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Prevalence of Intestinal Parasites among Dogs slaughtered at various areas in Calabar Metropolis, Cross River State, Nigeria

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Abstract **Original Research Article**

Gastrointestinal parasites are among the main entero-pathogens and the major cause of mortality in dogs. The study is to assess the prevalence of intestinal parasites among dogs slaughtered at various areas in Calabar. Seventy-five (75) samples were gotten from the slaughter point. The collected samples were examined using direct wet Mount method which involves small amount of the sample is placed on a microscope slide, mixed with saline or iodine, and covered with a coverslip. Thirty-eight (38) out of the seventy-five (75) samples were positive with parasites representing a prevalence of 50.66 % and mean intensity of 0.51. This study shows that male (40) (53.33%) dogs were more infected than the female (35) (46.66%) with no significant different between one slaughter and another at P< 0.05. The parasites isolated from this study were *Spirocerca* spp., *Cryptosporidium* spp., *Eimeria* spp., *Toxocara* spp, *Acanthocephalans* spp and *Giardia* spp. T. Understanding the risk factors and prevalence of these infections is therefore essential for implementing effective control measures such as regular deworming, improved hygiene, veterinary surveillance, and breeder education to safeguard both canine and human health.

Keywords: Dog, Canine, Feline, Zoonotic, Parasites.

Introduction

Canine parasitic infections pose a significant health risk not only to dogs but also to individuals who work closely with them. Parasites, including helminths, protozoa, and ectoparasites, are common in kennel and breeding facilities where multiple dogs are housed in close proximity. These infections can lead to serious health consequences, impacting both the welfare of the animals and the slaughter house' occupational health. Understanding the risks associated with canine parasitic infections is crucial for implementing effective control and prevention strategies in slaughter environments (Massetti *et al*., 2023).

Parasitic infections in dogs can be categorized into internal and external parasites. Internal parasites, such as hookworms (*Ancylostoma caninum*), roundworms (*Toxocara canis*), and protozoan parasites like *Giardia* and *Cryptosporidium*, primarily affect the gastrointestinal system but may also cause systemic complications (Raza *et al*., 2018). External parasites, including fleas (*Ctenocephalides felis*), ticks (*Rhipicephalus sanguineus*), and mites (*Sarcoptes scabiei*), can cause skin irritation, anemia, and serve as vectors

for zoonotic diseases (Mosallanejad *et al*., 2012). Slaughter house who regularly handle infected dogs are at an increased risk of exposure, particularly to zoonotic parasites that can be transmitted from dogs to humans.

The risk of parasitic infections among dog slaughter house is influenced by several factors, including personal hygiene, breeding practices, geographic location, and the immune status of the dogs. Poor sanitation, overcrowding, and inadequate parasite control measures significantly increase the likelihood of infestation and disease transmission. Additionally, certain parasites, such as *Toxocara canis*, can persist in the environment for extended periods, further elevating the risk of reinfection. Zoonotic transmission is a critical concern, as many canine parasites can infect humans through direct contact, ingestion of contaminated materials, or vector-mediated transmission (Rahman *et al*., 2020).

Preventive measures play a crucial role in reducing the risk of parasitic infections in slaughter facilities. Regular deworming protocols, flea and tick control programs, proper kennel sanitation, and routine veterinary check-ups are essential to maintaining a parasite-free environment. Furthermore, educating breeders on the importance of personal protective measures, such as hand hygiene and wearing gloves, can minimize the risk of zoonotic infections.

The risk of canine parasitic infections among dog breeders presents a significant challenge in both animal and public health. Many breeders operate in environments where dogs are kept in close quarters, increasing the potential for parasite transmission. Despite advancements in veterinary medicine and parasite control measures, parasitic infestations remain a persistent issue due to factors such as poor hygiene, inadequate preventive care, and limited awareness of zoonotic transmission risks (Moro & Abah, 2019).

One of the primary concerns is the prevalence of zoonotic parasites, which can infect both dogs and humans. Breeders who come into close contact with infected animals face heightened risks of contracting parasites such as *Toxocara canis*, *Echinococcus spp.*, and *Sarcoptes scabiei* (Mubarak *et al*., 2023). These parasites can cause a range of health issues in humans, from mild gastrointestinal discomfort to severe systemic infections. The lack of stringent biosecurity measures in many breeding facilities exacerbates the problem, making it easier for parasites to spread from dogs to breeders and their families.

Additionally, the economic impact of parasitic infections on breeding operations is considerable. Infected dogs often require extensive medical treatment, leading to increased veterinary costs and potential losses in breeding stock. Puppies born to infected mothers may suffer from poor health, stunted growth, and increased mortality rates, reducing the overall profitability of breeding enterprises (Menor-Campos, 2024). This makes parasite management not only a health concern but also a financial imperative for breeders.

Aims and Objectives

Aim

The aim of this study is to assess the risk factors associated with canine parasitic infections among dog breeders and develop effective prevention and control strategies.

Objectives

The objectives of this study are to;

1. Identify the most common parasitic infections affecting dogs in breeding facilities.
2. Evaluate the prevalence and transmission routes of canine parasites in breeder environments.
3. Assess the awareness and preventive measures used by dog breeders in controlling parasitic infections.

Examine the potential zoonotic risks associated with canine parasites among breeders and their families.

Literature Review

Developing regions, particularly in Africa, Asia, and Latin America, report higher parasite prevalence due to poor sanitation, lack of veterinary care, and free-roaming dogs. Zoonotic parasites like *Toxocara canis* and *Echinococcus*

spp. are more common due to exposure to contaminated soil and improper waste disposal.

Tropical and subtropical regions (e.g., Southeast Asia, South America) have higher rates of ectoparasites like ticks, fleas, and mites due to warm, humid climates that favor parasite survival and reproduction (Fuehrer *et al*., 2012). Temperate regions (e.g., North America, Europe) experience seasonal variations, with higher tick and flea activity in warmer months**.**

In North America & Europe better parasite control programs have reduced infection rates Emerging concerns include tick-borne diseases (e.g., Lyme disease from *Ixodes scapularis*). Growing trend in natural and holistic parasite control methods**.**

High prevalence of intestinal parasites (e.g., *Toxocara spp.*, *Ancylostoma spp.*) due to poor veterinary access and environmental contamination in Sub-Saharan Africa (Souza, *et al*., 2023).

3.0 Materials and Method

3.1 Study Area

The study was carried out in Calabar Metropolis, which is located close to the coastal region of the Atlantic Ocean. Calabar metropolis lies between Latitude 04º5’ to 5º15’ North and Longitude 8º15’ to 8º25’ East. Calabar metropolis is made up of two local government areas (LGAs); Calabar South Local Government Area and Calabar Municipal LGA which is bounded by Odukpani Local Government Area, in the north and east by the Great-kwa River in Fig. 1. Its’ southern shores are bounded by Calabar River and Calabar South Local Government Area. It has an area of 331,551 km. there is an all-year-round in all of about 350mm. Peak precipitation occurs in June to September. Daily temperature all through the year ranges between 22.4 C and 33.2 C, and relative humidity is from 60% to 93% with a tropical climate (Michael, 2021)

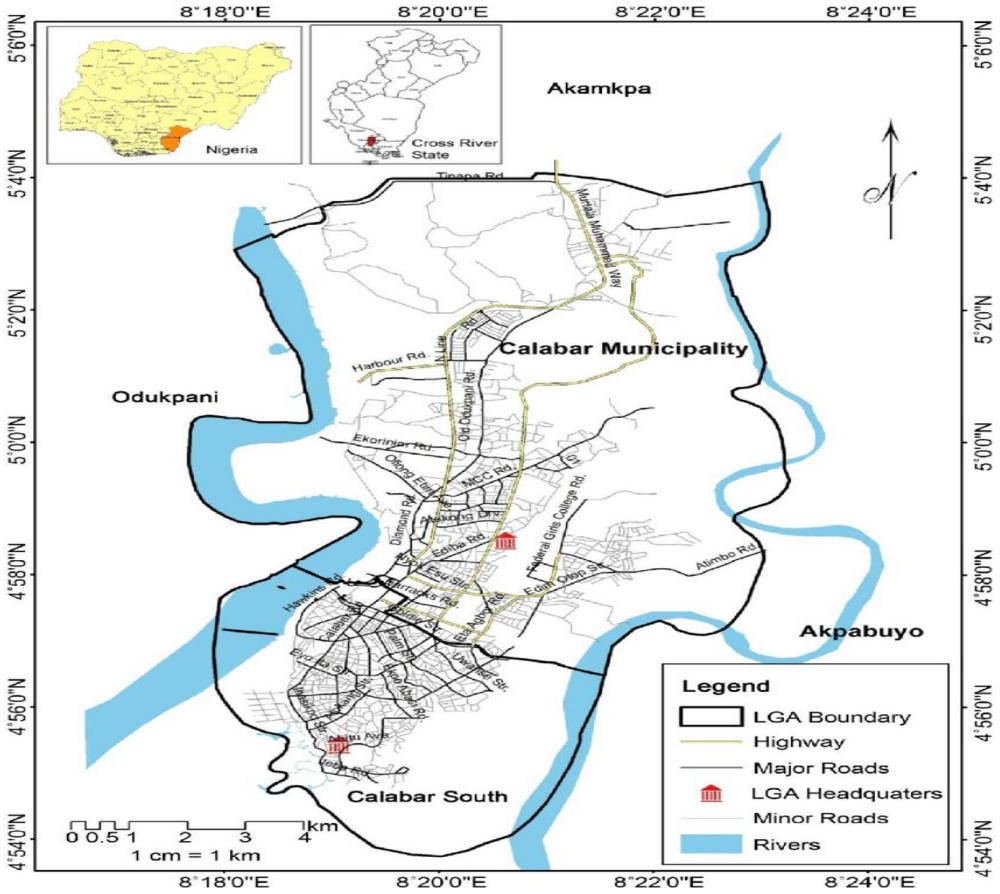

Fig 1: Map showing sample sites in Calabar Metropolis

3.2 SAMPLES COLLECTION

Generally, the laboratory diagnosis of intestinal parasites is based on stool examination for worms, eggs, cysts, trophozoites segments of cestodes.

The stool samples were collected from Seventy-five the newly open intestine of the slaughtered adult animals with specimen bottes. Septic measures were employed to avoid contamination as described by CDC (2016). Samples were collected from Anitigha, Uwanse and Atimbo slaughter points.

3.3 PARASITOLOGICAL ANALYSIS OF SAMPLES

Microscopy remains one of the most common and effective methods for diagnosing parasitic infections. It involves the examination of biological samples under a microscope to identify the presence of parasites, their eggs, cysts, or larvae. However, it requires skilled personnel. By employing various preparation and staining techniques, a wide range of parasitic infections can be accurately diagnosed. This involves sample preparation and staining like.

Floatation (Centrifugal Flotation) method was used;

The sample is mixed with a small amount of fresh feces (around 2–5 grams) with a water or saline solution in a cup. The mixture is strain through a tea strainer or cheesecloth into a centrifuge tube to remove large debris. The tube was centrifuged to form a pellet of fecal matter at the bottom. The supernatant is decanted and resuspend the pellet in a flotation solution, filling the tube until a slight convex meniscus form at the top. A coverslip as placed over the meniscus and let it stand for 10–20 minutes, allowing the eggs to float and adhere to the coverslip. The coverslip is carefully lifted and place it on a microscope slide, and examine it under a microscope to identify the parasites

EXAMINATION OF SPECIMEN

Examination of stool samples

The intestine was carefully placed in a sterile container and the outside of the intestine was visually inspected for any parasites. The intestine was then cut open using a scissors and the faces are then collected into a beaker, normal saline and Lugol's iodine solution were added and then some taken to the microscope for examination.

Microscopic Examination

Sample were examined using Light Microscope with lower power objectives of 40x and 100x magnification. Parasites observed were identified and preserved accordingly

DATA ANALYSIS

The data collected was analyzed using chi-Square presented in tables and percentages to represent the results. For a comprehensive analysis of data collected, emphasis was laid on the use of absolute numbers and percentages

RESULTS

Prevalence and Mean Intensity of intestinal parasites in Dogs

Result of Sevent-five samples gotten from this study shows that only thirty-eight sample were positive with parasites. This represents a prevalence of 50.66% as shown in table one (1). Twenty-one (21) of the Forty (40) male dogs slaughtered were positive for parasites which represent a prevalence of 52.50%. While only Seventeen (17) of Thirty-five female dogs slaughtered were positive for parasites with a prevalence of 48.50%. The Mean intensity was 0.52 and 0.48 in male female dogs respectively.

Prevalence of specific parasites isolated from Dogs

The results of specific parasites isolated from the samples in Anantigha shows that *Toxocara spp* spp (4) (6.6%) in Male dogs were more (3) (5.00%) in Female. While *Cryptosporidium spp* (3) (5.00%) and *Giardia spp* (2) (3.33%) were more in female dogs than in male (1) (1.66%) respectively. Sarocerca was not recorded in both male and female. While Acanthocephalans and Sarcocystic were not recorded in male dogs but one (1) (1.66%) I female dogs. In Uwanse *Toxocara spp and Cryptosporidium spp* were the same (2) (3.33%) for both in male and female dogs While Trichuris spp (2) (3.33%) and

Eimera (1) (1.66%) was isolated only in Male dogs**.** Whereas *Acanthocephalans* (2) (3.33%) and *Sarcocystic* (2) (3.33%) in male dogs were more than in Female (1) (1.33%) respectively as shown in table 2. From Atimbo slaughter *Toxocara spp* (2) (3.33%) and *Trichuris* spp (1) (1.66%) were recorded in female and male respectively as shown table 4. *Cryptosporidium spp* (3) (5.00%) were the same in both male and female. Whereas *Giardia spp* (3) (5.00%), *Acanthocephalans* (3) (5.00%) and *Sarcocystic* (2) (3.33%) were more in male than in female (2) (3.33%), (1) (1.66%) and (1) (1.66%) respectively. While Spirocerca (1) (1.66%) as only isolated from female dogs**.**

Table 1. Showing Prevalence of intestinal parasites from Anitigha, Uwanse and Atimbo slaughter points.

Location	Sex of Adult Dogs Slaughtered	Number of Dog Slaughtered	No infected	Prevalence (%)
Anantigha	Male	15	8	53.33
	Female	12	4	33.33
	Total	*27*	*12*	*4.44*
Uwanse	Male	14	6	42.85
	Female	13	7	53.84
	Total	*27*	*13*	*48.14*
Atimbo	Male	11	7	63.63
	Female	10	6	60.00
	Total	*21*	*13*	*61.90*
Total	Male	40	21	52.60
	Female	35	17	48.57

Table 2 Showing Prevalence of specific parasites isolated from Dogs in Anantigha

Location	**Sex of Dog Slaughtered**	**Number of Dog Slaughtered**	**Number (%) of Various Parasites Isolated from the intestine of Dogs**							
			Toxocara spp	***Trichuris spp***	***Cryptosporidi***	***Giardia spp***	**Eimera**	**S[rocerca**	**Acanthocephalans**	**Sarcocystic**

					um spp					
Anantigha	Male	**15**	**4(6.66)**	**-**	**2(3.33)**	**1(%)**	**1(%)**	**-**	**-**	**-**
	Female	**12**	**3(5.00)**	**1(%)**	**3(5.00)**	**2(3.33)**	**-**	**-**	**1(%)**	**1(%)**
	Total	***27***	***7*(%)**	***1*(%)**	***5*(%)**	***3*(5.00)**	***1*(%)**	**-**	***1*(%)**	***1*(%)**

Table 3 Showing Prevalence of specific parasites isolated from Dogs in Uwanse

Location	**Sex of Dog Slaughtered**	**Number of Dog Slaughtered**	**Number (%) of Various Parasites Isolated from the intestine of Dogs**							
			Toxocara spp	***Trichuris spp***	***Cryptosporidium spp***	***Giardia spp***	**Eimera**	**S[rocerca**	**Acanthocephalans**	**Sarcocystic**
Uwanse	Male	**14**	**2(3.33)**	**2(3.33)**	**2(3.33)**	**1(1.33)**	**1(1.33)**	**-**	**2(3.33)**	**2(3.33)**
	Female	**13**	***2*(3.33)**	**-**	**2(3.33)**	**2(3.33)**	**-**	**-**	**1(1.33)**	**1(1.33)**
	Total	***27***	***4*(6.66)**	***2*(3.33)**	***4*(6.66)**	***3*(5.00)**	***1*(1.33)**	**-**	***3*(5.00)**	***3*(5.00)**

Table 4 Showing Prevalence of specific parasites isolated from Dogs in Atmibo

Location	**Sex of Dog Slaughtered**	**Number of Dog Slaughtered**	**Number (%) of Various Parasites Isolated from the intestine of Dogs**							
			Toxocara spp	***Trichuris spp***	***Cryptosporidium spp***	***Giardia spp***	**Eimera**	**S[rocerca**	**Acanthocephalans**	**Sarcocystic**
Atimbo	Male	**11**	**-**	**1**	**3**	**3**	**-**	**2**	**3**	**2**
	Female	**10**	**2**	**-**	**3**	**2**	**-**	**-**	**1**	**1**

Total	***21***	***2***	***-***	***6***	***5***	***-***	***1***	***4***	***3***

Prevalence of specific parasites stages (Trophozoite, Ova, Cysts)

Results of prevalence of specific parasites stages (Trophozoite, Ova, Cysts) isolated from the sample include seven (7) *Spirocerca spp & Cryptosporidium spp.*, five (5, eight (8), *Eimeria spp* and six (6) *Giardia spp* cysts. The ova isolated were six (6), seven and nine (9) *Toxocara spp, Toxocara spp* and *Acanthocephalans spp* obtained respectively. While only five (5) Trophozoites of *Giardia spp* were isolated from this study as seen in Table 5

Table 5 Showing number of specific parasites stages (Trophozoite, Ova, Cysts) isolated from Dogs

S/N	Parasites	Dog		
		Trophozoites	**Ova**	**Cyst**
1	*Spirocerca spp.*	**-**	**-**	**7**
2	*Sarcocystis spp.*	**-**	**-**	**5**
3	*Cryptosporidium spp.*	**-**	**-**	**7**
4	*Giardia spp.*	**5**	**-**	**6**
5	*Toxocara spp.*	**-**	**6**	**-**
6	*Trichuris spp.*	**-**	**7**	**-**
7	*Acanthocephalans spp.*	**-**	**9**	**-**
8	*Eimeria spp.*	**-**	**-**	**8**

DISCUSSION

The result from this study indicates parasitic infection across the sample from local dogs' species across the three slaughters in Calabar. This study shows a prevalence of 50.66% from thirty-eight (38) samples of seventy-five (75). This result agrees with work of Sherry *et al*., (2015) who had above fifty percent (62.6%) prevalence of their sample (238 out of 380 samples) infected with gastrointestinal parasites in Greater Accra region of Ghana. This could have been due to the tropical conditions in the African countries which were conducive for the development, survival and transmission of infective stages of the parasites. To consolidates this report Othman & Abuseir (2021) stated that their results shows that dogs of ages under one year had similar rate of infection compared to older dogs with a rate of 67.3% and 67.4% respectively which is above fifty percent of their study sample. Specific parasites isolated from the study shows that *Cryptosporidium spp. Giardia spp, Toxocara spp. Acanthocephalans spp.* 16, 11, 10 and 8 respectively were highest from the study. This study agrees with work of Batchelor *et al*., (2008) who stated that the most common parasite was *Giardia* spp. found in 380/4526 dogs. Toxocara canis in 63/4526 dogs Cryptosporidium spp. infection was detected in only 29/4526. They further buttress that the prevalence of *Giardia* ($P < 0.001$) was significantly higher in dogs <12 months of age, with nearly one-fifth of all symptomatic dogs under 6 months being infected with Giardia. This study under review shows that the male (40) (53.33%) dogs were more infected than the female (35) (46.66%), which agrees with the work of Igor *et al*., (2021) that Sex was the only variable that showed statistical differences in the canine population males being more often infected than female ($p < 0.05$). The overall prevalence of specific parasites stages (Trophozoite, Ova, Cysts) in this study shows that the cysts stage were more isolated than ova and Trophozoites in dogs. *Eimeria spp*, *Cryptosporidium* spp, *Spirocerca* spp were highest followed by *Giardia* spp and *Sarcocystis* spp. This study agrees with work of Roshan & Tirth, (2023) who stated that gastrointestinal parasites identified in the urban street dogs were Cyst of *Entamoeba* spp, Oocysts of *Cryptosporidium* spp, Oocyst of *Cyclospora* spp, Oocysts of *Sarcocystis* spp. He stated that infected dogs and their faeces with considerably higher eggs/oocysts released per gram (epg/opg) are of zoonotic parasitic risk which spillover to humans, domestic animals and sympatric wildlife.

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