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Prevalence of Gastrointestinal Parasites in Domestic Cats (Felis catus) in Jere Local Government Area of Borno State, Nigeria

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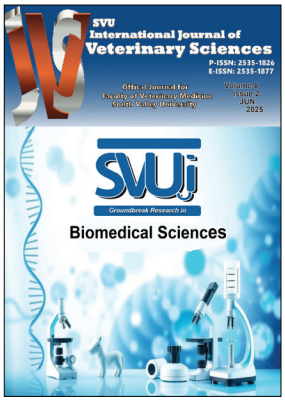

ABSTRACT

Cats are the only felines that live in close contact with humans. Because they can be vectors, carriers, reservoirs, and definitive hosts of many enteric parasites, their parasitological evaluation may contribute to their survival and safety. A total of *102* fresh faecal samples of cats of varied ages and sex were collected and transported to the laboratory. The copromicroscopic examination was carried out following saturated salt flotation technique. Furthermore, associated risk factors were assessed to establish the predictor of risks for parasitic achievement. Results of the present study revealed that *17.6*% cats found positive for the gastrointestinal parasites. The percentage of infection was found higher in female cats (*12.7*%) than males (*4.9*%). The preva lence in adults and kitten was recorded as *6.9*% and *10.7*% respectively. *Ancylostoma* species was found more prevalent with the infection rate of *8.8*% followed by *Toxocara* species, Coccidian oocyst and *Hymenolopis* species with the infection rate of *3.9*, *2.9* and *1.9*% respectively. This finding can be essential for veterinarians and public health authorities for strategic preventive and treatment intervention.

Keywords: *risk factors, cats, gastrointestinal parasites, prevalence, coprological analysis*

INTRODUCTION

Domestic cats (*Felis catus*) are well adored in many homes worldwide due to their ability to form strong bonds with humans and other animals, facilitated by their communication styles, such as vocalizations and body language. However, the rising population of stray and feral cats poses significant challenges related to public health, environmental impact, and potential spread of diseases. While cats are generally solitary animals, their social behaviors can thrive in nurturing environments, further endearing them to their human companions and emphasizing the needs for responsible pet ownership and population management (Chidumayo et al., 2020). Despite been domesticated, cats exhibit many traits similar to the wild felines, such as hunting instincts and territorial behaviours (Chidumayo et al., 2020).

Cats harbors different types of gastrointestinal parasites (GIP), and rate of parasitic infestation varies depending on the age and sex of the animal. They serve as carriers, reservoirs and host to various gastrointestinal parasites. Different GIP are found in cats with some species having zoonotic importance (Patil et al., 2024). This include a wide range of helminths e.g *Ancylostoma spp., Strongyloides spp., Toxocara spp.* and protozoa e.g. *Cystoisospora spp., Toxoplasma spp., Entamoeba spp., Isospora spp., Cryptosporidium spp., Giardia spp.* and *Trichuris spp.* (Monteiro et al., 2016; Lima et al.,2017; Oliveira-Arbex et al., 2017; Lopez-Osorio et al.,2020; Rabbani et al., 2020; Ubirajara Filho et al., 2022; Patil et al., 2024).The major route of infection is through ingestion of infective forms of the eggs, larvae, cysts or oocysts in water and soil but in other species the percutaneous form is also reported. The percutaneous form of infection is infectious form considering cat faces may contaminate soil of parks and backyards (Del Giudice et al., 2019; Da Silva et al.,2019; Ubirajara Filho et al., 2022). Factors such as geographical location, prophylactic measures, season and lack of veterinary care influence the prevalence of parasitic disease. Clinical signs associated with GIP include loss of appetite, rough hair coat, vomiting, coughing, diarrhoea, dehydration, bloody faces and anemia (Patil et al., 2024).

Regular monitoring and deworming of domestic cats are crucial for preventing disease transmission and managing parasite populations. By conducting periodic surveillance of parasite prevalence in local cat populations, pet owners and veterinary professionals can develop and implement effective worm control strategies, ensuring the health of both the animals and the communities they inhabit. This proactive approach is essential in mitigating public health risks associated with parasitic infections (Patil et al., 2024).

In Nigeria there is paucity of information on the prevalence and distribution pattern of GIP of cats. More research studies are required to determine the parasite fauna among cat's population for effective parasites control measures. Therefore, the aim of the current study was to determine the prevalence of Gastrointestinal parasites and its associated risk factors in Domestic Cats (*Felis catus*) in the study area.

MATERIALS AND METHODS

Study area

The study was conducted in Jere local government area of Borno state, Nigeria. it lies between latitudes 11º40 and 120º5N and longitudes 130º05 and 12º20E. The minimum temperature ranges from 15 to 20ºc and maximum ranges of 37 to 45ºc.The annual rainfall ranges from 500 to 700 mm characterized by high intensity. The rainy season usually lasts from the month of May to September with low humidity and then followed by long dry season. (Ezema et al., 2021).

Figure 1: ***Map of Jere Local Government area showing samplingsites.***

Ethical Approval

This research was approved following reviewed by the animal ethics committee of the faculty of Veterinary Medicine university of Maiduguri. Written informed consent was obtained from cats' owners for the used these animals in this study.

Study Animals

A cross-sectional study was conducted between the month of July to August 2024 and a total of 102 fecal samples were randomly collected from different

local breeds of cats in different location. Cats are categorized based on age and sex. Cats from 0-6 months are considered as young, while cats of 7 months and above are considered adult.

Sample collection and laboratory examination

Fecal samples were collected freshly into clean polythene bags from 102 cats and kept on ice park and transported to Veterinary parasitology laboratory, Faculty of Veterinary Medicine, University of Maiduguri. Physical examination was conducted for color, odor and texture of each fecal sample. Willis-molley floatation technique was performed as described by (Raji et al., 2013; Taylor et al. 2015). Floatation technique was carried out using saturated sodium chloride solution. 2-5 grams of fecal sample was used and placed into a mortar crushed and then saturated salt solution was added and mixed properly and sieved using tea sieve. The solution was poured into universal bottle and salt solution was added to form meniscus. A cover slip was then placed on the universal bottle and allow staying for 10 minutes. The cover slip was then removed and placed on the glass slide for identification.

Parasite Identification

The parasite identification was based on microscopic appearance of eggs, oocyst, and larvae seen during fecal examination of each sample under light microscope with x40 objective. Microscopic appearance of parasites was then compared with standard literature and micrographs (Raji et al., 2013; Taylor et al. 2015).

DATA ANALYSIS

The data obtained from the study were analyzed using graphpad (graphpad Prism Version 5.0 Software Inc., La Jolla, CA) for confidence interval.

RESULTS

A total of 102 cats were used in the analysis, with an overall prevalence of 17.6% was recorded for GIP infestations at different households. The species of parasites identified in cats are namely *Toxocara* species 4 (3.9%), *Ancylostoma* species 9 (8.8%), *Hymenolopis* species 2 (1.9%) *and* Coccidian Oocyst 3 (2.9%). Most common parasites were *Ancylostoma* followed by *Toxocara*, Coccidian oocyst and *Hymenolopis* as illustrated in Table 1.

The prevalence of gastrointestinal parasites was higher in female cats 13 (12.7%) with a CI of 6.4-19.0 than male 5 (4.9%) with a CI of 1.5-8.3. as illustrated in Table 2. For age, prevalence of gastrointestinal parasites was higher in young 11 (10.7%) with a CI of 6.2-15.2 than in adult cats 7 (6.9%) with a CI of 3.5-10.3 as illustrated in Table 3.

For type of parasitic infection those with single

Table 1: Prevalence of gastrointestinal parasites isolated from cats.

Parasites	Number infected	Percentage (%)
Toxocara **spp.**	4	3.9
Ancylostoma **spp.**	9	8.8
Hymenolopis **spp.**	2	1.9
Coccidian oocyst	3	2.9
Total	18	17.6

Table 2: Prevalence of gastrointestinal parasites based on sex

Risk Factors	Total number of sample	Infected	Not infected	Percentage (%)	95% CI
Male	70	5	65	4.9	1.5-8.3
Female	32	13	19	12.7	6.4-19.0
Total	102	18	84	17.6	

Table 3: Prevalence of gastrointestinal parasites based on age

Risk factors	Total number of sample	Infected	Not infected	Percentage (%)	95% CI
Young	43	11	32	10.7	6.2-15.2
Adult	59	7	52	6.9	3.5-10.3
Total	102	18	84	17.6	

Table 4: Type of parasitic infection in cat feces

Type of parasitic infection	No. of samples	Percentage (%)
The Single infection	16	88.9
The Double infection	2	11.1

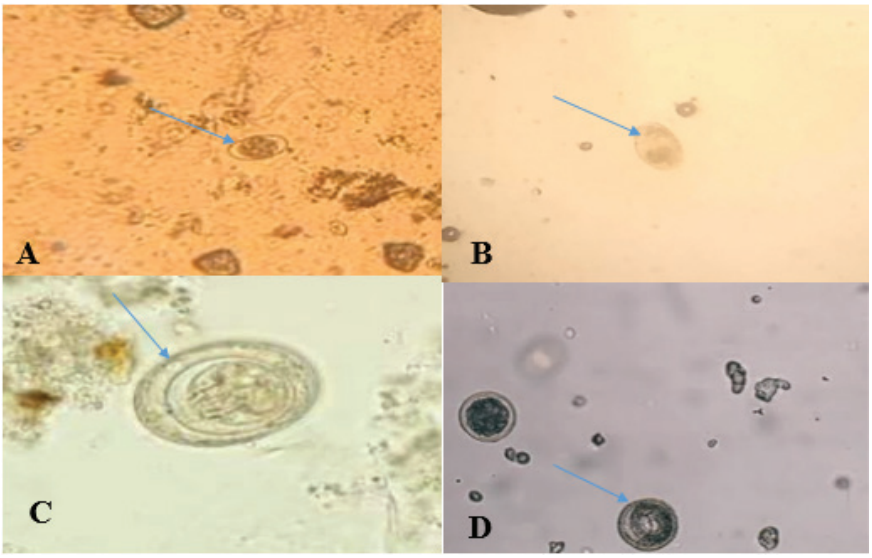

Figure A: *Ancylostoma* **eggs, Figure B:** ***Coccidian oocyst,*** **Figure C:** *Hymenolopis* **eggs Figure D:** *Toxocara* ***eggs at x40 objective .***

infection 16 (88.9%) were much compare with double infection 2 (11.1%) as illustrated in Table 4.

DISCUSSION

The result of this study showed an overall prevalence of 17.6% for GIP infestations at different households. Some studies reported higher prevalence of 171 (85.5%) Sowemimo, (2012), (80.7%) Raji et al. (2013), (63.0%) Udoidung and Essien, (2014), from Nigeria. Prevalence of 43 (47.7%) was reported by Al-Aredhi, (2015) in Iraq, 82 (68.3%) by Rabbani et al. (2020) in Indonesia, 25 (23.8%) by Ubirajara Filho et al. (2022) in Brazil, and 191 (53.0%) Patil et al. (2024) in India. The most common parasites in this study was *Ancylostoma* followed by *Toxocara*, *Coccidial oocyst* and *Hymenolopis* this agrees with studies of Chidumayo, (2018) in Zambia, Ubirajara Filho et al. (2022) *Ancylostoma* 9 (36. %) and *Toxocara* 2 (8%) in Brazil while other studies by Sowemimo, (2012) reported *Toxocara cati* (48.5%) as the most prevalent GIP, Udoidung and Essien, (2014) reported that *Toxocara cati* 21 (45.6%) as the most prevalent followed by *Ancylostoma* 8 (17.4%), *Toxocara cati* 5 (16.6%) and *Ancylostoma* 5 (16.6%) (Raji et al., 2013) in Nigeria. *Toxocara cati* 11 (25.5%) and *Ancylostoma spp* 10 (23.2%) by Al-Aredhi, (2015) in Iraq, *Toxocara cati* 48 (40%) and *Ancylostoma* 22 (18.3%) by Rabbani et al. (2020) in Indonesia. *Coccidial oocyst* 91 (25.2%) *and Toxocara cati* 55 (15.2%) (Patil et al., 2024) in India.

Our study recorded that females have high

prevalence of GIP than males and this confirms the report of Mehedi et al. (2020) females (66.6%) males (57.6%) in Bangladesh, Patil et al. (2024) females 96 (55.8%) and males 95 (50.5%) in India, while other researchers contradicts it as male 105 (87.5%) compare to female 66 (82.5%) Sowemimo, (2012), males 36 (57.1%) female 27 (42.8%) Udoidung and Essien, (2014), males 13 (92.8%) females 9 (75%) Raji et al. (2013) in Nigeria, males 12 (26%) females 13 (22%) by (Ubirajara Filho et al., 2022) in Brazil.

Based on age, the young have high prevalence of GIP than adult and this confirms the report of Sowemimo, (2012) as young 89 (96.7%) and adult 6 (42.9%), Udoidung and Essien, (2014) young 25 (39.6%) and adult 10 (15.8%) in Nigeria, young 14 (48%) and adult 6 (10.5%) by Ubirajara Filho et al. (2022) in Brazil and Mehedi et al. (2020) in Bangladesh but disagree with findings of Raji et al. (2013) in Nigeria were young 12 (75%) and adult 10 (100%), young 37 (27.2%) and adult 154 (68.7%) by (Patil et al., 2024) in India.

Single infection is more prevalent type of infection and this agrees with findings of other studies. Single infection 18 (41.8%) and double infection 15 (34.8%) by Al-Aredhi, (2015) in Iraq, single infection (42. %) and double infection 15 (35. %) by 9 Khalafalla, (2011) in Egypt. Single infection 15 (12.5%), 8 (6.7%) and double infection 1 (0.8%) by Rabbani et al. (2020) in Indonesia, single infection 9 (36. %) and double infection 3 (12%) by Ubirajara Filho et al. (2022) in Brazil. Single infection 17 (15.2%) and double infection 38 (15.2%) by (Patil et al., 2024) in India.

The young cats are more often infected than adults because young animals tend to be more naïve and have less developed immune system to withstand the infection while adult cats typically have stronger immunity from previous exposures, lowering their risk of infection (Morelli et al., 2021). The difference in prevalence of the GIP in cats may be attributed to factors such as susceptibility of host, level of pathogenicity of parasite, the infective dose, climatic conditions (temperature, rainfall and humidity, unhygienic environment, immunological status, and number of infective larvae and eggs in the environment (Dogo et al., 2017; Karaye et al.,2018). Other factors are roaming habits of cats and anthehelmithic treatment and owner awareness have been reported to have significant impact on helminths infection (Chidumayo et al., 2020).

There are limited research on feline helminthiasis and cat keeping practices, there seems to be low deworming and poor owner awareness of feline helminths. Sowemimo, (2012) in Nigeria reported that only 3% of owners dewormed their cats once a year and only about 17.5% of pet owners were aware of the zoonotic potential of some feline helminths.

CONCLUSION

The prevalence of GIP was high in the study area and the most common parasites were *Ancylostoma* followed by *Toxocara, Coccidial oocyst* and *Hymenolopis*. Prevalence of gastrointestinal parasites was higher in female and young cats, with single infection been the most common type of infection. This highlight the need for implementation of appropriate control strategies, such as to raise awareness among cat owners and veterinarians about the need for regular deworming and prompt treatment of infected cats.

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