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PREVALENCE OF CLINICAL DISEASES OF PET DOGS AND RISK PERCEPTION OF ZOONOTIC INFECTION BY DOG OWNERS IN BANGLADESH

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ABSTRACT

A case control study was conducted to ascertain the prevalence of clinical diseases and/or clinical conditions of 3670 sick pet dogs presented to the Central Veterinary Hospital (CVH), Dhaka during the one year period from January to December 2009. 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 prevalent diseases and/or conditions from low to high rates included glaucoma (0.05%), babesiosis (0.08%), sinusitis (0.08%), tetanus (0.08%), spaying (0.14%), nail injury (0.19%), nephritis (0.19%), cataract (0.25%), metritis (0.25%), poisoning (0.33%), orchitis (0.35%), rabies (0.35%), pus in antrum (0.41%), purulent cough (0.46%), alopecia (0.52%), pharyngitis (0.52%), transmissible venereal tumor (0.54%), cystitis (0.52%) phimosis (0.52%), paraphimosis (0.60%), stomatitis (0.63%), pneumonia (0.63%), mastitis (0.71%), otitis (0.73%), taeniasis (0.74%), abscess (0.82%), anal gland disease (0.82%), dystocia (0.84%), conjunctivitis (0.90%), lice infestation (0.90%), lameness (0.95%), ottorrhea (1.06%), uterine prolapse (1.31%), posthitis (1.31%), dental disorders (1.34%), metabolic diseases (1.36%), protrusion of eye ball (1.44%), canine distemper (1.61%), liver disease (1.72%), nutritional deficiency diseases (1.77%), infertility (1.80%), coccidiosis (1.93%), toxocariasis (1.93%), urinary tract infection (2.10%), accidental wounds (2.32%), haematuria (2.34%), bronchitis (2.81%), arthritis (2.94%), dermatomycosis (3.30%), aspiration pneumonia (3.32%), mange (3.76%), echinococcosis (3.92%), dermatitis (4.99%), diarrhea (5.21%), ancylolostomiasis (6.20%), flea infestation (9.84%) and tick infestation (11.88%). Age-wise overall prevalence of clinical diseases revealed significantly ($p < 0.05$) highest 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. The significantly ($p < 0.05$) highest prevalence of diseases and/or clinical conditions was recorded in local (33.35%) and German shepherd (22.53%) breeds of pet dogs in comparison to that in their counterpart breeds of Lhasa-Apso (7.57%), Greyhound (7.11%), Doberman (6.34%), Samoyed (6.23%), Dachshunds (5.20%), Spaniel (3.37%), Spitz (3.07%) and Poodle (3.18%). Results from season-wise analysis of overall prevalence of diseases and/or clinical conditions in pet dogs did not differ significantly ($p > 0.05$) among spring (21.53%), summer (25.80%), autumn (22.83%) and winter (29.84%). The highest prevalence of arthropode infestation (22.62%), followed by intestinal parasitic diseases (14.80%) and diarrhea (5.20%) suggest a poor husbandry of these pets in Dhaka. Results of this study indicate that the risk of zoonotic infection by canine intestinal parasite may be high in Bangladesh.

Key words: Pet dogs, clinical diseases, prevalence, zoonotic risk

INTRODUCTION

Dogs are the most successful canids, adapted to human habitation worldwide including Bangladesh. They have contributed to physical, social and emotional well-being of their owners, particularly children (Dohoo *et al*., 1998; Robertson *et al*., 2000). However, in spite of the beneficial effects, close bond between dogs and humans remain a major threat to public health, with dogs harboring a bewildering number of infective stages of disease causative agents transmissible to man and other domestic animals (Robertson *et al*., 2000; Molyneux, 2004). Furthermore, pet keeping is usually associated with certain responsibilities like housing, disease management and responsible for pet ownership with negative consequences for public health when neglected (William et al., 2002). Since pets 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, 2000). Therefore, the objective of this study was to determine the prevalence of clinical diseases in pet dogs presented to the Central Veterinary Hospital (CVH) in Dhaka for treatment and to assess the risk perception of zoonotic infection to their dog owners.

MATERIALS AND METHODS

The pet dogs used for this study were those presented at the Central Veterinary Hospital (CVH), Dhaka from January to December 2009. During the one year study period, a total of 3670 sick pet dogs were brought for treatment at the CVH. All the patients were first registered in the patient register book including date, age, sex, breed and complaint of the owners. Detailed clinical examination of each of the patient were carried out as described by Samad (2008), which included a complete medical history like family medical history, vaccination history, travel history, diet history, environmental history, birth history and potential source of intoxication.

Visual examination, pulse, respiration and rectal temperature recording and examination of the different organs and system of the body by using the clinical methods of palpation, percussion and auscultation were conducted. Mouth gag and local anesthesia were also used for clinical examination of the patients. Extension and flexion, needle puncture and otoscopy were also performed when required.

Samples considered significant for diagnostic purposes were collected. Faecal samples and skin scrapings were examined at the CHV, Dhaka. Blood and urine samples were collected for routine and specific examinations and were examined at the Central Disease Investigation Laboratory (CDIL), Dhaka. Where needed, owners were asked to perform X-ray examination from human radiologist to diagnose bone and chest diseases. Dead pet dogs were subjected to necropsy examination to record the gross lesions and collect samples for laboratory diagnosis.

Statistical analysis

Results are reported as percentage and the differences between the case and control groups for age, gender, season and breed were compared with X^2 analysis. All analyses were performed with standard software (SPSS, version 13.0, SPSS Inc, Chicago, III); values of $p < 0.05$ were considered significant.

RESULTS AND DISCUSSION

The different clinical and laboratory methods were used to study the prevalence of clinical diseases and disorders of pet dogs in Dhaka City Corporation during January to December 2009. A total of 57 types of diseases and disorders in 17 categories were recorded in 3670 sick pet dogs (Table 1). Table 1 details the age-wise and overall prevalence of clinical diseases in pet dogs. Table 2 shows breed-specific risks of clinical disorders for the 11 breeds of pet dogs, whereas Table 3 details the seasonality of clinical diseases and disorders in pet dogs. Overall prevalence of clinical diseases and disorders of pet dogs showed highest prevalence of arthropod infestation (22.62%), followed by internal parasites (14.80%), digestive disorders (10.22%), genital diseases (7.66%), musculoskeletal disorders (6.81%), respiratory disorders (6.70%), metabolic and nutritional deficiency diseases (3.13%), skin diseases (6.21%), urinary disorders (5.15%), Ear and eye disorders (4.44%), mange (3.76%), fungal diseases (3.30%), protozoan diseases (2.02%), viral diseases (1.96%), skin abscess (0.82%), poisoning (0.33%) and bacterial diseases (0.08%). These results support the earlier works made in Bangladesh (Rahman, 1988) and elsewhere (Harlett *et al*., 1983; William *et al*., 2002; Freeman *et al*., 2006; Meler *et al*., 2008).

Digestive disorders

Diarrhea (5.21%), pharyngitis (0.52%), stomatitis (0.63%), anal gland disease (0.82%), liver disease (1.72%) and dental disorders (1.34%) were recorded as clinical digestive disorders in pet dogs. The highest prevalence of diarrhea and stomatitis were recorded up to 6 months age group, and infection of the anal gland and dental disorders above 36 months of age groups in comparison to their respective age groups of dogs (Table 1).

Diarrhea (enteritis) is not a disease itself but rather a symptom which was recorded in 191 pet dogs. Clinically, it is characterized by passing of unformed, frequent and increased volume of stool. There are many causes of diarrhea which includes abnormal eating, sudden change in diet, food allergies, parasitic infestation, bacterial and viral infectious agents. Enteritis symptoms in dogs also include abdominal muscle cramps, fever, vomiting, dehydration and diarrhea. Canine enteritis is one of those diseases that need to be given proper and timely medical attention.

Pharyngitis is the inflammation of the walls of the pharynx which was recoded in 19 dogs. It is usually caused by exposure to variations of temperature, local irritant action of some foreign body, bacterial infections like Staphylococcal and Streptococcal organisms. Pharyngitis is clinically characterized by cough which is at first slight and dry, then moist and hoarse and followed by a discharge from the nose, there is little or no appetite, swallowing is difficult, the floor of the mouth is red, the tonsils are sometimes swollen, the flow of saliva is profuse, the throat is tender to the touch and when the part affected is touched the cough is excited.

Table 1. Age and system-wise prevalence of clinical diseases and/or conditions of pet dogs

S/N	Name of clinical diseases and conditions	Up to 6 months	7 – 36 months	> 36 months	Total
		No. (%)	No. (%)	No. (%)	No. (%)
①	Diarrhea (Enteritis)	67 (1.83)	46 (1.25)	78 (2.13)	191 (5.21)
②	Pharyngitis	06 (0.16)	05 (0.14)	08 (0.22)	019 (0.52)
③	Stomatitis	13 (0.35)	07 (0.19)	03 (0.08)	023 (0.63)
④	Anal gland disease	00 (0.00)	08 (0.22)	22 (0.60)	030 (0.82)
⑤	Liver disease	22 (0.60)	16 (0.44)	25 (0.68)	063 (1.72)
⑥	Dental disorders	04 (0.11)	12 (0.33)	33 (0.90)	049 (1.34)
I.	**Digestive disorders**	**112 (3.05)**	**94 (2.56)**	**169 (4.60)**	**375 (10.22)**
①	Aspiration pneumonia	17 (0.46)	47 (1.28)	58 (1.58)	122 (3.32)
②	Sinusitis	00 (0.00)	01 (0.03)	02 (0.05)	003 (0.08)
③	Bronchitis	04 (0.11)	21 (0.57)	56 (1.53)	081 (2.21)
④	Pneumonia	09 (0.25)	13 (0.35)	01 (0.03)	023 (0.63)
⑤	Purulent cough	00 (0.00)	09 (0.25)	08 (0.22)	017 (0.46)
II.	**Respiratory disorders**	**30 (0.82)**	**91 (2.48)**	**125 (3.41)**	**246 (6.70)**
①	Posthitis	00 (0.00)	21 (0.57)	27 (0.74)	048 (1.31)
②	Transmissible venereal tumor	00 (0.00)	04 (0.11)	16 (0.44)	020 (0.54)
③	Spaying	00 (0.00)	04 (0.11)	01 (0.03)	005 (0.14)
④	Orchitis	00 (0.00)	07 (0.19)	06 (0.16)	013 (0.35)
⑤	Metritis	00 (0.00)	02 (0.05)	07 (0.19)	009 (0.25)
⑥	Infertility	00 (0.00)	07 (0.19)	59 (1.61)	066 (1.80)
⑦	Paraphimosis	00 (0.00)	03 (0.08)	19 (0.52)	022 (0.60)
⑧	Phimosis	00 (0.00)	02 (0.05)	17 (0.46)	019 (0.52)
⑨	Dystocia	00 (0.00)	05 (0.14)	26 (0.71)	031 (0.84)
⑩	Uterine prolapse	00 (0.00)	08 (0.22)	40 (1.09)	048 (1.31)
III.	**Genital disorders**	**00 (0.00)**	**63 (1.72)**	**218 (7.66)**	**281 (7.66)**
IV.	**Bacterial disease (Tetanus)**	**03 (0.08)**	**00 (0.00)**	**00 (0.00)**	**003 (0.08)**
①	Rabies	00 (0.00)	05 (0.14)	08 (0.22)	013 (0.35)
②	Canine distemper	54 (1.47)	05 (0.14)	00 (0.00)	059 (1.61)
V.	**Viral diseases**	**54 (1.47)**	**10 (0.27)**	**08 (0.22)**	**072 (1.96)**
①	Toxocariasis	37 (1.01)	22 (0.60)	12 (0.33)	071 (1.93)
②	Ancylostomiasis	72 (1.96)	187 (5.10)	42 (1.14)	301 (6.20)
③	Echinococcosis	27 (0.74)	43 (1.17)	74 (2.02)	144 (3.92)
④	Taeniasis	05 (0.14)	08 (0.22)	14 (0.38)	027 (0.74)
VI.	**Heminthiasis**	**141 (3.84)**	**260 (7.08)**	**142 (3.87)**	**543 (14.80)**
①	Babesiosis	00 (0.00)	01 (0.03)	02 (0.05)	003 (0.08)
②	Coccidiosis	17 (0.46)	18 (0.49)	36 (0.98)	071 (1.93)
VII.	**Protozoan diseases**	**17 (0.46)**	**19 (0.52)**	**38 (1.04)**	**074 (2.02)**
①	Tick infestation	43 (1.17)	192 (5.23)	201 (5.48)	436 (11.88)
②	Flea infestation	61 (1.66)	142 (3.87)	158 (4.31)	361 (9.84)
③	Lice infestation	04 (0.11)	11 (0.30)	18 (0.49)	033 (0.90)
④	Mites (Mange)	02 (0.05)	50 (1.36)	86 (2.34)	138 (3.76)
VIII.	**External arthropods**	**110 (3.00)**	**395 (10.76)**	**463 (1262)**	**968 (26.38)**
①	Ottorrhea	05 (0.14)	22 (0.60)	12 (0.33)	039 (1.06)
②	Protrusion of eye ball	00 (0.00)	05 (0.14)	48 (1.31)	053 (1.44)
③	Cataract	00 (0.00)	02 (0.05)	07 (0.19)	009 (0.25)
④	Glaucoma	00 (0.00)	00 (0.00)	02 (0.05)	002 (0.05)
⑤	Otitis	03 (0.98)	11 (0.30)	13 (0.35)	027 (0.73)
⑥	Conjunctivitis	09 (0.25)	10 (0.27)	14 (0.38)	033 (0.90)

Table 1. Contd.

S/N	Name of clinical diseases and conditions	Up to 6 months	7 – 36 months	> 36 months	Total
		No. (%)	No. (%)	No. (%)	No. (%)
IX	**Ear and eye diseases**	**17 (0.46)**	**50 (1.36)**	**96 (2.62)**	**163 (4.44)**
①	Haematuria	00 (0.00)	31 (0.84)	55 (1.50)	086 (2.34)
②	Urinary tract infection	00 (0.00)	24 (0.65)	53 (1.44)	077 (2.10)
③	Cystitis	02 (0.05)	09 (0.25)	08 (0.22)	019 (0.52)
④	Nephritis	00 (0.00)	02 (0.05)	05 (0.14)	007 (0.19)
X.	**Urinary disorders**	**02 (0.05)**	**66 (1.80)**	**121 (3.30)**	**189 (5.15)**
①	Arthritis	04 (0.11)	18 (0.49)	86 (2.34)	108 (2.94)
②	Accidental wounds	39 (1.06)	21 (0.57)	25 (0.68)	085 (2.32)
③	Nail injury	01 (0.03)	02 (0.05)	04 (0.11)	007 (0.19)
④	Lameness	06 (0.16)	11 (0.30)	18 (0.49)	035 (0.95)
⑤	Pus in antrum	00 (0.00)	05 (0.14)	10 (0.27)	015 (0.41)
XI.	**Musculoskeletal disorders**	**50 (1.36)**	**57 (1.55)**	**143 (3.90)**	**250 (6.81)**
XII.	**Metabolic and nutritional diseases**	**54 (1.48)**	**39 (1.06)**	**22 (0.60)**	**115 (3.13)**
XIII.	**Poisoning**	**07 (0.19)**	**03 (0.08)**	**02 (0.05)**	**012 (0.33)**
①	Mastitis (Mammitis)	00 (0.00)	01 (0.03)	25 (0.68)	026 (0.71)
②	Dermatitis	28 (0.76)	62 (1.69)	93 (2.53)	183 (4.99)
③	Alopecia	04 (0.11)	07 (0.19)	08 (0.22)	019 (0.52)
XIV	**Skin disorders**	**32 (0.87)**	**70 (1.91)**	**126 (3.43)**	**228 (6.210**
XV	**Fungal diseases (Dematomycosis)**	**08 (0.22)**	**32 (0.87)**	**81 (2.21)**	**121 (3.30)**
XVI	**Abscess**	**07 (0.19)**	**11 (0.30)**	**12 (0.33)**	**030 (0.82)**
Overall		644 (17.55)	1260 (34.33)	1766 (48.12)*	3670 (100)

*significantly ($p<0.05$) higher

Stomatitis is the inflammation of the mucous lining of the mouth which may involve the checks, gum, tongue, lips and roof or floor of the mouth, which was recognized in 23 cases in pet dogs. It is usually recognized as a painful condition, associated with redness, swelling and occasional bleeding from the affected area.

Anal gland disease is a common problem in dogs which has been recorded in 30 pet dogs. The anal glands, also called anal sac can become impacted, infected and abscessed. The anal glands are located on either side of and slightly below the rectal (anal) opening and tend to express themselves naturally from the pressure during defecation. A tiny duct or tube leads from the gland under the skin to an opening directly beside the anus. Skunks discharge the secretion from these glands as a form of defensive while dog use it primarily for terristorial markings or as a form of communication. If for some reason the glands are being expressed insufficiently, bacteria will build and the glands will become infected. Clinically, it is characterized by licking or chewing around rectum, distressed behavior, smell a particular foul odor coming from the area, and the affected pets may lick the area 'scoot' along the floor or have problems with defecation. If the infection is left untreated an abscess will form and may rupture, causing serious problems for the pet.

Liver disease was recorded in 63 pet dogs by using a combination of history, physical examination, blood/ urine /fecal tests, coagulation profiles and diagnostic imaging tests as described by Anderson and Sevelins (2008). Clinically, liver disease is diagnosed by abnormalities like distended abdomen, pale mucous membranes, poor coat condition, dehydration, signs of jaundice, behavioral changes and/or neurological signs. However, liver is an amazing organ with a large reserve capacity, upwards of 70% of functional liver cells must be damaged before liver failure occurs.

Dental diseases in dogs is one of the most overlooked health problems that they face which has been recorded in 49 cases in pet dogs (Table 1).

Respiratory disorders

Aspiration pneumonia was recorded in 122 (3.22%) pet dogs which is an inflammatory lung disorder that occurs when dog inhales a foreign substance. This most commonly occurs with disorders that cause regurgitation or vomiting. In addition, neuromuscular disorders that cause difficulty swallowing or paralysis of the esophagus can also lead to aspiration pneumonia. Clinical diagnosis is based on history and clinical first signs of coughing, unwillingness to exercise, fever, depression, loss of appetite and nasal discharge.

Sinusitis is the inflammation of the sinuses which was recorded only in three (0.08%) pet dogs. Sinusitis is usually caused by inflammation from infectious agents and also resulting from allergies, dental abscesses or from an inhaled foreign object which creates nasal congestion. Clinically, characterized by sneezing and nasal discharge and sometimes affected dogs paw at their faces to relieve nasal itching or breathe through their mouth because of nasal congestion.

Bronchitis is the inflammation of the bronchioles which was recorded in 81 (2.21%) cases and characterized by coughing, tachypnea, shortness of breath, intermittent gagging, wheezing, anorexia, depression and fever. The cough is worsened by exercise and severely affected dogs become cyanotic (blue-tinge to gums and tongue) with exertion.

Pneumonia was recoded in 23 (0.63%) pet dogs which is clinically characterized by frequent coughing with mucous secretions, nasal discharges, difficulty in breathing, fever, wheezing or panting, loss of appetite, lethargy, that is, dog with pneumona had have rapid, labored breathing and abnormal lung sounds.

Genital disorders

Posthitis has been recorded in 48 (1.31%) dogs which usually caused by disruption in the integumentary system such as a wound or intrusion of a foreign bodies. The dogs with this condition behaved normally with exception of excessive licking at the prepuce and a yellow green, pus-like discharge was usually present.

Canine transmissible veneral tumor (CTVT) also called transmissible veneral tumor (TVT), Canine transmissible veneral sarcoma (CTVS) which was recoded in 20 (0.54%) pet dogs. It is transmitted from animal to animal during copulation. The tumor cells are themselves the infectious agents and the tumor that form are not genetically related to the host dog. In male dogs, the tumor affects the penis or prepuce whereas in females it affects the vagina or labia. It has been reported from many regions of the world including Bangladesh (Bari *et al*., 1983) and is a naturally occurring contagious round cell tumor of dogs (Park *et al*., 2006).

Orchitis is an inflammatory condition of the testes or testicles which was diagnosed in 13 (0.35%) pet dogs (Table 1). It is commonly caused by a bacterial infection where the bacteria enter the testes via the urine, prostatic secretions, blood, mucous membranes or trauma like a puncture wound. Other infectious agents that have been reported to cause orchitis include canine distemper virus, fungal infection (blastomycosis and coccidioidomycosis) and tick borne diseases (ehrlichiosis and rocky mountain spotted fever). Clinically characterized by sudden pain, scrotal swelling, lethargy and reluctance to stand or walk.

Metritis is the medical term used to describe inflammation of the uterus which was recorded in only seven (0.19%) dogs. Metritis is most often a bacterial uterine infection that develops in the immediate post-partum period and occasionally after abortion or breeding. Clinically characterized by fever, dehydration, depression, decreased appetite, vomiting, diarrhea, fast heart rate and vulvular discharge. Simple X-ray or an ultrasound may show the retained tissue or fluid in the uterus and culture of vaginal discharge of the female dogs confirmed the diagnosis.

Paraphymosis refers to the presence of an engorged (distended) penis that can not be retracted into it's normal position because of constriction of the preputial orifice which was recorded in 22 (0.60%) pet dogs. It is usually associated with erection or copulation. Hair surrounds the preputial orifice and can become entangled around the base of the penis, forming a restrictive band which then prevents restriction of the penis. A stenotic or narrowed preputial opening, and acquired secondary to injury, penis fracture, a foreign body (e.g. rubber band), persistent abnormal erection (priapism), neoplasia and inflammation of the penis and prepuce have been reported to be associated with this condition need to be investigated under local condition.

Phimosis in a constriction of the orifice of the prepuce so that it can not be drawn back over the glands, which was recorded in 19 (0.52%) cases of pet dogs (Table 1). It is primarily associated with congenital preputial stenosis and secondary to inflammation, edema (accumulation of fluid within the penis), neoplasia or scar tissue, and also persistent penile or preputial frenulum (thin band of tissue joining the penis and prepuce). Clinically characterized by unsuccessful attempt to copulate, inability to urinate with pooling of urine in the preputial cavity, dribbling urine, excessive licking of an exteriorized penis and finally necrosis or trauma of the penis and obstruction of urine flow.

Dystocia is the medical term used to diagnose a difficult birthing experience which may occur as a result of maternal or fetal factors and can occur during any stage of labor, and it was recorded in 31 (0.84%) cases in dogs (Table 1). Dystocia in dog has been recognized by (a) gestation lasting longer than 70 days, (b) stage 1 labor

lasting longer than 24 hours, (c) 20 minutes of intense labor without birth, (d) straining of 10 minutes if a fetus or a fluid filled bubbles is visible in the birth canal, (e) sudden discharge from the vagina of bright red blood lasting longer than 10 minutes and (f) thick, black, foul smelling discharge from the vagina.

Uterine prolapse is the protrusion of the uterus through the cervix from its normal position in the pelvic cavity into the vaginal canal and this condition was recorded in 48 (1.31%) cases of dogs (Table 1).

Bacterial diseases

Tetanus is very rare in dogs and dogs have been shown to be quite resistant to the *Clostridium tatani* toxin. However, rare cases usually affect dogs with injuries around the mouth or pups that are teething. This study recoded only three cases (0.08%) of tetanus in dogs up to 6 months of age (Table 1).

Viral diseases

Rabies is an important zoonotic disease worldwide including Bangladesh (Biswas *et al*., 1996) and approximately 90% of human cases result from dog bites in Indo-Bangladesh sub-continent. This study recorded 13 (0.35%) rabies cases in pet dogs which indicate the potential risk to pet owners. Almost all human deaths caused by rabies originating from Asia and Africa, and there are an estimated 55,000 human deaths annually from rabies worldwide, with about 31000 in Asia and 24,000 in Africa (Samad, 2008).

Canine distemper (CD) is worldwide distributed disease in which young dogs are more susceptible to the distemper virus than are more mature dogs (Samad, 2008). This observation is in confirmatory with our results of highest prevalence rate (1.47%, n=54) in dogs up to 6 months of age in comparison to 7 to 36 months (0.14%, n= 5) and above 36 months (0.0%, n=0) age groups of dogs. However, CD presents as a relatively mild disease with either no clinical signs or non-specific signs such as fever, depression, enlarged tonsils or weight loss.

Helminthiasis

Canine toxocariasis is a zoonotic parasitic disease, caused by *Toxocara canis*, which was recorded in 71 (1.93%) pet dogs and the highest infection rate was recoded in dogs up to 6 months groups (1.01%), followed by 7 to 36 months (0.60%) and above 36 months (0.33%) age groups of dogs (Table 1).

Canine ancylostomiasis (Hookworm disease) was diagnosed on microscopic detection of thin-shelled, morulated eggs in feces of 6.20% pet dogs. Significantly ($p < 0.01$) high rate of hookworm disease was recorded in 7 to 36 months (5.10%) in comparison to up to 6 months (1.96%) and above 36 months (1.14%) age groups of dogs (Table 1). Hookworm parasites of dog are in great importance for dog as well as for human because their ability to be a zonoosis. Dogs may become infected with hookworms by four routes: orally, through the skin, through the mother's placenta and through the mother's milk. Finding hookworm eggs during microscopic examination of a stool sample is diagnostic for the parasite.

Canine echinococcosis was diagnosed on microscopic fecal examination of characteristic small parasites and its eggs in 144 (3.92%) pet dogs, of which significantly ($p > 0.05$) highest rate of infection was recorded in dogs above 36 months (2.02%) in comparison to 7 to 36 months (1.17%) and up to 6 months (0.74%) age groups of dogs (Table 1). However, the higher rate of echinococcosis has been reported in stray dogs in Bangladesh and elsewhere (Gusbi, 1987; Molan and Saida, 1989). These results support the earlier reports on the occurrence of *Echinococcus granulosus* of dogs in Bangladesh (Islam, 1980 and 1983).

Taneniasis was diagnosed by demonstration of the characteristic Taenia eggs in the stool of 0.74% pet dogs (Table 1) and all the investigated 11 breeds of pet dogs had infection with this tapeworm (Table 2). No seasonal influence was observed on the prevalence of Taenia parasites in pet dogs. These observations support the earlier reports on taeniasis of street dogs in Bangladesh (Karim *et al*., 1981).

These findings on the occurrence of heminthiasis in pet dogs support the earlier report on the incidence of helminth parasites of zoonotic significance in street dogs in some districts of Bangladesh (Rahman, 1973) and elsewhere (Anene, 1996; Menelaos and Smaragda, 2006; Katagiri and Oliveira-Sequeira, 2008).

Protozoan diseases

Canine babesiosis is caused by two types of organisms, *Babesia canis* (large form) and *Babesia gibsoni* (small form), cause sudden destruction of erythrocytes known as acute hemolyic anemia in dogs. Only three cases (0.08%) of clinical babesiosis were recorded in pet dogs, of which two (0.05%) cases in dogs above 36 months groups, one case (0.03%) in dogs aged between 7 to 36 months but none in the age group below 6 months old groups (Table 1) which are 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. Breed-wise prevalence of clinical diseases and/or conditions of pet dogs

S/N	Diseases	German shepherd	Local	Dober-man	Sam-oyed	Lhasa-Apso	Poodle	Grey-hound	Boxer	Spaniel	Dach-shunds	Spitz	Total No. (%)
1	Diarrhea	23	21	08	12	16	08	25	17	17	13	31	191 (5.20)
2	Pharyngitis	03	02	03	01	02	01	01	01	00	01	04	019 (0.52)
3	Stomatitis	04	02	02	01	01	03	01	01	03	04	01	023 (0.63)
4	Anal gland disease	07	11	05	03	01	00	01	00	00	01	01	030 (0.82)
5	Liver disease	12	08	10	07	06	04	07	01	02	03	03	063 (1.72)
6	Dental disorders	09	19	01	04	02	01	01	03	09	00	00	049 (1.34)
I	**Digestive disorders**	**58**	**63**	**29**	**28**	**28**	**17**	**36**	**23**	**31**	**22**	**40**	**375 (10.22)**
1	Asp. pneumonia	22	46	09	00	00	18	10	01	09	07	00	122 (3.32)
2	Sinusitis	01	01	00	00	00	00	00	00	00	01	00	003 (0.08)
3	Bronchitis	11	21	15	02	09	03	08	01	05	04	02	081 (2.21)
4	Pneumonia	11	07	01	01	01	02	00	00	00	00	00	023 (0.63)
5	Purulent cough	07	05	01	01	00	01	01	00	01	00	00	017 (0.46)
II	**Respiratory disor.**	**52**	**80**	**26**	**04**	**10**	**24**	**19**	**02**	**15**	**12**	**02**	**246 (6.70)**
1	Posthitis	07	27	06	01	02	00	03	00	00	01	01	048 (1.31)
2.	Transmissible[1]	06	07	03	00	01	00	01	00	02	00	00	020 (0.54)
3.	Spaying	00	01	00	01	01	01	01	00	00	00	00	005 (0.14)
4	Orchitis	01	04	01	02	02	01	02	00	00	00	00	013 (0.35)
5	Metritis	01	02	00	01	01	00	01	00	01	00	02	009 (0.25)
6	Infertility	12	27	01	03	06	03	11	01	00	01	01	066 (1.80)
7	Paraphimosis	05	10	01	01	01	00	04	00	00	00	00	022 (0.60)
8	Phimosis	02	04	00	01	04	02	03	00	03	00	00	019 (0.52)
9	Dystocia	11	09	01	02	04	00	00	03	00	00	01	031 (0.84)
10	Uterine prolapse	10	32	00	00	00	00	00	00	00	00	00	048 (1.31)
III	**Genital disorders**	**55**	**123**	**13**	**12**	**22**	**07**	**32**	**04**	**06**	**02**	**05**	**281 (7.66)**
IV	**Tetanus**	**00**	**01**	**00**	**00**	**02**	**00**	**00**	**00**	**00**	**00**	**00**	**003 (0.08)**
1	Rabies	05	06	01	00	00	00	00	00	00	00	01	013 (0.35)
2	Canine distemper	08	05	03	05	07	02	06	02	08	09	04	059 (1.61)
V	**Viral diseases**	**13**	**11**	**04**	**05**	**09**	**02**	**06**	**02**	**08**	**09**	**05**	**072 (1.96)**
1	Toxocariasis	09	12	08	07	06	02	05	01	08	10	03	071 (1.93)
2	Ancylostomiasis	51	103	33	32	06	17	21	03	07	19	09	301 (8.20)
3	Echinococcosis	26	76	06	05	07	01	04	02	03	13	01	144 (3.92)
4	Taeniasis	03	09	01	04	03	01	01	01	01	02	01	027 (0.74)
VI.	**Heminthiasis**	**89**	**200**	**48**	**48**	**22**	**21**	**31**	**07**	**19**	**44**	**14**	**543 (14.80)**
1	Babesiosis	01	01	00	00	01	00	00	00	00	00	00	003 (0.08)
2	Coccidiosis	17	19	00	05	10	00	09	00	03	08	00	071 (1.93)
VII	**Protozoan diseases**	**18**	**20**	**00**	**05**	**11**	**00**	**09**	**00**	**03**	**08**	**00**	**074 (2.02)**
1	Tick infestation	112	184	19	14	33	07	24	08	09	17	09	436 (11.88)
2	Flea infestation	120	103	15	26	21	06	23	02	01	39	05	361 (9.84)
3	Lice infestation	15	09	00	01	01	00	01	00	05	00	01	033 (0.90)
4	Mites (Mange)	30	67	02	07	10	00	04	02	00	15	01	138 (3.75)
VIII.	**Arthropods**	**277**	**370**	**36**	**48**	**65**	**13**	**52**	**12**	**15**	**71**	**16**	**968 (26.38)**
1	Ottorrhea	15	16	03	01	01	02	00	00	01	00	00	039 (1.06)
2	Protrusion of[2]	10	23	01	04	07	00	07	00	01	00	00	053 (1.44)
3	Cataract	01	05	00	00	00	01	02	00	00	00	00	009 (0.25)
4	Glaucoma	01	01	00	00	00	00	00	00	00	00	00	002 (0.05)
5	Otitis	16	00	01	00	02	01	00	00	03	01	03	027 (0.74)
6	Conjunctivitis	03	08	07	02	05	04	01	00	03	00	00	033 (0.90)
IX	**Ear and eye dis.**	**46**	**53**	**12**	**07**	**15**	**08**	**10**	**00**	**08**	**01**	**03**	**163 (4.44)**
1	Haematuria	29	43	05	00	01	02	05	00	01	00	00	086 (2.34)
2	Urinary infection	04	29	02	11	21	01	07	00	00	01	01	077 (2.10)
3	Cystitis	03	07	01	03	02	00	01	00	00	01	01	019 (0.52)
4	Nephritis	01	02	01	01	00	00	00	00	00	01	01	007 (0.19)
X.	**Urinary disorders**	**37**	**197**	**21**	**25**	**24**	**03**	**13**	**00**	**01**	**03**	**03**	**189 (5.15)**
1	Arthritis	14	47	10	07	08	06	02	01	01	03	09	108 (2.94)
2	Accidental wounds	21	33	02	03	12	02	04	07	01	00	00	085 (2.32)
3	Nail injury	03	02	00	00	00	01	01	00	00	00	00	007 (0.19)
4	Lameness	15	05	02	03	05	00	00	04	01	00	00	035 (0.95)
5	Pus in antrum	00	08	02	00	00	00	01	00	00	00	04	015 (0.41)

Table 2. Contd.

S/N	Diseases	German shepherd	Local	Dober-man	Sam-oyed	Lhasa-Apso	Poodle	Grey-hound	Boxer	Spaniel	Dach-shunds	Spitz	Total No. (%)
XI.	**Musculoskeletal[3]**	**53**	**95**	**16**	**13**	**25**	**09**	**08**	**12**	**03**	**03**	**13**	**250 (6.81)**
XII.	**Metabolic[4]**	**42**	**19**	**03**	**11**	**11**	**03**	**07**	**08**	**03**	**01**	**07**	**105 (3.13)**
XIII.	**Poisoning**	**06**	**04**	**00**	**00**	**01**	**00**	**00**	**01**	**00**	**00**	**00**	**012 (0.33)**
1	Mastitis	03	07	04	01	05	02	01	00	00	03	00	026 (0.71)
2	Dermatitis	53	49	21	17	14	04	12	01	02	07	03	183 (4.99)
3	Alopecia	07	05	01	00	01	01	00	01	02	00	01	019 (0.52)
XIV	**Skin disorders**	**63**	**61**	**26**	**18**	**20**	**07**	**13**	**02**	**04**	**10**	**04**	**228 (60.21)**
XV	**Dematomycosis**	**17**	**49**	**10**	**03**	**09**	**02**	**20**	**00**	**07**	**03**	**01**	**121 (3.30)**
XVI	**Abscess**												
Overall		827*	1224*	233	229	278	117	261	73	124	191	113	3670 (100)

[1]Transmissible venereal tumor, [2]Protrusion of the eyeball, [3]Musculoskeletal disorders, [4]Metabolic and nutritional deficiency diseases
*Significantly ($p<0.05$) higher

Table 3. Season-wise prevalence of clinical diseases and conditions of pet dogs, No. (%)

S/N	Diseases and conditions	Spring	Summer	Autumn	Winter	Total
1	Diarrhea (Enteritis)	48 (1.31)	33 (0.90)	46 (1.25)	64 (1.74)	191 (5.20)
2	Pharyngitis	04 (0.11)	01 (0.03)	05 (0.14)	09 (0.25)	019 (0.52)
3	Stomatitis	03 (0.08)	07 (0.19)	06 (0.16)	07 (0.19)	023 (0.63)
4	Anal gland disease	08 (0.22)	05 (0.14)	05 (0.14)	12 (0.33)	030 (0.82)
5	Liver disease	11 (0.30)	10 (0.27)	17 (0.46)	25 (0.68)	063 (1.72)
6	Dental disorders	11 (0.30)	13 (0.35)	09 (0.25)	16 (0.44)	049 (1.34)
I	**Digestive disorders**	**85 (2.32)**	**69 (1.88)**	**88 (2.40)**	**133 (3.62)**	**375 (10.22)**
1	Aspiration pneumonia	29 (0.79)	24 (0.65)	27 (0.74)	42 (1.14)	122 (3.22)
2	Sinusitis	00 (0.00)	00 (0.00)	00 (0.00)	03 (0.08)	003 (0.08)
3	Bronchitis	25 (0.68)	14 (0.65)	13 (0.35)	29 (0.79)	081 (0.63)
4	Pneumonia	09 (0.25)	00 (0.00)	05 (0.14)	09 (0.25)	023 (0.63)
5	Purulent cough	04 (0.11)	05 (0.14)	04 (0.11)	04 (0.11)	017 (0.46)
II	**Respiratory disorders**	**67 (1.83)**	**43 (1.17)**	**49 (1.34)**	**87 (2.37)**	**246 (6.70)**
1	Posthitis	02 (0.05)	01 (0.03)	27 (0.74)	18 (0.49)	048 (1.31)
2	Transmissible venereal tumor	00 (0.00)	00 (0.00)	11 (0.30)	09 (0.25)	020 (0.54)
3	Spaying	04 (0.03)	02 (0.05)	02 (0.05)	00 (0.00)	005 (0.14)
4	Orchitis	04 (0.11)	03 (0.08)	04 (0.11)	02 (0.05)	013 (0.35)
5	Metritis	02 (0.05)	01 (0.03)	03 (0.08)	03 (0.08)	009 (0.25)
6	Infertility	14 (0.38)	14 (0.38)	28 (0.76)	10 (0.27)	066 (1.80)
7	Paraphimosis	00 (0.00)	00 (0.00)	09 (0.25)	13 (0.35)	022 (0.60)
8	Phimosis	00 (0.00)	00 (0.00)	09 (0.25)	10 (0.27)	019 (0.52)
9	Dystocia	03 (0.08)	00 (0.00)	07 (0.19)	21 (0.57)	031 (0.84)
10	Uterine prolapse	10 (0.27)	00 (0.00)	05 (0.14)	33 (0.90)	048 (1.31)
III.	**Genital disorders**	**36 (0.98)**	**21 (0.57)**	**105 (2.86)**	**119 (3.26)**	**281 (7.66)**
IV	**Tetanus**	**01 (0.03)**	**01 (0.03)**	**01 (0.03)**	**00 (0.00)**	**003 (0.08)**
1	Rabies	01 (0.03)	09 (0.25)	02 (0.05)	01 (0.03)	013 (0.35)
2	Canine distemper	21 (0.57)	04 (0.11)	08 (0.22)	26 (0.71)	059 (1.61)
V.	**Viral diseases**	**22 (0.60)**	**13 (0.35)**	**10 (0.27)**	**27 (0.74)**	**072 (1.96)**
1	Toxocariasis	10 (0.27)	14 (0.38)	11 (0.30)	36 (0.98)	071 (1.93)
2	Ancylostomiasis	27 (0.74)	132 (3.60)	79 (2.15)	63 (1.72)	301 (8.20)
3	Echinococcosis	13 (0.35)	56 (1.53)	33 (0.90)	42 (1.14)	144 (3.92)
4	Taeniasis	08 (0.22)	06 (0.16)	06 (0.16)	07 (0.19)	027 (0.74)
VI.	**Heminthiasis**	**58 (1.58)**	**208 (5.67)**	**129 (3.51)**	**148 (4.03)**	**543 (14.80)**
1	Babesiosis	01 (0.03)	01 (0.03)	01 (0.03)	00 (0.00)	003 (0.08)
2	Coccidiosis	21 (0.57)	07 (0.19)	16 (0.44)	27 (0.74)	071 (1.93)

Table 3. Contd.

S/N	Diseases and conditions	Spring	Summer	Autumn	Winter	Total
VII	**Protozoan diseases**	**22 (0.60)**	**08 (0.22)**	**17 (0.46)**	**27 (0.74)**	**074 (2.02)**
1	Tick infestation	89 (2.43)	162 (4.41)	59 (1.61)	126 (6.46)	436 (11.88)
2	Flea infestation	92 (2.51)	85 (2.32)	67 (1.83)	117 (3.19)	361 (9.84)
3	Lice infestation	04 (0.11)	04 (0.11)	08 (0.22)	17 (0.46)	033 (0.90)
4	Mites (Mange)	29 (0.79)	31 (0.84)	57 (1.55)	21 (0.57)	138 (3.76)
VIII	**External arthropods**	**214 (5.83)**	**282 (7.68)**	**191 (5.20)**	**281 (7.66)**	**968 (26.38)**
1	Ottorrhea	09 (0.25)	18 (0.49)	06 (0.16)	06 (0.16)	039 (1.06)
2	Protrusion of eye ball	15 (0.41)	22 (0.60)	11 (0.30)	05 (0.14)	053 (1.44)
3	Cataract	05 (0.14)	03 (0.08)	01 (0.03)	00 (0.00)	009 (0.25)
4	Glaucoma	01 (0.03)	01 (0.03)	00 (0.00)	00 (0.00)	002 (0.05)
5	Otitis	09 (0.25)	05 (0.14)	06 (0.16)	07 (0.19)	027 (0.73)
6	Conjunctivitis	11 (0.30)	05 (0.14)	09 (0.25)	08 (0.22)	033 (0.90)
IX	**Ear and eye diseases**	**50 (1.36)**	**54 (1.47)**	**33 (0.90)**	**26 (0.71)**	**163 (4.44)**
1	Haematuria	22 (0.60)	37 (1.01)	16 (0.44)	11 (0.30)	086 (2.34)
2	Urinary tract infection	20 (0.54)	12 (0.33)	25 (0.68)	20 (0.54)	077 (2.10)
3	Cystitis	03 (0.08)	09 (0.25)	04 (0.11)	03 (0.08)	019 (0.52)
4	Nephritis	01 (0.03)	03 (0.08)	03 (0.08)	00 (0.00)	007 (0.19)
X.	**Urinary disorders**	**46 (1.25)**	**61 (1.66)**	**48 (1.31)**	**34 (0.93)**	**189 (5.15)**
1	Arthritis	29 (0.79)	25 (0.68)	21 (0.57)	33 (0.90)	108 (2.94)
2	Accidental wounds	12 (0.33)	27 (0.74)	13 (0.35)	33 (0.90)	085 (2.32)
3	Nail injury	01 (0.03)	03 (0.08)	01 (0.03)	02 (0.05)	007 (0.19)
4	Lameness	07 (0.19)	01 (0.03)	08 (0.22)	19 (0.52)	035 (0.95)
5	Pus in antrum	03 (0.08)	03 (0.08)	05 (0.14)	04 (0.11)	015 (0.41)
XI.	**Musculoskeletal disorders**	**52 (1.42)**	**59 (1.61)**	**48 (1.31)**	**91 (2.48)**	**250 (6.81)**
XII.	**Metabolic and nutritional**	**40 (1.06)**	**22 (0.60)**	**20 (0.54)**	**33 (0.90)**	**115 (3.13)**
XIII.	**Poisoning**	**04 (0.11)**	**04 (0.11)**	**02 (0.05)**	**02 (0.05)**	**012 (0.33)**
1	Mastitis (Mammitis)	04 (0.11)	11 (0.30)	05 (0.14)	06 (0.16)	026 (0.71)
2	Dermatitis	47 (1.28)	40 (1.09)	56 (1.53)	40 (1.09)	183 (4.99)
3	Alopecia	05 (0.14)	05 (0.14)	04 (0.11)	05 (0.14)	019 (0.52)
XIV	**Skin disorders**	**56 (1.53)**	**56 (1.53)**	**65 (1.77)**	**51 (1.39)**	**228 (6.21)**
XV	**Dematomycosis**	**30 (0.82)**	**39 (1.06)**	**23 (0.63)**	**29 (0.79)**	**121 (3.30)**
XVI	**Abscess**	**07 (0.19)**	**07 (0.19)**	**09 (0.25)**	**07 (0.19)**	**030 (0.82)**
Overall		790 (21.53)	947 (25.80)	838 (22.83)	1095 (29.84)	3670 (100)

Canine intestinal coccidiosis is a cause of haemorrhagic diarrhea in young immuno-comprised dogs, which was diagnosed in 71 (1.93%) pet dogs which appears to be prevalent to all age groups of dogs (Table 1). Comparatively higher prevalence rate canine coccidiosis has been reported elsewhere (Nisar *et al*., 2009).

Arthropod diseases

The most common forms of external parasites of dogs are usually lice, fleas, ticks and mites. This study recorded 11.88% dogs infested with ticks, 9.84% with flea, 0.90% with lice and 3.76% with different types of mange (Table 1). It appears from the Table 1 that all age groups of dogs are affected with lice, tick, flea and mites but only mange mites showed significantly ($p > 0.05$) higher prevalence in dogs above 36 months (2.34%) in comparison to aged between 7 to 36 months (1.36%) and up to 6 months (0.05%) age groups (Table 1). However, higher prevalence rate of fleas and mange mites have been reported elsewhere (Rodriguez-Vivas *et al*., 2003; Durden *et al*., 2005) who reported *Demodex canis* (23.0%) as a most frequent mite, followed by *Sarcoptes scabei var* canis (7.0%) and *Otodectes cynotis* (3.5%) in Mexico. Seasonal frequency of ectoparasites infestations has also been reported (Shoorijeh *et al*., 2008).

Ear and eye diseases

Protrusion of the eyeball was recorded in 53 (1.44%) cases of pet dogs and its incidence was significantly ($p < 0.01$) highest in above 36 months old dogs (1.31%; n = 48) in comparison to 7 to 36 months (0.14%; n = 5) and up to 6 months (0.0%; n = 0) old groups of dogs (Table 1). Protrusion of the eyeball from its socket is usually the result of direct violence received in fighting. This occasionally happens from the bite of a larger dog, and eye is forced out of the socket and the lid contracts around it and prevents its return.

Cataract formation is one of the most prevalent eye diseases in the dog population and this study recorded 9 (0.25%) cases of cataract in pet dogs, and its occurrence was significantly highest in above 36 months old dogs (0.19 ; n = 9) in comparison to young dogs aged between 7 to 36 months (0.05% ; n = 2) whereas it was not recorded in growing dogs up to 6 months of age (Table 1). These results are in conformity with the earlier findings of Williams *et al.* (2004) and Gelatt and Mackay (2005) who reported the age-related cataract in the dogs. Of the 11 breeds of dogs examined, of which only four breeds had cataract which include German shepherd (0.03%), Local (0.14%), Poodle (0.03%) and Greyhound (0.05%). This observation supports the reports of Williams *et al*. (2004), Gelatt and Mackay (2005) and Kraijer-Huver *et al*. (2008) who reported that the prevalence of cataract is influenced by age, breeds and genetic status of animals.

Glaucoma is the abnormally high pressure in the eye. Inside the normal eye there is constant production and drainage of a watery fluid called aqueous humor. When there is a problem with the drainage of the fluid, the pressure within the eye can increase, and high pressure causes damage to the optic nerve, which in turn, causes vision loss. During this study period only two cases (0.05%) of glaucoma were recorded in old dogs aged above 36 months (Table 1). However, glaucoma may be classified as primary and secondary. Primary glaucoma occurs without previous trauma or ocular disease and will eventually affect both eyes. Secondary glaucoma is a consequence of some other disease, such as ocular inflammation, lens dislocation, intraocular tumors or trauma.

Otitis is an inflammation of the ear and it is one of the most frequent condition occur in dogs, which has been recorded in 27 (0.73%) pet dogs and all age groups are shown to be susceptible with this condition (Table 1). The main causes associated with canine otitis have been reported as allergies such as inhalant allergy and food allergy, parasites such as ear mites, endocrine diseases such as hypothyroidism, auto-immune diseases like lupus and tumors.

Conjunctivitis is the inflammation of the conjunctiva recorded in 33 (0.90%) cases of pet dogs and it was found in all age groups of dogs (Table 1).

Urinary diseases

Haematuria (n = 86), urinary tract infection (n = 77), cystitis (n = 19) and nephritis (n = 7) were recorded in pet dogs. Although the prevalence of urinary tract disease was found significantly ($p < 0.01$) highest in dogs above 36 months old (3.30%; n = 121) in comparison to growing dogs up to 6 months (0.05%; n = 2) and young dogs between 7 to 36 months (1.80%; n = 66) age groups (Table 1).

Musculo-skeletal disorders

Among the prevalence of musculoskeletal conditions, arthritis (2.94%) was found highest, followed by accidental wound (2.32%), lameness (0.95%), pus in antrum (0.41%) and lowest as nail injury (0.19%).

Metabolic and nutritional deficiency diseases

Both metabolic (1.36%) and nutritional deficiency (1.77%) diseases were recoded in pet dogs (Table 1) but the specific etiology and types are not evaluated in this clinical study. However, diabetes mellitus, cushing's disease, addison's disease, hypothyroidism, hyperparathyroidism and eclampsia are the reported metabolic disorders in canines.

Poisoning

Twelve (0.33%) suspected poisoning cases were recorded in dogs, of which 0.19% in up to 6 months old, 0.08% aged between 7 to 36 months and 0.05% in above 36 months old groups of dogs (Table 1).

Skin diseases

Skin diseases were recorded in 6.21% pet dogs which include mammitis (0.71%), dermatitis (4.99%) and alopecia (0.52%). The overall prevalence of skin diseases was recorded highest in dogs above 36 months (3.43%), followed by 7 to 36 months (1.91%) and lowest in dogs up to 6 months (0.87%) aged groups (Table 1).

Alopecia is the complete or partial lack of hair in any area of the skin where hair would normally be found. It may be caused by self-trauma by scratching or chewing hair follicle diseases that cause the hair to fall out or the failure of hair to grow after normal loss.

Fungal diseases

Dermatomycosis (ringworm) was diagnosed on the basis of clinical findings and microscopic examination of the scrapings of the skin lesions and 3.30% dogs were found to be affected with ringworm, and all age groups are found susceptible to this disease (Table 1). In the past, because of the circular lesions made by the fungi they were thought to be caused by worms, hence the name ringworm. The main six clinical signs may be used for the field diagnosis of ringworm which include: (a) A hairless, small, round lesion has formed on the dog, (b) The skin in the center of the lesion has become scaly, (c) Small pustules form on the surface of the sore, (d) The lesion may start out small but can continue to grow, (e) The sore may or may not be itchy and (f) Lesions are most common on the head, but may also form on the legs, tail and feet.

The present study provides the first systematic assessment on quantitative estimates of clinical diseases and conditions in 11 breeds of pet dogs of Bangladesh. The results show that ectoparasites and intestinal helminth species are widely prevalent health problems in dogs. The parasites recorded in this study have been previously documented in dogs throughout the world (Samad, 2008) including Bangladesh (Samad, 2000), with a pronounced difference in prevalence and density among the regions. Considering the high prevalence of ectoparasites and intestinal helminth infections found in dogs, and the close bonds in which dogs live together with people, the risk of transmission of these parasites to humans seems to be obviously high.

It may be concluded that pet owners should care more for their pets by proper housing, feeding and prevention of contamination of dogs. Interventions should include health education provided to dog owners and the establishment of a program focusing on zoonotic diseases especially to educate the public on the health hazards posed by indiscriminate disposal of dog feces and on responsible pet ownership.

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