**CHAPTER I**

**INTRODUCTION**

Dogs are the most thriving canids, adapted to human habitation worldwide including Bangladesh. They have contributed to refreshment by pet keeping, physical, social and emotional well-being for their owners (Robertson *et al*., 2000; Dohoo *et al*., 1998). Usually, pet keeping is associated with certain responsibilities like housing, disease management (William *et al*., 2002). However, in spite of the beneficial effects, close bond between dogs and humans remain a major threat to public health, with dogs harboring a large number of infective stages of disease causative agents transmissible to man and other domestic animals (Robertson *et al*., 2000; Molyneux, 2004). 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 (Kornblatt and Schantz, 1980; Dada *et al*., 1979).

A lot of diseases and disease conditions are frequently occurred in dogs. Among the viral diseases rabies, infectious canine hepatitis, canine distemper, canine parvo viral infections are very common in Indo-Bangladesh sub-continent (Biswas *et al*., 1996). Rabies is the most important zoonotic disease in worldwide including Bangladesh (Biswas *et al*., 1996) and approximately 90% of human cases result from dog bites. Almost all human deaths caused by rabies originating from Asia and Africa and there are an estimated 55,000 human deaths annually from rabies, with about 31000 in Asia and 24,000 in Africa (Samad, 2008). Othersly, on bacterial conditions, dogs are usually affected with leptospirosis, brucellosis, kennel cough, clostridium etc. (List of dog diseases Wikipedia).

Ectoparasites and intestinal helminth species are widely prevalent health problems in dogs. Parasites 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 elevated. Higher prevalence rate of fleas, ticks, lice, mites have been reported by Rodriguez-Vivas *et al*., 2003; Durden *et al*., 2005 where *Demodex canis* (23.0%) as a most frequent mite, followed by *Sarcoptes* *scabei var canis* (7.0%) and *Otodectes cynotis* (3.5%). Seasonal frequency of ectoparasites infestations has also been reported by Shoorijeh *et al*., 2008. The higher rate of echinococcosis has been available in stray dogs in Bangladesh (Molan and Saida, 1989; Gusbi, 1987).

In our country, dogs are generally infected with various diseases. A lot of cases are frequently observed in Central Veterinary Hospital, Dhaka.

Considering those important facts the present study is anticipated to following objectives:

* To identify the clinical feature of various diseases of dog.
* To determine the prevalence of diseases of dog in Central Veterinary Hospital, Dhaka.

**CHAPTER II**

**REVIEW OF LITERATURE**

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 **(Tarafder and Samad, 2010).**

**Tarafder and Samad (2010)** reported thatRabiesis 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).

Serovars and bacteriophage (phage) types were determined for 442 isolates of Salmonella enterica from dogs in the UK submitted to the Scottish Salmonella Reference Laboratory from 1954 to 2012. The most frequent serovars were Salmonella Typhimurium (196 isolates; 44.3 per cent), Dublin (40 isolates; 9.0 per cent), Enteritidis (28 isolates; 6.3 per cent), Montevideo (19 isolates; 4.3 per cent), Virchow (10 isolates; 2.3 per cent), Heidelberg (8 isolates; 1.8 per cent) and Derby (8 isolates; 1.8 per cent), along with 55 other recognised serovars among 127 other isolates, and six incompletely classified isolates. Serovars were frequently represented by strains commonly associated with poultry, cattle or pigs and their products. Among 196 Salmonella Typhimurium isolates from dogs, the most frequent phage types (definitive types) were the multiple antimicrobial-resistant strains DT104 (62 isolates), DT204c (18 isolates) and DT193 (8 isolates), along with antimicrobial sensitive wild finch strains DT40 (13 isolates) and DT56 variant (8 isolates). Eleven of 28 isolates of Salmonella Enteritidis were phage type 4. S enterica was frequently recovered from faecal or intestinal samples of dogs with diarrhoea, although many dogs had concurrent infection with other enteric pathogens. Salmonella Dublin was recovered from the brain and/or cerebrospinal fluid of two dogs with meningoencephalitis. Salmonella Kedougou was isolated from the joint fluid of a dog with septic arthritis. Salmonella Typhimurium and Salmonella Dublin were each recovered from the vaginas of bitches that had aborted. Isolates of Salmonella Enteritidis phage types 1, 4 and 8, Salmonella Typhimurium DT104, Salmonella Dublin and Salmonella Indiana were isolated from clinically healthy dogs in households where the same strains were recovered from human beings with diarrhoea. The pattern ampicillin-chloramphenicol-spectinomycin-streptomycin-sulfamethoxazole-tetracycline (ACSpSSuT) was the most frequent resistance phenotype and was observed in 44 (13.3 per cent) of 330 isolates. Dogs in the UK are exposed to a wide variety of serovars of S enterica, sometimes associated with clinical disease, and represent a zoonotic risk.

In the present study on recurrent pyoderma, dogs with a history of more than three episodes of skin infections in a period of one year were selected. The associated conditions and (or) underlying factors revealed upon thorough investigation were demodicosis, Malassezia dermatitis, flea infestation, hypothyroidism, keratinization disorder (seborrhea), combination of Malassezia dermatitis and tick infestation, and a combination of scabies and tick infestation. Therapy was given with cefpodoxime with clavulanic acid along with appropriate simultaneous medication for the underlying associated conditions. In all the cases response to therapy was excellent. Improvement was noticed by 9 to 19 days and 17 to 21 days in recurrent superficial and deep pyoderma, respectively. In one dog, relapse occurred by 45 days due to the associated condition of hypothyroidism which was confirmed through laboratory findings. Cefpodoxime with clavulanic acid proved to be an effective, safe, and convenient antibiotic for the treatment of recurrent pyoderma in dogs without any side effects **(Sudhakara Reddy et al., 2014).**

This study evaluated the seasonal dynamics of Rhipicephalus sanguineus (Latreille) (Acari: Ixodidae) on naturally infested dogs in a private shelter in southern Italy. From March to May 2008, 39 autochthonous mixed-breed young dogs and 10 beagles were enrolled in the study. From March 2008 until March 2009, every 21 ± 2 days, 11 body sites of each dog were checked for ticks. At each follow-up, the number of ticks, their developmental stage, sex and location on the dog's body were recorded. Adult ticks were found throughout the year, but immatures were absent in January and February. The adult tick population increased from July to August, whereas the load of immatures increased in early July and peaked in September, which suggests that R. sanguineus develops one generation per year in this area. The mean number of immature ticks per infested dog was higher than that of adults from March to October 2008. Ears, interdigital areas and armpits were the most frequent attachment sites of adult ticks. At the last follow-up, a total of 2266 ticks were collected and identified as R. sanguineus. The results suggest that R. sanguineus develops one generation per year in the study area, but that it infests dogs in all seasons. This information should be taken into account when planning control programmes against this tick species and the pathogens it transmits**. (Lorusso et al., 2010).**

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. It appears 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.(**Tarafder and Samad, 2010).**

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 infestationshas also been reported **(Shoorijeh *et al*., 2008).**

Canine toxocariasisis 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 **(Tarafdar and Samad, 2010).**

Canine echinococcosiswas 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 . 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).**

In the province of Al Hoceima, northern Morocco, and on two farms in Hungary, dogs were inspected for the presence of traumatic myiasis. Nine and four infested dogs were found in Morocco and Hungary, respectively. All the larvae and adults reared from them in the laboratory were identified as Wohlfahrtia magnifica (Schiner) (Diptera: Sarcophagidae). To our knowledge, these are the first cases of wohlfahrtiosis in dogs to be reported in these countries. All infested animals lived close to livestock, where wohlfahrtiosis was endemic. Infested body sites included limbs (six cases), external genitalia (two), ears (three), nose (one) and neck (one). Developing larvae caused severe welfare problems and tissue destruction in most cases. Although the number of cases reported here is small, wohlfahrtiosis in dogs may be very important from an epidemiological perspective because farm and stray dogs can act as both reservoirs and carriers of this parasitic fly species. Therefore, education of dog owners concerning the risk factors in endemic regions is recommended in order to reduce the prevalence of wohlfahrtiosis in dogs and thereby in livestock. Both owners and veterinarians should pay regular attention to any wounds and to the natural orifices of dogs, especially during the fly seasons **(R. Farkas *et* al., 2009)**.

Current concerns over the potential impacts of climate change and the increased movement between countries of people and companion animals on the distribution of ectoparasites, highlight the need for accurate understanding of existing prevalence patterns. Without these future changes will not be detected. Here, the distribution and prevalence of tick infestations of domestic dogs in Great Britain were examined. A total of 173 veterinary practices were recruited to monitor tick attachment to dogs in their local areas between March and October 2009. Practices selected five dogs at random each week from those brought to the surgery and undertook a thorough, standardized examination for ticks. Each veterinary practice participated for 3 months before being replaced. Any ticks identified were collected and a sample sent to the investigators for identification, along with a clinical history of the dog. A total of 3534 dogs were examined; 810 dogs were found to be carrying at least one tick. *Ixodes ricinus* (Linnaeus) (Acari: Ixodidae) was identified in 72.1% of cases, *Ixodes hexagonus* Leach in 21.7% and *Ixodes canisuga* Johnston in 5.6% of cases. Five samples of *Dermacentor reticulatus* (Fabricius) (Acari: Ixodidae) were also found, adding to the growing evidence that an established population of *D. reticulatus* now exists in south-eastern England. Almost all the ticks found were adults. Overall, 19.2% of the veterinary practices reported no tick detections, 50% reported that ≥14.9% of the dogs seen were infested and 14.6% reported that >50% of the dogs inspected carried ticks. The estimated incidence of tick attachment was 0.013 per day in March (lowest) and 0.096 per day in June (highest). A number of risk factors affected the likelihood of tick attachment on dogs. Gundog, terrier and pastoral breed groups were more likely to carry ticks, as were non-neutered dogs. Dogs with shorter hair were less likely to have ticks, and dogs were most likely to carry a tick in June. This study is of value because, unusually, it presents the results of a randomized sample of dogs and gives a prevalence which is higher than those previously recorded in Great Britain **(F. D. Smith et al. 2011).**

Tick-borne diseases are common occurrences in both the medical and veterinary clinical settings. In addition to the constraints related to their diagnosis and clinical management, the control and prevention of these diseases is often difficult, because it requires the disruption of a complex transmission chain, involving vertebrate hosts and ticks, which interact in a constantly changing environment. We provide a contemporary review of representative tick-borne diseases of humans and discuss aspects linked to their medical relevance worldwide. Finally, we emphasize the importance of a One Health approach to tick-borne diseases, calling physicians and veterinarians to unify their efforts in the management of these diseases, several of which are zoonoses**. (**[**Filipe Dantas-Torres**](javascript:void(0);) **et al. 2012).**

Southeast Asia remains one of the few relatively uncharted regions of the world with respect to parasitic diseases of companion animals. The combination of tropical climate, large populations of stray dogs and cats, and increasing popularity of pet ownership in Southeast Asia provides an ideal environment for vector-borne disease transmission. Early reports suggested that arthropod-transmitted infections associated with protozoa, filariae, rickettsiae and bacteria are prevalent in the region. However, more recent investigation into the epidemiology and zoonotic potential of these pathogens has been neglected, and further study is essential if we are to develop a better understanding of their diversity and significance in both dogs and cats. **(**[**Peter J. Irwin**](http://www.sciencedirect.com/science/article/pii/S1471492203003167)**;** [**Ryan Jefferies**](http://www.sciencedirect.com/science/article/pii/S1471492203003167)**, 2004).**

According to **Tarafder and Samad, (2010**),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.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.

Taneniasiswas diagnosed by demonstration of the characteristic Taenia eggs in the stool of 0.74% pet dogs and all the investigated 11 breeds of pet dogs had infection with this tapeworm. 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**).

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. (**Tarafder and Samad, 2010)**

**M.A.Samad (2010**) reported that,Canine babesiosisis 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 which are confirmatory to the earlier reports **(Samad, 2008)**.

**CHAPTER III**

**Materials and Methods**

**3. 1. Area and Study Population**

This study was conducted on dogs residing at different areas of Dhaka, the capital of Bangladesh (Figure 1). All dog breeds under Central Veterinary Hospital (CVH), Dhaka were examined thoroughly. The examined dogs mostly were exotic such as Spitz, German Shepherd , Bull dog, Dalmatian, some were street dogs and few were cross with exotic. A total of 56 dogs of different age brought to the CVH, Dhaka during May 2013 to July 2013 and were treated in this study.

**Figure 1: Map of working area (CVH, Dhaka, Bangladesh)**

**3. 2. Study design**

The study had been conducted from May 2013 to July 2013. The study design is schematically shown in the Figure 2.

Patient data

Species, Breed, Age, Sex of the patient, Owners status

Epidemiological study (Questionnaire)

Identify the target groups or population

Selection of the study area

Disease history

Pre-disposing factor

Onset and duration of illness

Weakness of patient

Clinical History (Anamnesis)

Clinical Examination

Inspection/ Observation

General attitude of the patient

Affected region of the body

Posture

Gait

Lameness

Body Condition Score (BCS)

Clinical examination, Laboratory examination & Disease Diagnosis

**Figure 2: Schematic representation of the study design**

**3. 3. Questionnaire design and Data collection**

In order to collect data, a structured questionnaire was carefully prepared on the basis of the objectives. It was a cross sectional study and the questionnaire was designed to comprise mostly closed ended (categorical) questions to ease data processing, minimize variation and improve precision of responses (Thrusfield, 2005). The questionnaire was filled up by repeated questioning to the owner, personal observation of patient and taking records from register book. Important data recorded including owner’s complaint, breed, age, sex, body condition, weakness, onset and duration of illness of the dog. Other information sought included history of birth, de-worming, vaccination, pregnancy status, parity, housing pattern, diet, environmental condition. Clinical examinations were performed according to questionnaire designed mentioning about temperature, respiration, pulse, hair coat, skin, general attitude of animal, posture, gait, lameness, fracture, depthness of wound etc.

**3. 4. Case Identification**

The sequential procedure of clinical diagnosis of the patient:

i. Owner’s complaint

ii. Anamnesis: History was taken about weakness of patient, onset and duration of illness from owner. Identify the pre-disposing factors of diseases.

iii. Clinical examination of patient; It includes:

**a. Inspection**

*Distant Inspection*: Firstly the general attitude of the patient (alertness/ dullness/ depression) was carefully inspected. Following this, the body condition of the animal (Cachectic/ poor/ fair/ good/ fat/ over fat) was observed as described by Radostitis *et al.,* 2000. In addition, posture and gait (normal or defective) were examined according to the condition of the dog.

*Close Inspection*: Following distant inspection, the patient was closely examined by visual examination, parting of hair/fleece, light palpation and close direct inspection to detect hair coat and skin abnormalities. Skin lesions, nature of lesions (foul odorous discharge, crusts, scale and dandruff), location/ distribution of those lesions were also studied. In addition, external parasites (eg. ticks, lice, flea, flies and larvae of flies) identified during examination were documented.

**b. Clinical examination and determination**

Wounds were identified by inspection and further examined for more precise diagnosis to categorize the nature of the wound whether it might be septic/ lacerated/ incised/ punctured/ perforating/ abrasions/ avulsion/ hematoma. Needle puncture was also performed if required. Temperature, pulse, respiration were taken through other scientifically clinical method. In case of fracture, extension and flexion were occurred in the dog.

**c. Laboratory diagnosis**

Samples considered significant for diagnostic purposes were taken. Fecal samples and skin scrapings were examined at CVH, Dhaka. Blood and urine samples were collected for routine and specific examinations and were examined at the Central Disease Investigation Laboratory (CDIL), Dhaka. Owners were asked to perform X-ray to diagnose fracture. Dead pets were subjected to post mortem examination to find out the gross lesions and collect samples for pathological observation.

**3. 5. Data Analysis**

All the data that were collected were entered into MS excel (Microsoft office excel-2007, USA). Data management and descriptive analysis was done by means of creating histogram and pie charts.



Figure 7: Tick infestation

**Figure 8: Mange**

Figure 6: Diarrhoea

Figure 5: Babesiosis

Figure 4: Pyorrhea

Figure 3: Myiasis in anal region

**CHAPTER IV**

**RESULTS**

A total of 56 affected dogs were brought to Central Veterinary Hospital, Dhaka where the dogs were categorized with 0-2 years, 2-3 years and more than 3 years. Mostly the older aged dogs were affected with different diseases (53.5%) **(Table 1 and Figure 9)**. Bacterial, viral, fungal diseases and ectoparasitic infestation were very much common to the affected dogs.

**Table 1: Age wise distribution of diseases and disorders in dog.**

|  |  |  |
| --- | --- | --- |
| **Age** | **No. of affected dogs** | **Prevalence (%)** |
| 0-2 years | 5 | 8.9% |
| 2-3 years | 21 | 37.5% |
| > 3 years | 30 | 53.5% |

**Figure 9: Age wise distribution of diseases and disorders in dog**

**Table 2: Diseases observed in the affected dogs**

|  |  |  |
| --- | --- | --- |
| **Diseases/ Disorders** | **No of affected dogs** | **Prevalence (%)** |
| Bacterial | 16 | 28.6% |
| Viral | 4 | 7.14% |
| Fungal | 1 | 1.78% |
| Endoparasitic infection | 4 | 7.14% |
| Ectoparasitic infestation | 18 | 32.14% |
| Protozoal infection | 1 | 1.78% |
| Surgical cases | 4 | 7.14% |
| Metabolic and Nutritional disorders | 6 | 10.71% |
| Immunogenic disorders | 2 | 3.57% |

**Figure 10: Diseases observed in the affected dogs**

The above table and pie diagram show that the prevalence of clinical diseases and disorders of dogs were multidimensional **(Table 2 and Figure 10)**. Ectoparasitic infestation (32.14%) and bacterial diseases (28.6%) were more prominent than others such as metabolic and nutritional disorders (10.71%), viral diseases (7.14%), endoparasitic infection (7.14%), surgical cases (7.14%), immunological disorders (3.57%), fungal diseases (1.78%) and protozoal infection (1.78%).

**Table 3: Diseases according to sex of dogs**

|  |  |  |
| --- | --- | --- |
| **Name of diseases** | **Male** | **Female** |
| Tick infestation | 6 (10.7%) | 2 (3.57%) |
| Fracture at femur | 0 | 1 (1.78%) |
| Gangrene at tail | 1 (1.78%) | 0 |
| Canine Distemper | 0 | 2 (3.57%) |
| Anemia | 0 | 1 (1.78%) |
| Gastritis | 0 | 1 (1.78%) |
| External Wound | 2 (3.57%) | 0 |
| Pyorrhoea | 0 | 1 (1.78%) |
| Bronchitis | 2 (3.57%) | 0 |
| Abscess | 2 (3.57%) | 0 |
| Lameness | 1 (1.78%) | 1 (1.78%) |
| Tapeworm infection | 2 (3.57%) | 0 |
| Nematodal infection | 0 | 2 (3.57%) |
| Flea infection | 1 (1.78%) | 1 (1.78%) |
| Diarrhoea | 0 | 3 (5.35%) |
| Mange | 3 (5.35%) | 1 (1.78%) |
| Myiasis | 2 (3.57%) | 0 |
| Ringworm Infection | 0 | 1 (1.78%) |
| Otorrhoea | 1 (1.78%) | 1 (1.78%) |
| Phimosis | 1 (1.78%) | 0 |
| Urinary Infection | 1 (1.78%) | 0 |
| Lice infestation | 0 | 1 (1.78%) |
| Fatty syndrome | 1 (1.78%) | 0 |
| Unthriftiness | 0 | 1 (1.78%) |
| Rabies | 0 | 1 (1.78%) |
| Pneumonia | 0 | 1 (1.78%) |
| Alopecia | 0 | 2 (3.57%) |
| Babesiosis | 1 (1.78%) | 0 |
| Corneal Opacity | 2 (3.57%) | 0 |
| **Total** | **29 (51.7%)** | **27 (48.3%)** |

It is observed that the overall prevalence of diseases on male and female were more or less similar (Male 51.7% and Female 48.3%). The above table shows that males were mostly infested with ectoparasites (tick, mite, fly, flea) and affected with tapeworm infection, bacterial infection (abscess, external wound, otorrhoea, bronchitis, corneal opacity). On other hand, females were infected with tick and mite infestation, alopecia, viral diseases (rabies, canine distemper), ringworm, diarrhea and nematode infection.

**Table 4: Diseases according to breed of dogs**

|  |  |  |
| --- | --- | --- |
| **Name of the breed** | **No. of affected (diseased)** | **Prevalence (%)** |
| Crish dog | 1 | 1.78% |
| Dutch hound | 2 | 3.57% |
| Dobberman | 2 | 3.57% |
| Boxer | 1 | 1.78% |
| Dalmatian | 5 | 8.92% |
| Lhasa-Apso | 6 | 10.71% |
| Local stray dog | 8 | 14.3% |
| Samoyed | 8 | 14.3% |
| American Alsatian | 1 | 1.78% |
| Spitz | 3 | 5.35% |
| Pug | 3 | 5.35% |
| Sarail (Brahmanbaria) | 1 | 1.78% |
| Bull dog | 1 | 1.78% |
| German Shepherd | 12 | 21.42% |
| Rottweiler | 1 | 1.78% |
| Labrador | 1 | 1.78% |

**Figure 11: Diseases according to breed of dogs**

The table and graph **(Table 4 and Figure 11)** indicates German Shepherd (21.42%) were mostly infected with different diseases. Bronchitis, Otorrhoea were more frequently observed on that breed. Other affected dogs were Samoyed (14.3%), local stray dogs (14.3%), Lhasa (10.71%), Dalmatian (8.92%), Pug (5.35%), Spitz (5.35%), Dobberman (3.57%). In case of Dalmatian, they were habitually infested with ectoparasites.

**Table 5: Overall frequency of distribution of diseases and disorders of study population on the basis of category of diseases:**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Category of disease** | **Disease** | * 1. **years** | * 1. **Years** | **>3years** | **Total (%)** |
| Bacterial disease | Corneal opacity | - | 2(3.57%) | - | 2(3.57%) |
| Pyorrhoea | - | 1(1.78%) | - | 1(1.78%) |
| Bronchitis | - | - | 3(5.35%) | 3(5.35%) |
| Abscess | 1(1.78%) | 1(1.78%) | - | 2(3.57%) |
| Diarrhoea | - | - | 2(3.57%) | 2(3.57%) |
| Otorrhoea | - | - | 2(3.57%) | 2(3.57%) |
| Urinary infection | - | - | 1(1.78%) | 1(1.78%) |
| Pneumonia | 1(1.78%) | - | - | (1.78%) |
| Viral disease | Canine distemper | - | - | 2(3.57%) | 2(3.57%) |
| Rabies | - | - | 1(1.78%) | 1(1.78%) |
| Fungal disease | Ring Worm | - | - | 1(1.78%) | 1(1.78%) |
| Endoparasitic disease | Tapeworm infection | - | 2(3.57%) | - | 2(3.57%) |
| Nematode infection | - | - | 2(3.57%) | 2(3.57%) |
| Ectoparasitic disease | Tick infestation | 1(1.78%) | 5(8.92%) | 2(3.57%) | 8(14.3%) |
| Lice infestation | - | - | 1(1.78%) | 1(1.78%) |
| Mange | - | 1(1.78%) | 3(5.35%) | 4(7.13%) |
| Flea infestation | - | 2(3.57%) | - | 2(3.57%) |
| Protozoal disease | Babesiosis | - | 1(1.78%) | - | 1(1.78%) |
| Surgical disease | Femur fracture | - | 1(1.78%) | - | 1(1.78%) |
| Tail gangrene | - | - | 1(1.78%) | 1(1.78%) |
| External wound | - | 2(3.57%) | - | 2(3.57%) |
| Abscess | 1(1.78%) | 1(1.78%) | - | 2(3.57%) |
| Phimosis | - | - | 1(1.78%) | 1(1.78%) |
| Lameness | - | - | 1(1.78%) | 1(1.78%) |
| Metabolic & Nutritional disease | Anemia | - | 1(1.78%) | - | 1(1.78%) |
| Acidosis | - | - | 1(1.78%) | 1(1.78%) |
| Fatty syndrome | - | - | 1(1.78%) | 1(1.78%) |
| Unthriftiness | 1(1.78%) | - | - | 1(1.78%) |
| Immunogenic disease | Alopecia | - | - | 1(1.78%) | 1(1.78%) |
| Allergy | - | - | 1(1.78%) | 1(1.78%) |

The above table shows the overall diseases found in the CVH on different age of the dogs. Among all the cases, ectoparasitic infestation especially tick infestation was the highest and it was observed in all the age group of the dog. On bacterial cases, bronchitis (5.35%) was frequent.

**CHATER V**

**DISCUSSION**

Prevalence of bacterial diseases was 28.6% (out of 56 dogs 16 dogs were affected) at Central Veterinary Hospital, Dhaka. Among this 5.37% were bronchitis, 3.57% were both in diarrhea and otorrhoea, Khan and Jaffer (1997) stated that around 16.96% cases of diarrhea of dogs caused by bacterial infectious agent which is higher in prevalence than this study due to small sample size. In the study of Tarafdar and Samad (2010) reported that 2.21% bronchitis, which is lower in comparison to my study due to different climatic conditions and polluted environment that is not habituated by different breeds of dog. In case of diarrhea, 5.21% prevalence was found which is greater than this value, due to proper feeding hygienic feed and healthy sanitary condition of dogs staying places. Ottorrhea is 1.06% which is lesser than my study value due to defective treatment and not properly uses the drugs that are prescribed in times of diseases. Jafri *et al*., 1997 stated that around 15.0% patients suffered from ottorrhea which is much higher than this study due to different topographical locations of Pakistan and Bangladesh varies the prevalence rate. Pneumonia found 1.78% cases in my study dog population but in the study of Jafri *et al*., 1997 found 2.4% cases due to shorter duration of study population of my study. Urinary infections are found 1.78% in my study but Jafri (1997) stated that he found 2.55% cases of urinary infections in his study which is slightly higher than my study population.

Major prevalence of ectoparasitic infestation was 32.14% where 16.07% were tick infestation, 1.785% were lice infestation, 5.35% were mange, 3.57% were flea infestation patients. Jafri *et al.,* 1997 observed around 45% cases were affected with tick infestation, 16.25% affected with psoroptic and sarcoptic mange, 1.95% affected with flea infestation and 2.3% with lice infestation which is comparatively higher due to smaller population of this study. In comparison to Samad (2010) in his study recorded 11.88% dogs infested with ticks, 9.84% with flea, 0.90% with lice and 3.76% with different types of mange. William et al., 2002 stated that he found 15.15% cases of tick infestation and 7.41% mange in dogs in his study in which tick infestation is higher and mange is lower in my study. In my study, Myiasis found 3.57% cases but Jafri *et al*., 1997 in his study stated that around 4.5% which is higher than my study due to sanitary conditions of kennels of dog and different topographical distribution of different flies. Smith *et al*., 2011 stated that, Overall, 19.2% of the veterinary practices reported no tick detections, 50% reported that ≥14.9% of the dogs seen were infested and 14.6% reported that *>*50% of the dogs inspected carried ticks. The estimated incidence of tick attachment was 0.013 per day in March (lowest) and 0.096 per day in June (highest). But in this investigation period is short and no seasonal variation study was done. Wu *et al*., 2009 stated that the prevalence of tick infestation is 2% in Taiwan which is lower than my study area due to topographical distribution.

7.14% of viral diseases were recorded at CVH, Dhaka out of 56 dogs. Among this 3.57% were Canine distemper and 1.78% was rabies. According to sex, female dogs (around 100%) were susceptible than male dogs. Jafri *et al*., 1997 found that around 11.1% dogs are affected with canine distemper which is higher than my study due to the study population of his prevalence study is higher than my study population. In the study of Tarafdar and Samad (2010) reported that 13 (0.35%) rabies cases and in case of canine distemper 1.47% in pet dogs which indicate the potential risk to pet owners, which is less than my prevalence value because of unconsciousness of pet owner in giving the vaccines in proper time. 0.3% dogs are affected in rabies in USA which comparatively lower than my study due to effective vaccination schedule maintaining in pet animal in U.S.A. found that around 85% rabies patient found in Canada in observation of shunks, which is comparatively higher than this study due to shorter sample population. Jafri *et al*., 1997 found that around 2.66% of cases found positive in rabies which is higher than my study prevalence. Udupa and Sastry (1996) found that 28.65% cases are affected in Canine parvo viral diarrhea but in my study due to short period of time and less well organized Laboratory facility and dog owners’ unconsciousness about laboratory test could not find enough data about Canine parvo viral diarrhea.

Among 56 dogs, tape worm infection recorded in 02 dogs (3.57%) and nematode infection is 2(3.57%). Jafri, 1997 suggested that 35.5% dogs are affected with tapeworm infection and around 85.4% dogs infected with nematode infection which is much higher than my study prevalence due to short duration of study and smaller sample size of my study. In comparison to Samad (2010) 3.92% pet dogs affected with tape worm and 6.20% pet dogs affected with nematode, which is higher than my study due to short sample population of my study and shorter duration of time period. Faris *et al*. (2004) stated that 36.84% prevalence out of 65 dogs in case of tape worm infection, which is higher in prevalence than my value due to larger number of population in his study involved.

The prevalence of babesiosis was recorded 01 (1.78%) in dog population at Central veterinary hospital, Dhaka. In comparison to Samad (2010), 0.06% of cases found babesiosis which is almost same with my study due to shorter study population and shoter period of time of my study. Ring worm or dermatomycosis is present 1.78% out of 56 dogs, according to Samad (2010), 3.32% cases found dermatomycosis which is higher in prevalence than my study due to shorter sample of dog population of my study.

In case of surgical cases, 3.57% found abscess which is higher than Samad (2010) reported 0.82% cases because of unhygienic condition and less sanitation in dog kennels, lack of proper dose of treatment and lack of proper immune level in body of dog. 3.57% cases found external wound that in comparison with Samad (2010), in his study 2.32% cases found external wound that is lesser than my study due to lack of proper security and safety measures of owners. In my study area, Fracture cases found 1.78% but Jafri (1997) stated that he found 2.3% cases of fracture in Pakistan in his study area. Lameness and Phimosis both are found 1.78% cases according to Samad (2010) revealed that lameness 0.95% cases and phimosis 0.85% cases which is lower due to my short sample size and short duration of time and lack of exposure much of cases.

Metabolic and nutritional diseases are found 10.71% where Samad (2010) in his study found 3.13% which is lower than my value due lack of nutritious feed giving and proper time to time feeding.

**CHAPTER VI**

**CONCLUSION**

The study was conducted at Central Veterinary Hospital (CVH), Dhaka city to measure and evaluate the prevalence of general diseases and disorders of dogs in relation to ages, sexes, breeds etc in study work based on history, anamnesis. Mainly ecto-paracsiticidal drug, deworming practice and a routine vaccination should develop to overcome from ectoparasitic infestation. However, poor management, inadequate drugs, lack of awareness of dog owners, different topographic region, different places and environment enhances the high incidence and prevalence of diseases and disorders.

**LIMITATION OF THE STUDY**

During my study period at Central Veterinary Hospital, Dhaka the following limitations were observed:

* Due to the short duration of the assigned period the relation of different types of diseases and disorders with the season cannot be studied.
* Small number of sample population. So it cannot be studied widely.
* Lack of modern laboratory diagnosis facilities. Most of diagnosis treated on the basis of Central Disease Investigation Laboratory (CDIL) findings.
* Most of the diseases and disorders were mainly diagnosed by taking clinical history from owner and by observing the clinical findings. If Lab diagnosis was available all time then the accuracy of the result will be more significant.

**CHAPTER VII**

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