



Prevalence of parasitic infections of stray cats in Jammu, India

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Abstract

Stray cats are afflicted with various parasitic infestations and the infective stages of these parasites may spread infection to other animals including human beings. The study was conducted for a period of one year from March 2009 to February 2010 to determine the prevalence of parasitic infection in and around Jammu—humid subtropical zone of North Western India. A total of 100 stray cats were examined using standard parasitological methods. Post mortem examinations of stray cats were also conducted to determine the presence of any mature parasite in the gastrointestinal system and other viscera. All the cats examined were found to be positive for one or other type of parasitic infection. Eggs identified were those of hookworms found to be predominant (80%) followed by Taeniid eggs (40%), *Toxocara* eggs (32%), *Strongyloides* eggs (28%), *Dipylidium canium* eggs (20%) and *Spirometra* eggs (8%). EPG of the positive samples were also recorded. Mean \pm SD EPG of hookworm eggs, *Toxocara* eggs and *Strongyloides* eggs were 50 ± 1.81 , 102.5 ± 4.81 and 87.57 ± 7.52 respectively. Besides these, prevalence of *Toxoplasma/Hammondia* oocyst was 88%, *Isospora* oocyst 80% and *Cryptosporidium* oocyst 4% (ZN- staining). Five cat carcasses lying open on the road-side were also collected and brought to the laboratory for post-mortem examination. While opening the carcasses, three different parasites were also found and they were identified as *Ancylostoma tubaeforme* (80%), *Taenia taeniaeformis* (60%) and *Dipylidium caninum* (40%). The high parasitic burden evident from this study could pose a potential threat to public health.

Keywords: India, Jammu, Parasites, Prevalence, Stray cats.

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Introduction

Cats are highly susceptible to a variety of parasitic infections because cats have the habit of roaming freely. The wide variety of parasites found in cat can be detrimental to their health and to humans in the vicinity (Krecek *et al.*, 2010) or when people accidentally come into contact with infective stages of parasites (Smyth, 1995). Ascarids and hookworms are particularly important because they commonly cause larva migrans in human beings (Kazaco, 2002). Intestinal helminthes in cats from the Guadeloupe (Esterre & Maitre, 1985), Puerto Rico (Acholonu, 1977), India (Mamatha *et al.*, 2005), Mizoram in North East state of India (Borthakur & Mukharjee, 2010) has been widely reported. Sparganosis in human being is caused by *Spirometra*. *Toxoplasma* and *Cryptosporidium* oocysts cause abortion and diarrhoea in human beings respectively. Now-a-days

the cat is gaining popularity as pet animal. So, public health education should be given to the pet owner /general public regarding the hazards of zoonotic diseases. Children are at most serious risk as they have the habit of playing with pet or even from the environment where cat faeces may be present. Ectoparasites like cat flea can also transmit the causative agent of a zoonotic disease called 'Cat-Scratch Disease' in human beings. Scanty information is available on the prevalence of parasite of stray cats within the subtropical climate. This study allows improving explanation about the distribution of parasitism and its veterinary and zoonotic significance in the area under study. The aim of this study was to provide information on the prevalence of parasites in stray cat of Jammu, a humid subtropical zone of India.

Materials and methods

Study area

The study was conducted from March 2009 to February 2010 in Jammu – a humid subtropical zone of North Western India. The area is located 332 mts above mean sea level between 74° 50' East Longitude and 30° 40' North Latitude. The study region has a subtropical climate, with an annual rainfall of about 1069mm. The mean annual minimum and maximum temperature is between 16.36°C and 30.18 °C respectively.

Coprological examination

Faecal samples were collected freshly per rectum into clean polythene bags using simple random sampling method from 100 cats and examined by using floatation and sedimentation technique as per the procedure outlined by Soulsby (1982). Quantitative examination was done by counting eggs per grams (EPG) of faeces using Mc Master Technique. Maximum effort was made to characterize and classify the different eggs observed under 10x magnifications to the level of genera or species (Soulsby, 1982). Faecal smears were prepared and stained with modified Ziehl Neelsen staining method for presence of *Cryptosporidium* oocyst as described by Henricksen and Pohlenz, (1981).

Necropsy examination

Five cat carcasses lying open on the road side at different period of time were brought to the laboratory of division of Veterinary Parasitology, Faculty of Veterinary Science & Animal Husbandry, Jammu for post-mortem examination. The animals were examined for presence of ectoparasites. Visceral organs were screened individually in search of any lesions associated with parasitic disease and endoparasites. The entire alimentary tracts of all cat carcasses were removed and the different compartments (oesophagus, stomach, small

intestine, caecum and colon) were tightly ligated with gauze. The content of different compartments was scrapped off along with parts of mucosa, using a spatula. The contents were passed through a series of graded screens (sieves) to remove fecal debris and collected in separate beaker. The resultant sediments were placed in separate universal bottles containing equal amount of warm 10% formalin solution for further identification and classification (Georgi & Theodorides, 1980; Soulsby, 1982).

Results

Microscopic examination of faecal samples revealed all the samples were positive for atleast one of the helminthes eggs. Concurrent infection with two or more species was also seen in most of the stray cats examined. The prevalence of helminth parasites as shown in Table 1, indicated as most predominant eggs of hookworms (80%) followed by Taeniid (40%), *Toxocara* (32%), *Strongyloides* (28%), *Dipylidium* (20%) and *Spirometra* (8%). Mean±SD EPG (Egg per gram) of hookworm, *Toxocara*, *Strongyloides* was recorded 50 ± 1.81, 102.5 ± 4.81, 87.57 ± 7.52 respectively.

Protozoan oocyst from the faecal sample recorded *Toxoplasma/Hammondia* 88% followed by *Isospora* oocyst 80% and *Cryptosporidium* oocyst 4%. The photomicrographs of the helminthes egg and oocyst isolated are also presented (Plate I-VIII).

On necropsy examination *Ancylostoma tubaeforme*, *Taenia taeniaeformis* and *Dipylidium caninum* were also isolated. The percent prevalence and intensity of gastrointestinal parasites were presented in Table 2. Out of 5 cat carcasses opened, 4 were found to be positive for *A. tubaeforme*, 3 for *Taenia taeniaeformis* and 2 for *Dipylidium caninum* and highest prevalence (80%) and mean intensities (07.0±1.4) was recorded for *Ancylostoma* parasite.

Table1: The prevalence and egg counts of gastrointestinal parasites in stray cats of Jammu, India

Parasite	Prevalence (%)	Egg Count (Mean ±SD)
Hookworm	80.0	50±1.81
<i>Toxocara</i> spp.	32.0	102.5±4.81
<i>Strongyloides</i> spp.	28.0	87.57±7.52
Taeniid	40.0	-
<i>Dipylidium caninum</i>	20.0	-
<i>Spirometra</i> spp.	8.0	-
<i>Toxoplasma/Hammondia</i>	88.0	-
<i>Isospora</i> spp.	80.0	-
<i>Cryptosporidium</i> spp.	4.0	-

Table 2: The prevalence and intensities of different gastrointestinal helminthes in necropsy examination in stray cats of Jammu, India

Parasite	Prevalence (%)	Intensity Mean \pm SD	Number of worm (range)
<i>Ancylostoma tubaeforme</i>	80.0	07.0 \pm 1.4	7-12
<i>Taenia taeniaformis</i>	60.0	04.5 \pm 1.9	1-8
<i>Dipylidium caninum</i>	40.0	03.3 \pm 1.1	1-5



Plate I: Photomicrograph of spirometra egg isolated from faecal sample of stray cat (X 100)



Plate II: Photomicrograph of strongyle egg and isospora oocyst isolated from faecal sample of stray cat (X 100)



Plate III: Photomicrograph of dipylidium egg isolated from faecal sample of stray cat (X 400)



Plate IV: Photomicrograph of taeniid egg isolated from faecal sample of stray cat (X 100)



Plate V: Photomicrograph of isospora isolated from faecal sample of stray cat (X 100)



Plate VI: Photomicrograph of toxoplasma/hammondia isolated from faecal sample of stray cat (X 100)



Plate VII: Photomicrograph of toxoplasma/hammondia (arrow) and isospora isolated from faecal sample of stray cat (X 100)



Plate VI: Photomicrograph of cryptosporidium isolated from faecal sample of stray cat (X 100)

Discussion

Higher parasitism in terms of egg of hookworm (80%) in faecal sample in the present study is similar with observation recorded by Krecek *et al.* (2010) in stray cat of St. Kitts of West Indies as 88%. Higher parasitism of hookworm in cat was also recorded by various workers at different geographical area. (Mircean *et al.*, 2010 at Transylvania, Adams *et al.*, 2008 at Christmas island, Abu-Madi *et al.*, 2008 at Qatar; Sommerfelt *et al.*, 2006 at Argentina and from India by Borthakur and Mukherjee, 2010; Mamatha *et al.*, 2005; Islam *et al.*, 1999; Chhabra *et al.*, 1984). The other positively infected faecal sample with parasitic egg were identified as *Taeniid* (40%), *Toxocara* (32%), *Strongyloides* (28%), *Dipylidium*(20%) and *Spirometra* (8%). The

comparison of the present study with published survey indicated difference in prevalence of particular parasite, perhaps due to regional, environmental and climatic variations. Mamatha *et al.* (2005) recorded 13% and 7% of *Ancylostoma* egg, *Taenia* egg respectively in cat faecal sample in Bangalore, India which are lower than the present findings and that reported in Doha, Quatr (Abu-Madi, 2008). In the former study they also reported the presence of parasitic eggs found in the current study except *Strongyloides*, but additionally reported *Physaloptera* spp. Pilarczyk *et al.* (2005) recorded *Toxocara* spp. (22.1%) as most predominant infection in cat of Szczecin temperate region. Mircean *et al.*, (2010) recorded 3.4% for

Strongyloides spp in household Romanian cat and Coumarane *et al* (2008) in palm civet cat faecal sample from south India. Presence of *Dipylidium* and *Spirometra* eggs was also widely reported by various workers (Borthakur & Mukharje, 2010, Sharma *et al.*, 2010, Milan & Casanova, 2009) who have results similar to our findings.

The mean±SD EPG of hookworm, Toxocara, Strongyloides was recorded as 50 ± 1.81, 102.5±4.81, 87.57± 7.52 respectively which indicated a light parasitic load. The stray cats harboured the infective parasites and may transmit the same to the other animals or human beings when in contact.

The humid and subtropical climate of the study area may be very much conducive to have the higher infection of the protozoan oocyst, *Toxoplasma/Hammondia* (88%) followed by *Isospora* oocyst 80% and *Cryptosporidium* 4% in the stray cats. However a low affection in comparison to present study is reported by Chhabra *et al.* (1984) from North India who encountered 16.9% and 11% for *Isospora felis* and *I. rivolta* respectively from cats. Another species of *I. felis* reported by Singla *et al.* (2009) in a stray kitten from Ludhiana, North India, where as Shastri (1990) reported *Toxoplasma gondii* oocyst from cat of Parbhani (Maharashtra), India. However, upto species level identification of these oocyst in the present study has not been made. Presence of these oocysts in captive wild kitten has been reported by Jithendran (2002) from Himachal Pradesh, a sub temperate region of North Western Himalayas. Lorenzini *et al.* (2007) too reported *Isospora* spp from faecal examination of cat in Porto Alegre, Rio Grande do Sul, Brazil and stated highest infection rate during summer i.e. 27.6%. The present findings of cryptosporidian oocyst generally agree with similar work examining their prevalence

in cat worldwide such as by Mitambo *et al.*, 1991 from Glasgow area(8.1%), Arai *et al.*, (1990) from Tokyo (3.8%), Sophia *et al* (2008), from UK (1%). However no such literature is available about the presence of this parasite from India so far.

The nematode *Ancylostoma tubaeforme* and cestode *Taenia taeniaeformis* and *Dipylidium caninum* were collected from the five necropsied cat indicating that the stray cat are potential source of tapeworm infection. Similar finding was also reported from Mizoram by Borthakur and Mukharjee, 2011 in 27 necropsied cats carcasses. They however reported another four nematode and one trematode in additional. In Kashmir, temperate region of North Western India similar parasites were reported by Pandit *et al.*, (2007) from fox (*Vulpus vulpus*) and Singla *et al.*, (2009) in stray kittens from Ludhiana, North India.

In this present study, eggs of hookworm, *Taenia*, *Ascaris*, *Dipylidium*, *Spirometra*, *Toxoplasma* and *Cryptosporidium* found are proven zoonotic agents. The results of this study suggest that the cat may contribute significantly to the environmental burden of these agents and remain as a continuous source of infection to the environment to disseminate the zoonotic parasitic diseases. The findings of this study should alert field veterinarians, researchers and human health workers in the region on the possibility of infections in human. Further epidemiological studies should be conducted to ascertain the incidence of such zoonotic parasites in cats by well defined sensitive diagnostic test.

Competing Interest

The authors declare that they have no competing interest of any kind.

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