

CLINICAL INVESTIGATION OF CANINE DISEASE AND DISORDERS IN KATHMANDU VALLEY OF NEPAL

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ABSTRACT

A case control study was conducted to ascertain the prevalence of clinical disease and clinical disorders of sick pet dogs presented to the City Veterinary Hospital Kathmandu Valley Nepal for a period of one year from July 2020 to June 2021. A total 1409 clinically ill pet dogs were examined and recorded the disease and disorders on the basis of age, season and breeds of dogs. Among diseases and disorders the highest prevalence (26.54%), was significantly ($p < 0.01$) seen by viral disease followed by digestive disorders (10.14%), ear and eye disease (8.72%), respiratory disorders (7.73%), fungal disease (7.16%), protozoan disorders (6.52%), urinary disorders (5.53%), metabolic and nutritional disease (5.39%), genital disease (5.03%), skin disorders (4.54%), helminthiasis (3.97%), external parasite (3.12%), poisoning (3.12%), and lowest (2.41%) by edema. It is observed that the prevalence of diseases and disorders was significantly ($p < 0.01$) higher above 36 months of age group and moderate in 7-36 months' age and lowest in 0 to 6-month age groups. According to season the highest prevalence (29.59%) was seen in winter season (December-February) followed by 25.90% in summer (March-May), 24.27% in autumn and lowest 20.22% in rainy season and it was statistically significant ($p < 0.01$). According to breed the prevalence was significantly higher 34.56% in local dogs followed by 14.05% in German shepherd dogs, 10.14% in Labrador breed, 7.94% in pug, 7.59% in Golden Retriever breed, 6.03% in lhasa Apso breed, 5.89% in Doberman breed, 4.61% in Spitz breed, 3.97% in Boxer breed, 3.26% in Beagle breed and lowest 1.92% seen in Spaniel breed. The present study demonstrated the excellent efficacy of Amoxicillin @ 20mg/kg body weight against secondary bacterial infection of canine parvo virus infection reduced the clinical signs of CPVI within 6.0 ± 0.32

days than Ceftriaxone @ 25 mg/kg body weight and Enrofloxacin @ 8mg/kg body weight that took recovery period of 7.4 ± 0.25 and 7.9 ± 0.37 days respectively but it was not statistically significant and present study demonstrated the excellent efficacy of Doxycycline @ 10mg/kg body weight against Ehrlichiosis reduced the clinical signs within 5.0 ± 0.32 days than Rifampicin @ 20 mg/kg body weight orally that took recovery period of 8.0 ± 0.25 days In conclusion it was observed that the age, seasons and breed has effect on disease and disease conditions of pet dogs and commercial drug was found effective to control infections and healing of CPVI lesion.

Keywords: Canine Disease, Antibiotics, Age, Season, Breeds

INTRODUCTION

Dog, (*Canis lupus familiaris*), domestic mammal of the family Canidae (order Carnivora). It is a subspecies of the gray wolf (*Canis lupus*) and is related to foxes and jackals. The dog is one of the two most ubiquitous and most popular domestic animals in the world. For more than 12,000 years it has lived with humans as a hunting companion, protector, object of scorn or adoration, and friend. 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.

Ectoparasites and intestinal helminth species are widely prevalent health problems in dogs. Parasites documented in dogs throughout the world including Nepal 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; where *Demodex canis* (23.0%) as a most frequent mite, followed by *Sarcoptes scabiei 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). In our country, dogs are generally infected with various diseases. A lot of cases are frequently observed in City Veterinary Hospital, Kathmandu. Considering those important facts the present study is anticipated to following objectives:

To investigate the prevalence of disease and disorders in dogs in Kathmandu Valley, Nepal and to know the age, breed and season-wise prevalence of dog diseases and eventually to evaluate the efficacy of commercial drugs against canine parvo virus infection and canine *Ehrlichiosis*.

MATERIALS AND METHODS

Study area

This study was executed on dogs residing at different areas of Kathmandu valley, Nepal. All dog breeds come to “City Veterinary Hospital Kathmandu valley, Nepal were examined thoroughly.

Study Period

The study was conducted for a period of 1 year from July 2020 to June 2021.

Study population

The examined dogs mostly were exotic such as Spitz, German Shepherd, Golden Retriever, Labrador, some were street dogs and few were cross with exotic. A total 1409 clinically ill dogs of different age brought to the City Veterinary Hospital, Kathmandu valley, Nepal was under investigation.

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.



(Source: https://www.researchgate.net/figure/Urbanizing-Nepal-showing-the-Kathmandu-Valley-in-the-set-map_fig1_332713605)

Figure 1. Map of working area (City Veterinary Hospital Kathmandu Valley Nepal)

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 was 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 City Veterinary Hospital Kathmandu Nepal. Blood and urine samples were collected for routine and specific examinations and were examined at Laboratory of City Veterinary Hospital. 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.

Among the infected dogs 30 were treated with different commercial drugs. The dogs were divided into 3 groups and treated as shown in Table 1. Among the infected dogs 20 were treated with different commercial drugs. The dogs were divided into 2 groups and treated as shown in Table 2.

Table 1. Grouping of dogs for antibacterial treatment against secondary bacterial infection in canine parvo virus infection

Name of the group	No. of dogs treated	Name of drugs	Dose & route of administration
Group-A	10	Amoxicillin	@ 20 mg/kg body wt. i/v daily for 7 days
Group-B	10	Ceftriaxone	@ 25 mg/kg body wt. i/v daily for 7 days
Group-C	10	Enrofloxacin	@ 8 mg/kg body wt. i/v daily for 7 days

Table 2. Grouping of dogs for evaluation efficacy of commercial drugs against Ehrlichiosis

Name of the group	No. of dogs treated	Name of drugs	Dose & route of administration
Group-D	10	Doxycycline	@ 10mg/kg body wt. i/v daily for 3 days followed by orally for 18 days
Group-E	10	Rifampicin	@ 20 mg/kg body wt. orally daily for 21 days

Data 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 20.0, SPSS Inc, Chicago, III); values of $p < 0.05$ were considered significant.

RESULTS AND DISCUSSION

Different clinical and laboratory methods were used to study the prevalence of clinical diseases and disorders of pet dogs in City Veterinary Hospital during July 2020 to June 2021. A total of 1409 pet dogs were examined for diseases and conditions.

Prevalence of clinical diseases and disorder of pet dogs:

Among all diseases and disorders the highest prevalence was seen by viral disease (26.54%), followed by digestive disorders (10.14%), Ear and eye disease (8.72%), respiratory disorders (7.73%), fungal disease (7.16%), protozoan disorders

(6.52%), Urinary disorders (5.53), Metabolic and nutritional disease (5.39%), genital disease (5.03%), skin disorders (4.54%), helminthiasis (3.97%), external parasite (3.12%), poisoning (3.12%), and lowest by edema (2.41%) shown in Table 3.

Table 3. Prevalence of clinical diseases and condition of pet dog

Diseases/ Disorders	No of affected dogs	Prevalence (%)	Level of significance
Digestive disorders	143	10.14	<0.001***
Respiratory disorders	109	7.73	
Genital	71	5.03	
Viral	374	26.54	
Helminthiasis	56	3.97	
Protozoan diseases	92	6.52	
External parasite	44	3.12	
Ear and eye diseases	123	8.72	
Urinary disorders	78	5.53	
Edema	34	2.41	
Metabolic and nutritional	76	5.39	
Poisoning	44	3.12	
Fungal (Dermatomycosis)	101	7.16	
Skin disorders	64	4.54	

***means statistically highly significant

Age-wise prevalence of clinical diseases and condition of pet dogs

It is observed that the prevalence of diseases and disorders was highest above 36 months of age group and moderate in 7-36 months' age and lowest in 0- 6months age groups shown in Figure 2.

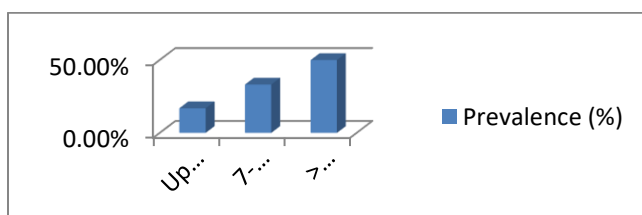


Figure 2. Age-wise prevalence of clinical diseases and condition of pet dogs
 (P-value = 0.001***) ***means statistically highly significant

Season-wise prevalence of clinical diseases and disorders of pet dogs:

According to season the highest prevalence (29.59%) was seen in winter season (December-February) followed by 25.90% in summer (March-May), 24.27% in autumn and lowest 20.22 % in rainy season shown in Table 4.

Table 4. Season-wise prevalence of clinical diseases and disorders of pet dogs

Season	No. of affected dogs	Prevalence (%)	P Value
Summer (Mar-May)	365	25.90	<0.001***
Rainy (June-Aug)	285	20.22	
Autumn (Sep-Nov)	342	24.27	
Winter (Dec-Feb)	417	29.59	

**means statistically significant at 1% level of significance

Breed-wise prevalence of clinical diseases and disorders of pet dogs

According to breed the highest prevalence 34.56% of clinical disease and disorders were seen in local dogs followed by 14.05% in German shepherd dogs, 10.14% in Labrador breed, 7.94% in pug, 7.59% in Golden Retriever breed, 6.03 % in lhasa Apso breed, 5.89% in Doberman breed, 4.61% in Spitz breed, 3.97% in Boxer breed, 3.26% in Beagle breed and lowest 1.92% seen in Spaniel breed and shown in Table 5.

Table 5. Breed-wise prevalence of clinical diseases and disorders of pet dogs

Total no. of dogs	Name of the breed	No. of affected dogs	Prevalence (%)	P Value
1409	German Shepherd	198	14.05	<0.000***
	Local	487	34.56	
	Doberman	83	5.89	
	Golden Retriever	107	7.59	
	Lhasa-Apso	85	6.03	
	Labrador	143	10.14	
	Pug	112	7.94	
	Boxer	56	3.97	
	Spaniel	27	1.92	
	Beagle	46	3.26	
Spitz	65	4.61		

***means statistically highly significant

Efficacy of antibacterial drugs against secondary bacterial infection in canine parvo virus infection

Among the canine parvo virus infected dog, 30 animals were selected for antibacterial treatment against secondary bacterial infection. The antibacterial efficacy of Amoxicillin (Clavam®, Alkem Ltd.), Ceftriaxone (Monocef®, Aristo Ltd.) and Enrofloxacin (K FLOX®, KAP Animal Health Ltd.) were determined on the basis of recovery of the disease showed in table 6. The present study demonstrated the excellent efficacy of Amoxicillin @ 20 mg/kg body weight against secondary bacterial infection of canine parvo virus infection that significantly ($P < 0.05$) reduced the lesions of CPVI within 6.0 ± 0.32 days than Ceftriaxone @ 25 mg/kg body weight and Enrofloxacin @ 8 mg/kg body weight that took recovery period of 7.4 ± 0.25 and 7.9 ± 0.37 days respectively. Amoxicillin injection was found more effective to control the secondary bacterial infections and healing of CPVI lesion than the other Ceftriaxone and Enrofloxacin.

Efficacy of commercial drugs against Ehrlichiosis in dog:

Among the Ehrlichiosis infected dog, 20 animals were selected for treatment. The efficacy of drug Doxycycline (Docline®, Ear india overseas) and Rifampicin (R-Cin®, Lupin Ltd.) were determined on the basis of recovery of the disease showed in Table 7. The present study demonstrated the excellent efficacy of Doxycycline @ 10 mg/kg body weight against Ehrlichiosis reduced the clinical signs within 5.0 ± 0.32 days than Rifampicin @ 20 mg/kg body weight orally that took recovery period of 8.0 ± 0.25 days.

Table 6. Efficacy of antibacterial drugs against secondary bacterial infection in canine parvo virus infection

Name of the group	No. of animal treated	Name of antibiotic	Dose & route of administration	Average duration of complete recovery (days) (Mean±SE)
Group-A	10	Amoxicillin	@ 20mg/kg body wt. i/v daily for 7 days	6.0 ± 0.32
Group-B	10	Ceftriaxone	@ 25 mg/kg body wt. i/v daily for 7 days	7.4 ± 0.25
Group-C	10	Enrofloxacin	@ 8mg/kg body wt. i/v daily for 7 days	7.9 ± 0.37
Level of significance				0.070 (NS)

NS = means not significant

Table 7. Efficacy of commercial drugs against Ehrlichiosis in dog

Name of the group	No. of animal treated	Name of antibiotic	Dose & route of administration	Average duration of complete recovery (days) (Mean±SE)
Group-D	10	Doxycycline	@ 10mg/kg body wt. i/v daily for 3 days followed by orally for 18 days	5.0±0.32
Group-E	10	Rifampicin	@ 20 mg/kg body wt. orally daily for 21 days	8.4±0.25
Level of significance				0.170 (NS)

NS = means not significant

DISCUSSION

The different clinical and laboratory methods were used to study the prevalence of clinical diseases and disorders of pet dogs in City Veterinary Hospital Kathmandu Nepal for a period of 1 year. A total of 1409 sick pet dogs were examined during the study.

Prevalence of clinical diseases and condition of pet dogs

In this study the prevalence of Viral Disease was (26.54%) and internal parasites was (3.97%) which were higher than the findings of Hossain *et al.*, (2017) and Tarafder and Samad (2010). The prevalence of digestive disorders was (10.14%) which is closely related with the findings of Rakha *et al.*, (2015). In this study the prevalence of skin diseases was 7.16% which were lower than the study of Runa *et al.*, (2016) who found 18.69% skin infection. The prevalence of protozoan disease 6.52% was Lower with the findings of Smith *et al.*, (2011) and higher than the study of Samad *et al.*, (2010). Fungal disease and viral diseases of our study was Higher than the findings of Hossain *et al.* (2017).

Age-wise prevalence of clinical diseases and condition of pet dogs

In my study the prevalence of clinical diseases and disorders was highest above 36 months of age group and moderate in 7-36 months' age and lowest in 0-6months age groups which is similar with the findings of Tarafder and Samad (2010).

Season-wise prevalence of clinical diseases and condition of pet dogs

In this study the prevalence (29.59%) was highest in winter season (December-February) followed by 25.90% in summer (March-May), 24.27% in autumn and lowest 20.22 % in rainy season which were lower than the findings of Ghada Tagorti (2019) and similar with the findings of Hossain *et al.* (2017).

Breed-wise prevalence of clinical diseases and condition of pet dogs

In my study the highest prevalence 34.56% of clinical disease and conditions were seen in local dogs followed by 14.05% in German shepherd dogs, 10.14% in Labrador breed, 7.94% in pug, 7.59% in Golden Retriever breed, 6.03 % in lhasa Apso breed, 5.89% in Doberman breed, 4.61% in Spitz breed, 3.97% in Boxer breed, 3.26% in Beagle breed and lowest 1.92% seen in Spaniel breed, all the findings are nearly similar with the findings of Tarafder and Samad (2010).

Efficacy of antibacterial drugs against secondary bacterial infection in canine parvo virus infection

The antibacterial efficacy of Amoxicillin (Clavam®, Alkem Ltd.), Ceftriazone (Monocef®, Aristo Ltd.) and Enrofloxacin (Bacnil®, JJ Laboratories pvt.Ltd.) were determined on the basis of recovery of the disease. The present study demonstrated the excellent efficacy of Amoxicillin @ 20mg/kg body weight against secondary bacterial infection of canine parvo virus infection that significantly ($P<0.05$) reduced the lesions of CPVI within 6.0 ± 0.32 days which was similar with the findings of Kataria and Agnihotri *et al.*, (2020).

Efficacy of commercial drugs against Ehrlichiosis in dog

The present study demonstrated the excellent efficacy of Doxycycline @ 10mg/kg body weight against Ehrlichiosis reduced the clinical signs within 5.0 ± 0.32 days than Rifampicin @ 20 mg/kg body weight orally that took recovery period of 8.0 ± 0.25 days was similar with the findings of Harrus *et al.*, (1998).

CONCLUSION

On the basis of present findings, conclusion were found that among the clinical disease and disorders in dogs the highest prevalence was seen by Viral (26.54%) and the lowest prevalence was by Edema (2.41%), according to age wise distribution of diseases old dogs were more prone to disease and disorders than younger dogs, seasonal prevalence of clinical disease were found more in winter season, according to breed wise prevalence pure breed were found less prone to disease than local disease, according to choice of antibiotic for reduction of secondary bacterial infection was Amoxicillin as it significantly reduces the secondary bacterial infection in canine parvo virus infection than other antibacterial drugs.

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