12%.

Table 2. Prevalence of parasite species in relation to collection sites

Location (%)	No. tested	Parasite species				
		<i>E.h.</i>	<i>H.n.</i>	<i>An.</i>	<i>As.</i>	
<i>Stro. Ta.</i>						
Maimalari	37	0	0	8	2	1
Mammy Market	83	2	3	4	0	0
Gwange III	53	6	4	3	0	0
Unimaid	17	1	0	3	0	0
Mairi	10	1	1	2	0	0
Total	200	10	8	20	2	

E.h- *Entamoeba histolytica*,

H.n-Hymenolepis nana

An-Ancylostoma spp.

As- Ascaris spp.

Stro- Strongyloides

Ta.- Taenia

4. Discussion

The eggs, cysts or larva of these species were observed and the prevalence and intensity of the

different worms show the overall prevalence of infection with intestinal parasites as 22.5%(45) . The most frequently observed intestinal parasite in this study was hookworm (*Ancylostoma* spp) (10%) followed by *Entamoeba* (5%). The prevalence for the other four worms (*Hymenolepis*, *Ascaris*, *Strongyloides larva*, and *Taenia*) were low and varied from 4% to 0.5%. This work agrees with the results of other researchers where *Ancylostoma* species always appears to be prevalent (Kutdang et al 2010). Nnochiri (1968), said the triad of hookworms, *Ascaris* and *Trichuris* is most common in Nigeria.

The study revealed that infection with intestinal parasites is endemic for dogs in Maiduguri area. Given the relatively high prevalence rate for these parasites as encountered in this study, it shows that the parasites pose a danger to the general public, especially children. This is because they are more exposed to infected soils by walking bare footed, children also eat soil (geophagia) while playing, people defecating openly; eating indiscriminately without washing hands may increase the prevalence of infection.

Dogs harbour zoonotic infections like toxocariasis, echinococcosis, iphylobothriasis etc. (Ajayi 1989). These parasites are known to be the causative agents of zoonotic diseases and causative agents of visceral larva migrans (VLM), ocular larva migrans (OLM) and cutaneous larva migrans (CLM). *Toxocara canis* and *Ancylostoma caninum* have been implicated to be the causes of these various migrans forms. An infection rate of 36.3% of mixed infections was reported in Zaria by Ajanusi and Gunya (1998) . In this study, there was no mixed infection recorded. The difference in the infection rate between their results and the present result may be as to the number of dogs examined by the two groups. In this study the high or low rates of infection may be due to the sites of collection or it may be due to the disproportionate sampling sizes in the study sites or it could be due to the way these dogs are allowed to roam the streets and visiting refuse dumps thereby picking up germs.

Different helminths species cause different conditions in dogs or other vertebrates, particularly man. Surveys have demonstrated that 10 to 30% of soil samples from parks and play grounds are contaminated. The helminths may have adverse effects on the dogs as well as zoonotic implication on man. Therefore centre for disease control (CDC) (1995) suggested a number of ways for the prevention of zoonotic transmission of ascarid and hookworms of dogs and cats; the need for regular diagnosis of faecal examinations of dogs or prophylactic treatment of old dogs.

Dogs have been part of human households ever since people began living in villages, some 12,000-15,000 years ago, interaction with them may very well be one of our more successful strategies for survival. Today, dogs continue to play a major role in the lives of the people around the world while the medical history of our relationship with animals, including dogs, documents mostly the detrimental effects of animal contact, including zoonoses and injury from bites. There is a long history of health interaction while animal contact carries risk, the frequency of most zoonotic disease can be lessened, perhaps even eliminated with animal management practices that would serve both man and animals.

In addition, more research is needed on how to better incorporate dogs for those in urban centres so that both the animals and people can enjoy improved health. It is recommended that dog owners and pet lovers should have the basic knowledge of zoonotic diseases. More veterinary research institutes need to be established if possible one in each geopolitical zone of Nigeria. Dogs should be reared intensively instead of allowing them to roam the street as stray dogs. Children should be discouraged from playing in or around animal houses.

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