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PREVALENCE OF PROTOZOAN DISEASES IN PET DOGS AT DISTRICT VETERINARY HOSPITAL, SIRAJGANJ, BANGLADESH

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ABSTRACT

A study was conducted to investigate the prevalence of protozoan diseases of 272 sick pet dogs submitted to the District Veterinary Hospital (DVH), Sirajganj during the two years period from January, 2009 to December, 2010. A total 7 types of protozoan diseases were identified in only 61 dogs and their variation in prevalence were analyzed on the basis of age and sex. The overall prevalence of protozoan diseases of pet dogs in the study area was observed 22.42%.The highest prevalence (%) of the diseases was found as Giardiasis (42.62%) followed by Amoebiasis (26.23%), Coccidiosis (14.75%), Balantidiasis (9.84%), Toxoplasmosis (3.28%), Babesiosis (1.64%) and Leishmaniasis (1.64%). Age-wise highest cumulative prevalence (%) of protozoan diseases was identified in age group above 1 year (54.10%), compare to that in less than or equal to 1 year (45.90%) age groups of pet dogs. On the other hand, sex-wise overall cumulative prevalence (%) of the diseases of dog was noticed in the female (55.74%) than male (44.26%). Results of this study revealed that the protozoan disease problems of dogs may be high in Sirajganj district and it also showed that people of this district does not follow scientific method of dogs rearing.

Key Words: Prevalence, Protozoan diseases, Sirajganj district

INTRODUCTION

Dog is very intelligent animal and can easily understand the psychology of a person. Among all the domestic animals, dogs appeared on the earth about 20 million years ago (Sharma *et al*., 2008). Their pleasing disposition, cooperative behavior, and natural instinct for affinity with human beings were the reasons for choosing them as domestic animals companionship. It is used in the defense department to detect enemy arms and position and in the police department it is used to detect crime (Rahman, 1988). Since pet share the same environment with humans, they constitute an important reservoir of zoonotic diseases (Kornblatt and Schantz, 1980). Household pets have been found to play a direct role in transmitting zoonosis (Dada *et al*., 1979; Kornblatt and Schantz, 1980). Review of literatures revealed that at least 36 important zoonotic diseases are acquired from dogs worldwide, although the occurrence of some important zoonotic diseases acquired from dogs have reported from Bangladesh but the inland reports on this aspect are very limited (Samad, 2011). Domestic dogs pose a significant risk as reservoirs for infectious diseases, especially for wild canids (Bronson *et al.*, 2008). In the absence of vaccination, a reservoir of susceptible animals remains vulnerable to new disease introductions (Levy *et al*., 2008). In rural areas of Bangladesh very few people keep dog as a pet animal but in urban areas dog rearing is getting popularity day by day. But they have limited knowledge about scientific rearing system of dog. For this reason they are affected with different zoonotic diseases and cause public health hazard. Some reports on incidence of diseases and disorders encountered in dogs at Central Veterinary Hospital, Dhaka (Rahman, 1988) and a case control study was conducted to ascertain the prevalence of clinical diseases of sick pet dogs presented to the central Veterinary Hospital, Dhaka (Tarafder and Samad, 2010). But there was no study conducted in District Veterinary Hospital, Sirajganj. However, the objective of present work was to determine the prevalence of protozoan diseases in pet dogs in Sirajganj district.

MATERIALS & METHODS

Geographical location of study area

Sirajganj district is situated in Rajshahi Division, Bangladesh; its geographical coordinates are 24°27' 0" North, 89°43' 0" East. Sirajganj has an area of 2,498 sq km (964 sq miles) including reverine areas, and it represents

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around 1.7 percent of the total area of Bangladesh. It ranks 3rd in size among the eight districts of Rajshahi division and 25th among the 64 districts of Bangladesh. The annual average temperature reaches a maximum of 34.6°C, and a minimum of 11.9°C. The annual rainfall is 1610 mm (63.4 in).

Experimental animals

This research work was conducted at the District Veterinary Hospital (DVH), Sirajganj on the clinical cases of pet dogs during the period from January, 2009 to December, 2010. During two years study period, a total of 272 case of sick pet dogs were studied which were brought for treatment at the DVH, Sirajganj. Only 61 dogs were infected by protozoa among 272 sick dogs. Date, age, sex, breed and complaint of the owner of all studied pet dogs were noted in the registered book. All this information and data were collected from the disease register book of the DVH, Sirajganj.

Methods followed for diagnosis

The history and physical examination of each of the patient were carried out for the pet dogs are briefly described bellow:

History/Anamnesis

(A) History of the patients: It includes (a) Date of examination, (b) Signalment (client and patient) identification, (c) Chief complaint, (d) Patient illness, (e) Past medical history

A complete medical history: It includes (a) Family medical history, (b) Vaccination history, (c) Travel history, (d) Diet history, (f) Environmental history, (g) Birth history, (h) Potential source of intoxication.

Physical examination

Physical examination was done by visual inspection, pulse & respiration rate and rectal temperature. Examination of the different organs and systems of the body was carried out by using the clinical methods of palpation, percussion and auscultation. Mouth gag and local anesthesia were used to restraint the patients. Extension and flexion, needle puncture and otoscopy were also performed when required.

Laboratory Examination

Fecal samples and skin scrapings were examined at the hospital. Blood and urine samples were collected for specific examinations and were examined at the Field Diseases Investigation Laboratory (FDIL), Sirajganj. The specific blood examination included examination of blood smear for blood protozoa. To diagnose protozoan diseases different types of laboratory test followed as like direct saline smear stained smear and fecal floatation technique for faeces examination and stained blood film (thin film, thick film) method for blood examination (Table 1). Other techniques also followed where required. Trophozoite of Giardia was identified as shown in the Fig. 1.

Table 1. Recommended procedures for the diagnosis of protozoa of the dog

Organism	**Stage**	**Procedure**
Balantidium Coli	Trophozoites Cysts	Direct smear Zinc sulfate centrifugation flotation technique
Coccidia (Toxoplasma, Isospora, Cryptosporidium)	Oocysts	Sheather's sugar centrifugation flotation technique
Entamoeba histolytica	Trophozoites Cysts	Direct smear
Giardia sp	Trophozoites Cysts	Direct smear, occasionally seen on flotation Direct smear, zinc sulfate centrifugation flotation technique

Fig. 1. Trophozoite of *Giardia* sp

Postmortem Examination

Post mortem examinations of dead pet dogs submitted either at the DVH or FDIL, Sirajganj was done to record gross pathological changes. The samples were collected and sent to Central Disease Investigation Laboratory (CDIL), Dhaka for the diagnosis to be confirmed. The interpretations were then recorded.

Statistical analysis

The prevalence of infection for each protozoan disease was calculated as the number of positive samples divided by the total number of samples infected among the total number of dog tested and expressed as percentage. All analyses were performed with standard software (SPSS, version 13.0, SPSS Inc, Chicago, III).

RESULTS AND DISCUSSION

Prevalence (%) of protozoan diseases of pet dogs is shown in Table 2. The highest prevalence of protozoan diseases in dog was observed as Giardiasis (42.62%) followed by Amoebiasis (26.23%), Coccidiosis (14.75%), Balantidiasis (9.84%), Toxoplasmosis (3.28%) and both Babesiosis and Leishmaniasis (1.64%). The overall prevalence of protozoan diseases in dogs was 22.42%. Similar study was observed by Gare daghi Yagoob (2014) where he observed the overall prevalence of intestinal protozoan parasites of dog was 19 %. He also showed that the prevalence of *Giardia* spp of dog ranked the highest percentage (9%) followed by *Isospora* spp (7%) and *Cryptosporidium* spp (6%). Similar study was also found by Mohammad Mirzaei (2010) where he reported that the overall prevalence of parasitism was 13 (13.26%) dogs among 98 stool samples. The parasites most frequently detected were: *Giardia* spp (7.14%), *Isospora* spp. (5.1%) and *Cryptosporidium* spp (4.08%). There have many studies of the general prevalence of intestinal protozoan parasites in dogs population worldwide (Dubna *et al.*, 2007; Little *et al.*, 2009; Mundim *et al.*, 2007; Oliveira-Sequeira *et al.*, 2002; Palmer *et al.*, 2008; Papazahariadou *et al.*, 2007; Ramirez-Barrios *et al.*, 2004; Rimhanen-Finne *et al.*, 2007).

The highest prevalence was reported as Giardiasis (42.62%) in our study area. Similar study was noticed by Papini *et al*. (2005) and Szenasi *et al*. (2007) where they found that the overall prevalence of Giardia infection was 55.2% and 58.8% in kenneled dogs respectively. But it was observed that the overall prevalence of this parasite has been reported in Brazil 12.2% (Oliveira-Sequeira *et al*., 2002), in Australia 9.4% (Palmer *et al*., 2008), The variable prevalence may be attributed to climate conditions (Mohammad Mirzaei, 2010).

Age-wise and sex-wise cumulative prevalence (%) of protozoan diseases in dog are shown in Table 3. The highest prevalence of the diseases in dog was observed in the age of >1 year (54.10%), followed by ≤ 1 year (45.90%). Higher rate of Giardia infection was found in younger dog (22.95%) than older dog (19.67%). Coccidiosis was observed most common in younger animal (9.84%) than older animal (4.92%). But the prevalence of Amoebiasis and Balantidiasis was reported as higher in > 1 year of age than ≤ 1 year of age (Table 3). The study supported by Ramirez-Barrios *et al*. (2004); Visco *et al*. (1977) and Vanparijs *et al*. (1991) where they reported that the coccidia were the main intestinal protozoa found in the pet dogs, mostly in younger animals. Similar results were also obtained by Vanparijs *et al*. (1991). Coccidiosis is a cause of haemorrhagic diarrhea in young immuno-comprised dogs, which was appears to be prevalent to all age groups of dogs (Tarafder and Samad, 2010). Comparatively higher prevalence rate of canine coccidiosis has been reported

elsewhere (Nisar *et al*., 2009). Giardia has been also reported to be found in up to 39% of fecal samples from pet and shelter dogs, with a higher rate of infection in younger animals (The Merck Manual for pet health, edition July 2011) which was supported to the present study. But the prevalence of both Babesiosis and Leishmaniasis was 0% in ≤ 1 year of age and 1.64% in >1 year of age (Table 3) that was supported by Tarafder and Samad (2010) where they reported that higher rate of Babesiosis was observed in older dog (above 36 months of age) than younger dog (7 to 36 months of age) but none in the age group below 6 months old groups, and which were confirmatory to the earlier reports (Samad, 2008). However, the higher prevalence rate of Canine Babesiosis has been reported elsewhere (Kumar *et al*., 2009; Wu *et al*., 2009; Amuta *et al*., 2010).

Table 2. Prevalence of protozoan diseases of pet dogs in District Veterinary Hospital, Sirajganj

Name of the Diseases	**No. of total animal**	**No. of positive sample**	**Prevalence (%)**
Amoebiasis	61	16	26.23
Giardiasis	61	26	42.62
Coccidiosis	61	9	14.75
Balantidiasis	61	6	9.84
Toxoplasmosis	61	2	3.28
Leishmaniasis	61	1	1.64
Babesiosis	61	1	1.64
Total		61	100

Table 3. Age-wise and sex-wise cumulative prevalence (%) of protozoan diseases of dog

Name of Diseases	**≤ 1 year No (%)**	**>1 year No (%)**	**Total No (%)**	**Male No (%)**	**Female No (%)**	**Total No (%)**
Amoebiasis	5 (8.20)	11 (18.03)	16 (26.23)	9 (14.75)	7 (11.48)	16 (26.23)
Giardiasis	14 (22.95)	12 (19.67)	26 (42.62)	10 (16.39)	16 (26.23)	26 (42.62)
Coccidiosis	6 (9.84)	3 (4.92)	9 (14.75)	4 (6.56)	5 (8.20)	9 (14.75)
Balantidiasis	2 (3.28)	4 (6.56)	6 (9.84)	2 (3.28)	4 (6.56)	6 (9.84)
Toxoplasmosis	1 (1.64)	1 (1.64)	2 (3.28)	1 (1.64)	1 (1.64)	2 (3.28)
Leishmaniasis	0 (0.00)	1 (1.64)	1 (1.64)	1 (1.64))	0 (0.00)	1 (1.64)
Babesiosis	0 (0.00)	1 (1.64)	1 (1.64)	0 (0.00)	1 (1.64)	1 (1.64)
Total	45.90	54.10	100	27(44.26)	34 (55.74)	61 (100)

The highest prevalence of protozoan diseases in dog was observed in the female (55.74%) than male (44.26%) (Table 3). Higher rate of giardia, coccidia and balantidia infections was observed in female (26.23%, 8.20% and 6.56% respectively) than male (16.39%, 6.56% and 3.28%), respectively. But prevalence of amoebiasis was found as higher in male dog (14.75%) than female dog (11.48%) (Table 3). Similar results were also found by

Mohammad Mirzaei (2010) where he reported that the giardia and coccidia infection was higher in female than male. Prevalence is variable and depended on a number of factors including age, living conditions, diagnostic methodology employed and region studied (Mundim *et al.*, 2007). It may be attributed to climate conditions and management of pet animals rearing.

These results support the earlier works done in Bangladesh (Rahman, 1988, Tarafder and Samad, 2010). Tarafder and Samad (2010) reported that prevalence of clinical diseases and/or clinical conditions of 3670 sick pet dogs presented to the Central Veterinary Hospital (CVH), Dhaka where a total of 57 types of diseases and conditions in 17 categories were recorded in these pet dogs and their variation in prevalence were analyzed on the basis of age, gender, season and breeds of dogs. The highest prevalence of diseases and/or conditions was tick infestation (11.88%) followed by flea infestation (9.84%), ancylolostomiasis (6.20%), diarrhea (5.21%), dermatitis (4.99%), echinococcosis (3.92%), mange (3.76%), aspiration pneumonia (3.32%) and dermatomycosis (3.30%). They also reported that the prevalence of protozoan diseases (only Coccidiosis and Babesiosis) was 2.02%. They showed that diarrhea (5.21%) is not a disease itself but rather a symptom which was recorded in 191 pets among 3670 sick dogs; there are many causes of diarrhea but protozoan infection is one of the main causes. Tarafder and Samad (2010) was also observed that age-wise overall prevalence of clinical diseases revealed highest in older dogs that was in age group above 36 months (48.12%) compared to that in 7 to 36 months (34.33%) and up to 6 months (17.55%) age groups of pet dogs that was supported to the present study. Rahman (1988) observed highest prevalence rate of diseases of dog recorded in above 3 years of age groups (53.33%). In another study, he considered stray dogs in Bangladesh to be an important disseminator of zoonotic parasitism. The infective stages of protozoan parasites are cysts and oocysts passed in the faeces and are capable of prolonged survival in the environment. Infection and re-infection of human, domestic animals or wildlife can occur when the cysts or oocysts are ingested via contamination water, food materials or through host to host (Leonhard *et al*., 2007). Frequency of protozoan parasites in the studied dogs was high. *Giardia* spp, *Entamoeba* spp and *Coccidia* spp were the most frequent parasites found in the study area.

From the above discussion, it is concludated that the overall prevalence of protozoan diseases in pet dogs in Sirajganj district was high (22.42%). It was probable due to climatic condition and mismanagement of dog rearing. The prevalence of giardiasis (42.62%) was the highest among all the protozoan diseases. It was may be due to malabsorption, unhygienic kennel and mismanagement. Coccidiosis was most commonly observed in younger dog which may be due to age-factor, poor sanitation, poor nutrition and overcrowding/ stress. High rate of Entamoebia infection was found in this flood affected/disaster prone area which may be due to ingestion of infected food and water. The prevalence of protozoan diseases was observed higher in the age of >1 year (54.10%) than in the age of ≤ 1 year (45.90%). Female dogs showed the highest prevalence of diseases (55.74%) whereas male showed less (44.26%).That variances was probably due to variation in number of the animal's management factors of the owner. The study noticed that the dogs are reservoirs for zoonotic protozoan parasites and should be considered important to public health. Dogs may have an important role in the transmission of some diseases. So, preventive measures against intermediate host should be taken to prevent the transmission of protozoan diseases including vaccination program, sanitation measures and public awareness. This should be combined with more government intervention on regulations and policies in the area in order to limit the risk of contaminating the vegetation, and thus decreases both human infection and the animal reservoir.

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