INNSPUB

International Journal of Biosciences | IJB |
ISSN: 2220-6655 (Print) 2222-5234 (Online)
http://www.innspub.net
Vol. 25, No. 5, p. 38-43, 2024

RESEARCH PAPER OPEN ACCESS

Zoonotic gastrointestinal parasites of dogs: A community prevalence study in delta state, Nigeria

Ede Emmanuel Lemy*[1], Owhororo Ejiro[1], Orhewere Regina Dada Abiodun[2], Asibeluo Eloho Hope[3]

[1]*Department of Science Laboratory Technology, Delta State University, Abraka, Delta State, Nigeria*

[2]*Department of Basic Science, Auchi Polytechnic, Auchi, Edo State, Nigeria*

[3]*Department of Animal and Environmental Biology, Delta State University of Science and Technology, Ozoro, Delta State, Nigeria*

Key words: Dogs, Gastrointestinal parasites, Zoonotic diseases

http://dx.doi.org/10.12692/ijb/25.5.38-43 Article published on November 06, 2024

Abstract

This study was aimed at determining the prevalence of zoonotic gastrointestinal parasites of dogs in Obiaruku community and its environs of Delta State, Nigeria. A total number of 110 dogs were examined in the different quarters (Ghana Quarters and Izu Quarters) using saline wet mount and formol-ether concentration techniques. The study recorded 39.1% prevalence of gastrointestinal parasites of dogs in the study area. The prevalence studies per community show that Izu quarters had the highest prevalence of 27 (39.7%), while Ghana Quarters had the least prevalence 16 (38.1%). The species-specific prevalence of zoonotic gastrointestinal parasites of dogs examined in different communities in Obiaruku showed that the highest 16 (59.2%) parasitic infection was *Ancylostoma caninum*, followed by *Dipylidium caninum* 6 (22.2%), *Toxocara canis* 4 (14.8%) and the least 1 (3.7%) was *Trichuris vulpis* in Izu Quarters. The sex-related prevalence of zoonotic gastrointestinal parasites of dogs in Izu Quarters showed that the female dogs 11 (47.8%) was more infected than the male 16 (39.0%). The age-related prevalence of zoonotic gastrointestinal parasites of dogs in Izu Quarters showed that the puppies of age 0-6months 16 (50.0%) were more infected, followed by adult of more than 12 months of age 7 (35.0%) and the young dog of 7-11 months 5 (31.2%). It is therefore necessary that policies that would aim at vaccination and deworming of dogs should be enforced in these areas.

* **Corresponding Author:** Ede Emmanuel Lemy ✉ lemy.ede@delsu.edu.ng

Introduction

The domestic dog (*Canis familiaris*) is generally considered as the first domesticated mammals from wolves (Morey, 2016). The relationship between humans and dogs has existed for many centuries, with several advantages and some known disadvantages (Cutt *et al.*, 2007). In most industrialized countries, dogs have been put to remarkably high adapt to human needs in health promotion, guiding the blind, assisting the deaf, assisting persons that are impaired in their mobility, sniffing out drugs, explosives and other dangerous chemicals beyond what human can do. Dogs have also been trained for search and rescue mission using their powerful sense of smell to locate lost and injured as well as to alert epileptic patients that a seizure is imminent (Cutt *et al.,* 2007; Gillum and Obisesan, 2010).

However, in Nigeria, studies on the use of dogs have shown that people keep dogs for various reasons, for companionship as pet, house guard, assistance for hunting of wildlife, and as food animal. Their perceived economic and social worth thus depends on the community values attached to their use, which varies from one place to another. The value attributed to dogs are mainly based on the culture of the people which contributes to the condition at which the dogs are kept as well as level of supervision they receive within human community (WHO, 2020).

Despite its usefulness, dogs like many other canines have been reported to harbour a variety of zoonotic intestinal parasites, such as *Ancylostoma caninum, Dipylidium caninum, Toxocara canis*, *Giardia canis, Isospora canis* and *Trichuris vulpis* among many others, some of which can also infect livestock, wildlife and humans (Sowemimo and Asaolu, 2018). These parasites causes mortality in dogs and their role in transmitting infections to humans have been widely recognized (Perera *et al*., 2013). The signs and symptoms of these parasitic infections in dog's ranges from vomiting, diarrhea, anemia, anorexia to dermatitis. Although so-me infected animals may present no symptoms (Getahun and Addis, 2012).

Environmental contamination by dog faeces in public spaces is a risk factor to public health, as dogs can be carriers of pathogenic agents that are transmissible to humans (Pam *et al.,* 2013). Zoonotic gastrointestinal parasites of dogs is currently endemic in 20 of the 36 state in Nigeria (Ogbaje *et al.,* 2015) and with the increasing number of dogs in some communities of Delta State, coupled with poor environmental practices and lack of awareness of this zoonotic parasites, they may be a possible public health risk of human and other intermediate host getting infected with these parasites is inevitable. Therefore, this study was conducted in order to enrich baseline data on the occurrence of zoonotic gastrointestinal parasites of dogs in Obiaruku community and its environs of Delta State, Nigeria.

Materials and methods

Study area

Obiaruku is situated in the Niger Delta region which is rich in oil and gas. It lies between latitude 5°51'N and 6°10'N and longitude 5°10'E and 5°48'E of Ukwuani Local Government Area. The area is drained by the River Ethiope and one of its tributaries, the Orogodo River which only flows into the River Ethiope during the rainy season. The climate is of the tropical equatorial climate with mean annual temperature of 27.32℃, average relative humidity of about 60%-80% and annual rainfall amount of 4205mm (Ojeh, 2012; Lemy and Egwunyenga, 2018).

Study population

The study populations consisted of household dogs from different quarters within Obiaruku. The dogs were group into local and exotic breed. Information was obtained on the approximate age, sex and breed of each dog from their dog owners, using the criteria described by Tizard (1996). Age was conventionally classified as young (0-3) month, sub-adults (3 month to 1 year), adult (1-8) year and old (>8) years (Tizard, 1996), but for the purpose of this study age of dogs were grouped into three categories 0-6 months, 7-11 months and one year and above.

Study design

The study was carried out from December 2022 through September, 2023 to determine the prevalence of zoonotic gastrointestinal parasites of dogs in some quarters (Ghana Quarters and Izu Quarters) in Obiaruku, Delta State, using sedimentation and wet mount techniques.

Sample collection

Clean sample containers were distributed to dog owners for the collection of specified quantity of faecal samples. The samples were collected from fresh voided faeces, into labeled disposable container and examined macroscopically for proglottides. During collection each sample was labeled with the corresponding dog's number, date, age group, sex, breed and place of collection. The samples were transported immediately to the Advanced Research Laboratory, Delta State University, Abraka. A small quantity of faeces from each dog was mixed thoroughly with 10% formalin for preservation.

Parasitological procedures

The presences of zoonotic intestinal parasites of dogs were confirmed by sedimentation and wet mount techniques. After laboratory examination, the result was considered as positive when at least one parasite egg or cyst was observed in one of the employed technique (Lorenzini *et al.,* 2007). The eggs were identified using ova identification keys from center for diseases control and prevention and chesbrough diagnostic text book (Cheesbrough, 2005).

Saline wet mount preparation techniques

A drop of normal saline was placed on a slide and an applicator stick was used to pick a small portion of the faecal sample equivalent to the size of a match head, this was then mixed with the saline drop. A cover slip was placed on the slide and examined under a microscope for the presence of ova, cyst, trophozoites and adult worms using the X10 and X40 objective lens (Cheesbrough, 2005).

Formol-ether concentration techniques

In a suitable container, a small portion of faecal sample was thoroughly mixed with 4ml of 10% formal saline and then filtered through mesh gauze into a beaker. About 7mL of the filtrate was transferred into a centrifuge tube, 3ml of ethyl acetate was added into the 7mL of filtrate, and this was centrifuged at 1500rpm (revolution per minute) for 5 minutes. After centrifugation, the tube was allowed to rest in a rack. Four layers became visible, the top layer was that of ether, the second was a plug of debris, the third was a layer of formal-saline and the fourth was sediment containing the eggs and cysts of the parastes. An applicator stick was used to break through the debris layer, and the first three layers were discarded, the sediment at the bottom of the tube was shaken. It was then transferred to a clean slide and a coverslip was placed on the slide and examine under the microscope using X10 or X40 objective lens (Cheesbrough, 2005).

Data analysis

Raw data from this study was entered into Microsoft excel data base system; chi-square test was used to measure association between prevalence of the parasite with the age, sex and breeds of dogs. In all the analysis, the confidence level was held at 95% and the results were considered significant at ($P<0.05$).

Results

A total number of 110 dogs were examined in the different quarters (Ghana Quarters and Izu Quarters) within Obiaruku community and environs, out of which 43 (39.1%) dogs were found to be infected with zoonotic gastrointestinal parasites of dogs (Table 1). The prevalence studies per community show that Izu quarters had the highest prevalence of 27 (39.7%), while Ghana Quarters had the least prevalence 16 (38.1%) gastrointestinal parasites of dogs examined in different communities in Obiaruku showed that the highest 16 (59.2%) parasitic infection was *Ancylostoma caninum*, followed by *Dipylidium caninum* 6 (22.2%), *Toxocara canis* 4 (14.8%) and the least 1 (3.7%) was *Trichuris vulpis* in Izu Quarters (Table 2).

Table 1. Overall prevalence of zoonotic gastrointestinal parasites of dogs in the study area

Studied areas	No of dogs examined	No of dogs infected	Prevalence (%)
Obiaruku			
Ghana quarters	42	16	38.1
Izu Quarters	68	27	39.7
Total	110	43	84.1

X^2=9.793859981356, df=5, P-value=0.08

Table 2. Prevalence of zoonotic gastrointestinal parasites of dogs identified in the study area

Study area	No. examined	No. infected	Parasite species identified				
			Ancylostoma caninum	*Dipylidium caninum*	*Toxocara canis*	*Trichuris vulpis*	*Isospora* sp.
Izu quarters	68	27 (39.7)	16 (59.2)	6 (22.2)	4 (14.8)	1 (3.7)	0 (0.0)
Ghana quarters	42	16 (38.1)	3 (18.7)	4 (25.0)	9 (56.2)	0 (0.0)	0 (0.0)
Total	110	43 (77.8)	19 (77.9)	10 (47.2)	13 (71.0)	1 (3.7)	0 (0.0)

X2=33.971, P-value=0.0263

Table 3. Sex- related prevalence of zoonotic gastrointestinal parasites of dogs in the study area

Location	No. examined	No. infected	Parasites identified (%)				
	Male	Male	*Ancylostoma caninum*	*Dipylidium caninum*	*Toxocara canis*	*Trichuris vulpis*	*Isospora* sp.
Izu qrts	45	16 (35.5)	13 (28.8)	1 (2.2)	2 (4.4)	0 (0.0)	0 (0.0)
Ghana qrts	23	9 (39.1)	3 (33.3)	1(11.1)	5 (55.5)	0 (0.0)	0 (0.0)
	Female	Female					
Izu qrts	23	11 (47.8)	3 (27.2)	5 (45.4)	2 (18.1)	1 (9.0)	0 (0.0)
Ghana qrts	19	7 (36.8)	0 (0.0)	3 (48.8)	4 (57.1)	0 (0.0)	0 (0.0)

Table 4. Age-related prevalence of zoonotic gastrointestinal parasites of dogs in the study area

Location and age	No examine	No. infected	Parasites identified (%)				
			Ancylostoma caninum	*Dipylidium caninum*	*Toxocara canis*	*Trichuris vulpis*	*Isospora* sp.
			Izu quarters				
0 – 6	32	16 (50.0)	10 (62.5)	3 (18.7)	3 (18.7)	0 (0.0)	3 (18.7)
7 – 11	16	5 (31.2)	3 (60.0)	2 (40.0)	0 (0.0)	0 (0.0)	2 (40.0)
>12	20	6 (35.0)	3 (42.8)	1 (14.2)	1 (14.2)	1 (14.2)	1 (14.2)
Ghana quarters							
0 – 6	20	8 (40.0)	1 (12.5)	2 (25.0)	4 (50.0)	0 (0.0)	2 (25.0)
7 – 11	10	5 (50.0)	1 (20.0)	1 (20.0)	3 (60.0)	0 (0.0)	1 (20.0)
>12	12	3 (25.0)	1 (33.3)	1 (33.3)	1 (33.3)	0 (0.0)	1 (33.3)

The sex-related prevalence of zoonotic gastrointestinal parasites of dogs in Izu Quarters showed that the female dogs 11 (47.8%) was more infected than the male 16 (39.0%). However, the male dogs were mostly infected with *Ancylostoma caninum* 13 (81.2%), followed by *Toxocara canis* 2 (12.5%) and the least infection was *Diplydium caninum* 1 (6.2%). While the highest 5 (45.4%) parasitic infection was *Diplydium caninum*, followed by *Ancylostoma caninum* 3 (27.2%), *Toxocara canis* 2 (18.1%) and the least infection was *Trichuris vulpis* 1 (9.0%) in the female dogs. In Ghana Quarters, the male dogs 9 (39.1%) were more infected than the female 7 (36.8%). The highest parasitic infection

within the male dogs was *Toxocara canis* 5(55.5%), followed by *Ancylostoma caninum* 3 (33.3%) and the least *Diplydium caninum* 1 (11.1%). Female dogs were mostly infected with *Toxocara canis* 4 (57.1%) and *Diplydium caninum* 3 (42.8%) (Table 3).

The age-related prevalence of zoonotic gastrointestinal parasites of dogs in Izu Quarters showed that the puppies of age 0-6months 16 (50.0%) were more infected, followed by adult of more than 12 months of age 7 (35.0%) and the young dog of 7-11 months 5 (31.2%).

However in Ghana Quarters the young dogs of age 7-11 months had the highest 5 (50.0%) parasitic infection, followed by the puppies of age 0-6 months 8 (40.0%) and the least infection occurred in adult dogs of more than 12 month of age 3 (25.0%) (Table 4).

Discussion

The study recorded prevalence of 46.8% parasitic infections of dogs in the study area. Similar prevalence has been documented in Zaria, Nigeria by Ogbaje *et al.* (2015). The level of infection may be attributed to poor treatment and veterinary care as reported by Dagmawi *et al.* (2012). There was variation in the level of occurrence across the different location. However, this cannot be attributed to environmental factor as reported by Abere *et al.* (2013) as the study was carried out in the same environmental and geographical zone. However, poor hygiene, lack of modern animal health care programmes and shading of large number of infective eggs into the environment by dogs which can survive for a longer period (Swai *et al*, 2010). Species of *Ancylostoma caninum* were the most dominant zoonotic parasites. This is in line with the earlier studies of Iboh *et al.* (2014) in Calabar, Nigeria. *Trichuris vulpis* recorded lower prevalence as earlier reported by Taylor *et al.* (2007). However the study also revealed a prevalence of 100.0% for *Trichuris vulpis*.

Locality related prevalence showed that female dogs in Izu Quarters (47.8%) were more infected than the male. This result agrees with the findings of Iboh *et al.* (2014) who recorded high prevalence of parasites for female dogs. Also, male dogs in Ghana Quarters (39.1%) were more infected. This result agrees with the findings of Mustapha *et al.* (2016) in Borno, Nigeria. Result obtained from this study revealed that puppies and young dogs within the age group of 0-6 months and 7-11 months are more prone to parasitic infection than the adult dogs of more than 12 months. This result agrees with the findings of Iboh *et al.* (2014) and Mustapha *et al.* (2016).

Conclusion

The high prevalence of zoonotic parasites detected in dog faeces sampled across the different communities in Obiaruku, Delta State showed that dogs in this area poses a potential risk to human health with regards to zoonosis. It is therefore necessary that policies that would aim at vaccination and deworming of dogs should be enforced in these areas. Therefore, this present study also advocates for improved environmental and personal hygienic practices by dog owners, as it would reduce the waste and other items that attract scavenging dogs and also help in eliminating expelled infected dog faeces from the environment.

References

Abere T, Bogale B, Melaku A. 2013. Gastrointestinal helminth parasites of pet and stray dogs as a potential risk for human health in Bahir Dar Town, Northwestern Ethiopia. Journal of Veterinary World **6**(7), 388–392.

Cheesbrough M. 2005. District laboratory practice in tropical countries. 2nd ed. Cambridge University Press, p. 191–205.

Cutt H, Gile B, Knuiman M, Burke V. 2007. Dog ownership, health, and physical activity. Journal of Health and Place **13**, 261–272.

Dagmawi P, Mekonnen A, Abebe F, Berhanu M. 2012. Prevalence of gastrointestinal helminths among dogs and owners' perception about zoonotic dog parasites in Hawassa Town, Ethiopia. Journal of Public Health and Epidemiology **4**(8), 205–209.

Getahun Z, Addis M. 2012. Prevalence of gastrointestinal helminths among dogs in Bahirdar, Ethiopia. Journal of World Applied Sciences **19**, 59–60.

Gillum RF, Obisesan TO. 2010. Living with companion animals, physical activity, and mortality in a U.S. national cohort. International Journal of Environmental Research and Public Health **7**(6), 52–59.

Iboh CI, Ajang RO, Abraham JT. 2014. Comparison of gastrointestinal helminths in dogs and awareness of zoonotic infection among dog owners in Calabar, Nigeria. African Journal of Parasitological Research **2**(1), 41–45.

Lemy EE, Egqunyenga AO. 2018. Epidemiological study on some parasitic helminths of cattle in Delta North, Delta State, Nigeria. Journal of Animal Health and Behavioural Science **2**, 1.

Lorenzini G, Tascat H, Carli GA. 2007. Prevalence of intestinal parasites in dogs and cats under veterinary care in Porto Alegre, Rio Grande do Sul, Brazil. Brazilian Journal of Veterinary Research **44**(2), 137–145.

Morey D. 2016. The social bond between dogs and people. Journal of Archaeological Science **33**,158–175.

Mustapha FB, Balami SB, Malgwi SA, Adamu SA, Wakil Y. 2016. Prevalence of gastrointestinal parasites of hunting dogs in Maiduguri, Borno State, Nigeria. Journal of Agriculture and Veterinary Science **9**(8), 39–42.

Ogbaje CI, Ofukwu RA, Ajogi IA. 2015. Zoonotic gastrointestinal parasite burden of local dogs, implications to human health. International Journal of One Health **1**, 32–36.

Pam VA, Igeh CP, Hassan AA, Udokaninyene AD, Kemza SY, Bata SI. 2013. Prevalence of heamo and gastrointestinal parasites in dogs in Jos, Nigeria. Journal of Veterinary Advances **3**, 8–16.

Perera PK, Rajapakse RP, Rajakaruna RS. 2013. Gastrointestinal parasites of dogs in Hantana, Sri Lanka. Journal of National Science Foundation **41**, 81–91.

Sowemimo OA, Asaolu SO. 2008. Epidemiology of intestinal helminth parasites of dogs in Ibadan, Nigeria. Journal of Helminthology **82**, 89–93.

Swai ES, Kaaya EJ, Mshanga DA, Mbise EW. 2010. A survey on gastrointestinal parasites of non-descriptive dogs in and around Arusha Municipality, Tanzania. International Journal of Animal and Veterinary Advances **3**(2), 63–67.

Taylor MA, Coop RL, Wall RL. 2007. Veterinary Parasitology. 4th ed. Wiley Blackwell Publishing, p. 62–67.

Tizard IR. 1996. Veterinary Immunology: An Introduction. 5th ed. Saunders Company, London, p. 493.

World Health Organization. 2020. Guidelines for dog rabies control. Geneva. www.who.int/bookorders. Accessed 6 February 2017.