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Prevalence of cystoisosporosis among cats in Chennai

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Abstract
Cystoisospora spp. are important coccidian parasites causing enteritis in both domestic and stray cats. Young animals are more susceptible due to immature immunity, overcrowding and environmental contamination. To assess the prevalence of *Cystoisospora* infection in Chennai, a total of 200 faecal samples were collected from December 2024 to October 2025. Samples were examined using sheather's sugar flotation technique and positive samples were confirmed by micrometry for species identification. Data were statistically analysed using IBM-SPSS software. The overall prevalence of *Cystoisospora* spp. was 9.5% (19/200). Age-wise analysis showed the highest prevalence in kittens (13.51%), followed by cats aged 1-3 years (7.41%) and adults above three years (6.94%); however, the difference was not statistically significant (χ^2=2.21; p>0.05). A significant association was observed between living status and infection, with stray cats (14.44%) having a significantly higher prevalence than pet cats (5.45%) (χ^2=4.65; p<0.05). Male cats (11.70%) showed a higher prevalence than females (7.55%), but gender was not statistically associated with infection (χ^2=1.15; p>0.05). Breed and seasonal variations also showed no significant association (p>0.05), though higher infection occurred in domestic short-hair cats and during summer. The findings indicate that *Cystoisospora* infection persists in Chennai's cat population, particularly among stray and younger animals. Regular deworming, improved sanitation, and management of stray cat populations may help reduce environmental contamination and transmission.

Keywords: *Cystoisospora* spp., cats, prevalence, faecal flotation, Chennai

Introduction
Cystoisospora spp., particularly *C. felis* and *C. rivolta*, are common coccidian parasites affecting the intestinal tract of domestic and stray cats worldwide. Infection occurs through ingestion of sporulated oocysts from contaminated environments or paratenic hosts such as rodents and lizards (Dubey & Greene, 2012) [1]. Kittens and stressed animals are more susceptible, often showing diarrhoea, dehydration and poor growth, whereas adults may remain asymptomatic carriers (Lappin, 2010) [2]. Warm and humid climates favour oocyst sporulation, leading to higher environmental contamination and transmission (Dubey, 2018) [3]. Although intestinal parasites in cats are reported from several parts of India, limited information is available from Tamil Nadu, especially Chennai. Increasing urban stray cat populations and close human-animal contact highlight the need for surveillance. Hence, the present study was conducted to investigate the prevalence of *Cystoisospora* spp. in cats in Chennai and to assess the influence of age, sex, breed, living conditions and seasonal factors.

Materials and Methods
Study period and study area
In the present investigation, 200 faecal samples of domestic and stray cats were collected randomly from various parts of Chennai. Sampling considered different factors such as category (pet/stray), age, gender, breed, and season. The study was conducted from December 2024 to October 2025.

Faecal examination: Fresh faeces were collected and examined within a few hours or stored under refrigeration to prevent sporulation and degradation (Lappin, 2010) [2].

A measured amount of faeces is emulsified in flotation solution using sheather's sugar solution. The suspension is strained to remove large particles and filled into a flotation chamber or topped to form a meniscus before placing a coverslip (Zajac & Conboy, 2012) [4]. After 10-15 minutes, the coverslip is transferred to a slide and observed microscopically at 10× and 40× magnification (Dubey, 2018) [3]. *Cystoisospora felis* and *C. rivolta* oocysts are identified based on size, double-layered wall, and internal sporocyst development in sporulated stages (Dubey & Greene, 2012) [1]. *C. felis* oocysts are larger, usually spherical to subspherical, measuring approximately 38-51 × 27-39 µm (Dubey, 2018) [3]. *C. rivolta* oocysts are smaller and typically ellipsoidal, measuring 18-29 × 16-23 µm (Soulsby, 1982) [5].

Data analysis

Numerical data collected were analysed using IBM-SPSS software version 24.0.

Results and Discussion

Out of 200 cats examined, 19 were positive for *Cystoisospora* spp., giving an overall prevalence of 9.5% (Fig. 1). All positive samples were subjected to micrometry for species-level confirmation (Soulsby, 1982) [5] (Fig. 2). Contrary to the present findings, Borkataki *et al*. (2013) [6] reported a much higher prevalence (80%) among stray cats in India. In Bengaluru, however, a lower prevalence of 3.47% was reported in cats from mixed populations including stray, owned, and shelter cats (Gautham *et al*., 2018) [7].

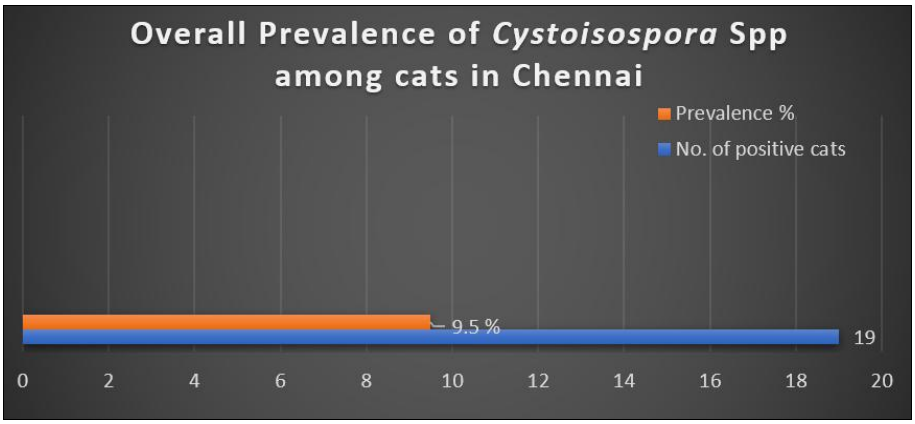

Fig 1: Bar diagram showing overall prevalence of *Cystoisospora* spp. among cats in Chennai

Age-wise prevalence: Age groups were classified as <1 year, 1-3 years, and >3 years. Prevalence was highest in kittens (<1 year) at 13.51%, followed by 7.41% in 1-3 years and 6.94% in >3 years (Table 1). Although the association between age and infection was not statistically significant, kittens showed higher infection rates. Lappin (2010) [2] stated that young animals are more likely to shed oocysts. Stress factors such as weaning, crowding, and poor hygiene also predispose kittens to infection. A similar trend was reported by Neeraja *et al.* (2023) [8], who found 36.76% prevalence in cats below six months of age.

Table 1: Age-wise prevalence of *Cystoisospora* spp. of cats in Chennai

	No. of cats examined	Cats infected (No.)	Prevalence (%)
Kitten (<1 year)	74	10	13.51%
Young (1-3years)	54	4	7.41%
Adult (>3years)	72	5	6.94%
Chi-square calculated: 2.21			
χ^2 table at 5% = 5.99, χ^2 table at 1% = 9.21			
Not significant at 5% or 1% level.			

Fig 2: Microscopic examination of *Cystoisospora* spp. oocyst

Pet vs stray cats

Of 110 pet cats, 6 (5.45%) were positive, compared to 13 of 90 stray cats (14.44%). A statistically significant association ($P<0.05$) was observed between living status and prevalence (Table 2). Higher infection among stray cats agrees with Dubey (2018) [3], attributing increased exposure to predation, scavenging, inter-cat interactions, and limited veterinary care.

Table 2: Prevalence of *Cystoisospora* spp. among Pet and Stray Cats in Chennai

	No. of cats examined	Cats infected (No.)	Prevalence (%)
Pet cat	110	6	5.45%
Stray cat	90	13	14.44%
Chi-square calculated: 4.65			
χ^2 table at 5%=3.84, χ^2 table at 1%=6.64			
Statistically significant at 5% level			

Gender-wise and breed-wise prevalence

Among 94 male cats, 11 (11.70%) were positive, while 8 of 106 females (7.55%) were infected. There was no significant association ($P>0.05$) between sex and prevalence (Table 3). For breed, 95 domestic shorthair cats, 85 purebred cats, and 20 others were assessed. Prevalence was 11.58%, 7.06%, and 10% respectively, with no significant association ($P>0.05$) (Table 4).

Seasonal occurrence

Prevalence was highest in summer (12.86%), followed by monsoon (10.91%) and winter (5.33%) (Table 5). Although no statistically significant association was observed, higher summer prevalence may be due to increased oocyst sporulation under warm and humid conditions.

Table 3: Gender-wise prevalence of *Cystoisospora* spp. of cats in Chennai

	No. of cats examined	Cats infected (No.)	Prevalence (%)
Male	94	11	11.70%
Female	106	8	7.55%
Chi-square calculated: 1.15			
χ^2 table at 5% = 3.84, χ^2 table at 1% = 6.64			
Not significant at 5% or 1% level.			

Table 4: Breed wise distribution of *Cystoisospora* spp. of cats in Chennai.

	No. of cats examined	Cats infected (No.)	Prevalence (%)
Domestic short Hair	95	11	11.58%
Pure breed	85	6	7.06%
Others	20	2	10%
Chi-square calculated: 1.07			
χ^2 table at 5% = 5.99, χ^2 table at 5% = 9.21			
Not significant at 5% or 1% level			

Table 5: Seasonal occurrence of *Cystoisospora* spp. of cats in Chennai.

	No. of cats examined	Cats infected (No.)	Prevalence (%)
Summer	70	9	12.86%
Monsoon	55	6	10.91%
Winter	75	4	5.33%
Chi-square calculated: 2.56			
χ^2 table at 5%= 5.99, χ^2 table at 1%=9.21			
Not significant at 5% or 1% level			

Conclusion

The present study demonstrated an overall *Cystoisospora* prevalence of 9.5% in cats of Chennai, with kittens and stray cats showing higher levels of infection. Although most factors such as age, sex and breed were not statistically significant, the increased prevalence in free-roaming animals highlights the role of environmental exposure. Early development, stress and environmental contamination played a major role in susceptibility. Improved hygiene, regular faecal screening and routine anticoccidial treatments are essential to reduce infection and prevent clinical disease, especially in young and shelter cats.

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Ethical approval

All sampling procedures were conducted in accordance with institutional ethical guidelines for animal handling. Faecal samples were collected non-invasively without causing harm to animals, and no cats were restrained specifically for research purposes. Ethical approval was obtained from the Institutional Animal Ethics Committee (IAEC) prior to commencement of the study.

Conflict of interest

The authors declare that they have no conflicts of interest regarding the publication of this research.

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