

ORIGINAL ARTICLE

Diseases of dogs and cats recorded in the Bangladesh Agricultural University Veterinary Teaching Hospital during 2009–2020

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Abstract

Background: A retrospective study was performed to estimate the occurrence and distribution of diseases or conditions in dogs and cats belonging to the Mymensingh division and the surroundings that were brought to Bangladesh Agricultural University Veterinary Teaching Hospital (BAUVTH) for treatment and management from January 2009 to December 2020.

Methods: Data on animal species, age, sex, and reporting time of clinical cases were collected from the case register book of BAUVTH to determine the percentages of various diseases or conditions in dogs and cats using Microsoft Excel (2007).

Results: In this study, 2535 small animals (e.g., dogs and cats) with various diseases or conditions were considered. Of the total diseases or conditions, 72.39% and 27.61% belonged to dogs and cats, respectively. From 2009 onwards, there was a progressive trend in the number of cases recorded in these animals. The highest occurrence of diseases was found as cutaneous wounds (18.89%), and the lowest was found as conjunctivitis (0.72%) as well as epistaxis (0.79%) in the animals. In addition, male dogs (49.69%) and female cats (16.94%) showed greater frequencies of various diseases or conditions than the corresponding female dogs (23.35%) and male cats (10.63%). Although the adult dogs (42.67%) were more frequently affected by different diseases or conditions than the younger ones (20.53%), cats (15.65%) up to six months of age were predominantly affected by several diseases or conditions than the older ones (11.94%). Moreover, the diseases or conditions in dogs were observed to be higher in the winter (28.41%) followed by the rainy (23.15%) and summer (20.84%) seasons. Likewise, cat diseases or conditions were more frequently observed in the winter (11.70%) followed by summer (8.99%) and rainy (6.90%) seasons. Furthermore, 48.32% of surgical and 51.68% of non-surgical cases were found in all the animals.

Conclusion: Dogs and cats were usually presented with various clinical cases in that particular region. Male dogs and female cats suffered more frequently than female dogs and male cats. Age and seasonal variations may also be responsible for different affections. These findings might be helpful for the development of certain disease control and management strategies for pet animals.

Keywords : Canine and feline diseases, age, sex, season, hospital

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Introduction

Pet animals are very popular with a significant percentage of dogs and cats irrespective of social status worldwide, including Bangladesh. In many households, pet animals contribute to the physical, social, and mental development of children (Dohoo *et al.*, 1998; Robertson *et al.*, 2000). A well-trained dog may replace a qualified person to perform certain specific functions such as psychological attachments, trusted guard to detect arms and narcotics in the police, military, and so on (Rahman, 1988). Similarly, cats have become more common as pets around the world, irrespective of religion and age (Lepczyk *et al.*, 2010).

Despite the beneficial effects, pets are a major threat to public health due to the transmission of various zoonotic diseases (Robertson *et al.*, 2000). In addition, domestic dogs and cats pose a significant risk as reservoirs for several infectious diseases from wild canids (Bronson *et al.*, 2008) while sharing the same environment with humans (Dada *et al.*, 1979; Kornblatt and Schantz, 1980). Dogs and cats are the reason for a wide range of diseases and risks to other wildlife species and human beings (Moodie, 1995). For instance, the cat is the definitive host of *Toxoplasma gondii*, a parasite that is responsible for a wide variety of ailments in humans (Smith and Frenkel, 1995; Dubey, 2002; Webster and Dubey, 2010) such as schizophrenia, epilepsy, altered personality, and aggregated neuroticism (McAlister, 2005; Lafferty, 2006; Palmer, 2007; Torrey *et al.*, 2015). Besides, both species are the sources of rabies and plague, and are responsible for spreading these diseases to society (Eng and Fishbein, 1990; Craven *et al.*, 1993). Bacterial diseases e.g., scratch fever, *Salmonella* causing diarrhea, leptospirosis and giardiasis are most common in dogs and cats (Thompson *et al.*, 1993; Bolin, 1996; Bugg *et al.*, 1999), whereas viral diseases e.g., rabies, canine distemper, infectious canine hepatitis, feline panleukopenia virus are frequently found in these animals (Scott, 1980; Van-Vuuren *et al.*, 2000; Decaro *et al.*, 2007). Apart from infectious diseases, there are a lot of surgical cases commonly found in dogs and cats.

Different types of wounds, such as open, punctured, and penetration wounds, are often noticed in these animals (Parvez *et al.*, 2014; Saker *et al.*, 2015a). Moreover, myiasis, trauma, abscess, fracture, hematoma, neutering (castration), and spaying have also been reported (Tarafder and Samad, 2010; Parvez *et al.*, 2014).

Prevention and management of animal diseases are very essential to ensure a healthy environment and society for pet animals as well as their owners. Positive knowledge, along with better hygiene measures, is the key element in this regard after proper judgement of the origin and distribution of diseases (Plaut *et al.*, 1996; Beugnet and Marie, 2009; Ettinger and Feldman, 2009). This study has been designed to investigate the occurrence of diseases in dogs and cats focusing on certain environmental and animal features for easier disease control and prevention in the future.

Materials and methods

A retrospective study was conducted using the clinical case records of the Bangladesh Agricultural University Veterinary Teaching Hospital (BAUVTH). For this, necessary data on animal species, age, sex, time of case reporting, and types of clinical cases were compiled from January 2009 to December 2020 with the consent of the BAUVTH authority.

Study animals and area

A total of 2535 dogs (n = 1835) and cats (n = 700) were subjected to this study, which were brought to BAUVTH for the purpose of treatment and management of various diseases or conditions during that period of time. These animals mainly belonged to the division of Mymensingh and its surroundings, the north-central part of Bangladesh (Figure 1).

Recorded diseases or conditions

Several diseases or conditions i.e., cutaneous wound, fracture, trauma, myiasis, castration, spaying, alopecia, diarrhea, inappetence, lice infestation, influenza, weakness, vomiting, conjunctivitis and epistaxis of the selected

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animals were recorded from the routine case register book of BAUVTH to perform the retrospective analysis.

Data processing and analysis

Animal age was categorized as young or adult; dog: young (0 to 10 months) and adult (11 months to above), cat: young (0 to 6 months) and adult (7 months to above). Months of case reporting were converted to seasons: summer (March to June),

rainy (July to October) and winter (November to February). The data obtained from this study were entered in the Microsoft Excel (2007) spread sheet, and further descriptive statistics were performed to calculate the percentages of various diseases or conditions in dogs and cats according to species, age, sex, and seasonal variations along with the types of certain clinical cases using the Microsoft Excel (2007) software.

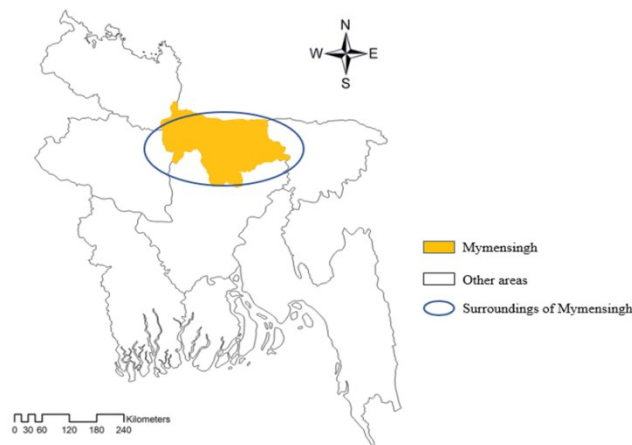


Figure 1: Map of Bangladesh showing the locations of the study area, i.e., BAUVTH (Mymensingh) and the reported animal habitats (Mymensingh and surroundings)

Results

The number of yearly recorded diseases or conditions of dogs and cats have been illustrated in Figure 2. A rising trend was found in the number of recorded cases with the progression of time. The lowest number ($n = 102$) of total cases of dogs and cats was recorded in 2009, whereas in 2020 the recorded cases were almost three times higher ($n = 316$). From 2018 onwards, the sole cases of dogs decreased, while there was a remarkable increase in the cases of cats recorded in 2020. Likewise, the numbers of monthly as well as seasonally recorded diseases or conditions of the animals have been embellished in Figure 3. From November to February (winter), the highest numbers of cases were found in both dogs ($n = 720$) and cats ($n = 297$), whilst March to June

(summer) and July to October (rainy) showed the most fluctuating pattern in the numbers of cases recorded in the animals.

The frequency and percentage of various diseases or conditions according to the species of animals are presented in Table 1. Dogs were more frequently (72.39%) affected by different diseases or conditions than cats (27.61%). In the case of dogs, cutaneous wounds (15.62%) and alopecia (13.49%) were the most frequently occurring cases, whereas inappetence (11.68%) and trauma (8.35%) were fairly common cases. On the contrary, spaying (6.62%) was the most common case followed by diarrhea (3.62%), inappetence (3.62%), and cutaneous wound (3.27%) in the cats. Overall, both species together presented cutaneous wounds (18.89%), inappetence

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(15.27%), and alopecia (14.16%) which were much more evident than the other affections.

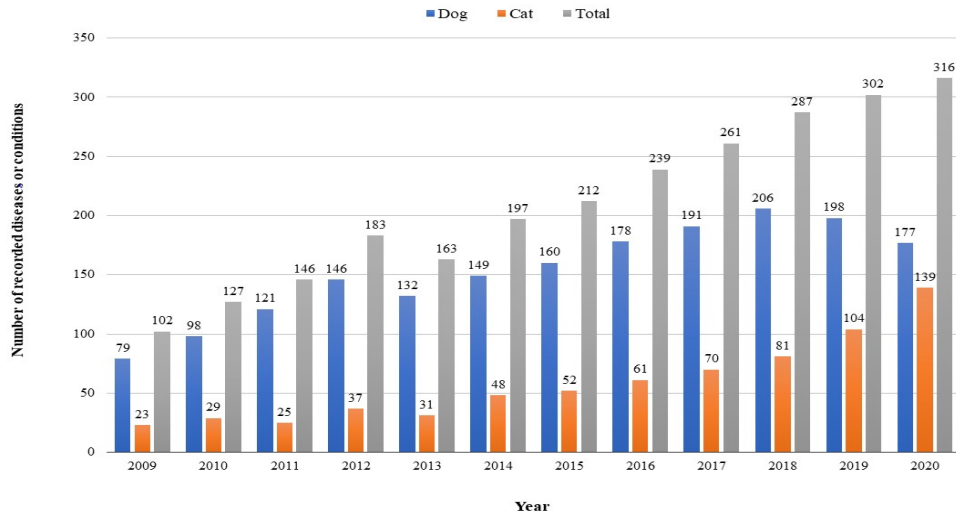


Figure 2: Year-wise number of the diseases or conditions of dogs and cats recorded between 2009 and 2020

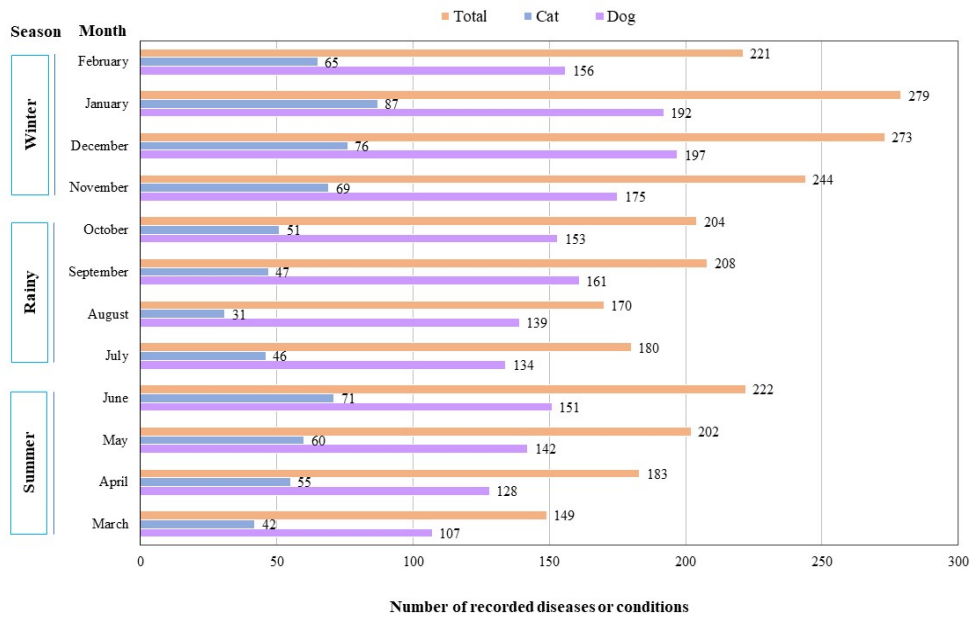


Figure 3: The monthly distribution of the diseases or conditions of dogs and cats between 2009 and 2020

Diseases of dogs and cats recorded at BAUVTH during 2009-2020

Table 1: The distribution of various diseases or conditions in dogs and cats attended at BAUVTH between 2009 and 2020

Diseases or conditions	Species					
	Dog		Cat		Dog + Cat	
	Frequency	%	Frequency	%	Frequency	%
Cutaneous wound	396	15.62	83	3.27	479	18.89
Fracture	55	2.16	27	1.09	82	3.23
Trauma	212	8.35	73	2.88	285	11.24
Myiasis	64	2.54	9	0.35	73	2.89
Castration	74	2.91	27	1.06	101	3.98
Spaying	37	1.46	168	6.62	205	4.09
Alopecia	341	13.49	18	0.74	359	14.16
Diarrhea	83	3.27	92	3.62	175	6.90
Inappetence	295	11.68	92	3.62	387	15.27
Lice infestation	54	2.13	10	0.39	64	2.52
Influenza	38	1.50	-	-	38	1.50
Weakness	56	2.20	46	1.81	102	4.02
Vomiting	110	4.34	37	1.46	147	5.80
Conjunctivitis	10	0.39	8	0.31	18	0.72
Epistaxis	10	0.39	10	0.39	20	0.79
Total	1835	72.39	700	27.61	2535	100.00

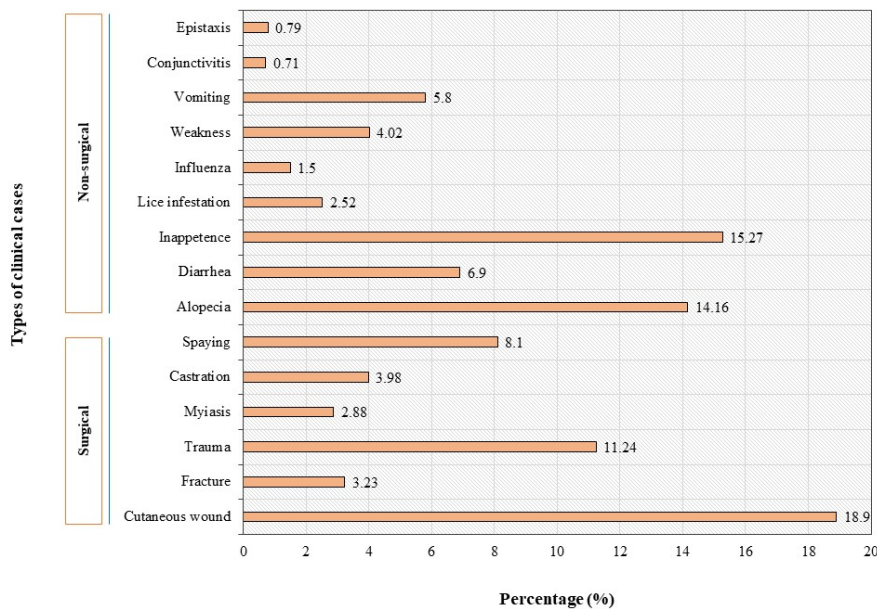


Figure 4: The distribution of surgical and non-surgical cases of dogs and cats attended at BAUVTH during 2009-2020

The age-wise distributions of various diseases or conditions in both dogs and cats are

furnished in Table 2. In the case of dogs, young animals (20.53%) were less prone to different diseases or conditions than adults

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(42.67%). On the other hand, young cats (15.65%) were frequently found to have different diseases or conditions than aged cats (11.94%).

The distributions of various diseases or conditions of the animals according to sex are shown in Table 3. In the case of dogs, the male

individuals (49.69%) were more frequently affected by the diseases or conditions than their female counterparts (23.35%). In contrast, female cats (16.94%) suffered more frequently from different diseases or conditions than males (10.63%).

Table 2: The age-wise distribution of various diseases or conditions in dogs and cats attended at BAUVTH between 2009 and 2020

Diseases or conditions	Age							
	Dog				Cat			
	Young (0-10 months)		Adult (≥ 11 months)		Young (0-6 months)		Adult (≥ 7 months)	
	Frequency	%	Frequency	%	Frequency	%	Frequency	%
Cutaneous wound	67	2.64	329	12.98	18	0.71	65	2.56
Fracture	19	0.75	36	1.42	16	0.63	11	0.43
Trauma	84	3.31	128	5.05	41	1.62	32	1.26
Myiasis	25	0.99	39	1.54	2	0.08	7	0.28
Castration	9	0.35	65	2.56	27	1.06	-	-
Spaying	-	-	37	1.46	168	6.63	-	-
Alopecia	84	3.31	25	0.98	5	0.19	13	0.51
Diarrhea	47	1.85	36	1.42	39	1.54	53	2.09
Inappetence	63	2.48	232	9.15	28	1.10	64	2.52
Lice infestation	19	0.75	35	1.38	6	0.24	4	0.16
Influenza	21	0.83	17	0.67	-	-	-	-
Weakness	13	0.51	43	1.69	17	0.67	29	1.14
Vomiting	63	2.48	47	1.85	19	0.75	18	0.71
Conjunctivitis	3	0.12	7	0.28	5	0.19	3	0.12
Epistaxis	4	0.16	6	0.24	6	0.24	4	0.16
Total	521	20.53	1314	42.67	397	15.65	303	11.94

Diseases of dogs and cats recorded at BAUVTH during 2009-2020

Table 3: The sex-wise distribution of various diseases or conditions in dogs and cats attended at BAUVTH between 2009 and 2020

Diseases or conditions	Sex							
	Dog				Cat			
	Male		Female		Male		Female	
	Frequency	%	Frequency	%	Frequency	%	Frequency	%
Cutaneous wound	267	10.53	129	5.10	37	1.46	46	1.81
Fracture	46	1.81	9	0.35	18	0.71	9	0.35
Trauma	158	6.23	54	2.13	37	1.46	36	1.42
Myiasis	45	1.77	19	0.75	-	-	9	0.35
Castration	74	2.92	-	-	27	1.06	-	-
Spaying	-	-	37	1.46	-	-	168	6.63
Alopecia	258	10.80	83	3.27	9	0.35	9	0.35
Diarrhea	46	1.81	37	1.46	46	1.81	46	1.81
Inappetence	193	7.61	102	4.02	55	2.17	37	1.46
Lice infestation	36	1.42	18	0.71	1	0.04	9	0.35
Influenza	9	0.35	29	1.14	-	-	-	-
Weakness	38	1.49	18	0.71	9	0.35	37	1.46
Vomiting	64	2.52	46	1.81	19	0.75	18	0.71
Conjunctivitis	3	0.19	7	0.28	5	0.19	3	0.12
Epistaxis	6	0.24	4	0.16	7	0.28	3	0.12
Total	1243	49.69	592	23.3	270	10.63	430	16.94

Table 4: The seasonal variations of dog and cat diseases or conditions attended at BAUVTH between 2009 and 2020

Diseases or conditions	Seasonal variations											
	Dog						Cat					
	Summer		Rainy		Winter		Summer		Rainy		Winter	
	F	%	F	%	F	%	F	%	F	%	F	%
Cutaneous wound	93	3.67	119	4.69	184	7.26	27	1.06	19	0.75	37	1.46
Fracture	19	0.75	5	0.19	31	1.22	8	0.32	5	0.19	14	0.55
Trauma	41	1.62	46	1.81	125	4.93	14	0.55	47	1.85	12	0.47
Myiasis	31	1.22	16	0.63	17	0.67	6	0.24	2	0.08	1	0.04
Castration	63	2.49	4	0.16	7	0.28	11	0.43	7	0.28	9	0.36
Spaying	19	0.75	4	0.16	14	0.55	93	3.67	14	0.55	61	2.41
Alopecia	144	5.68	118	4.65	79	3.12	12	0.47	1	0.04	5	0.19
Diarrhea	29	1.14	15	0.59	39	1.54	26	1.03	23	0.91	43	1.69
Inappetence	67	2.64	181	7.14	47	1.85	17	0.67	21	0.83	54	2.13
Lice infestation	7	0.28	6	0.24	41	1.62	2	0.08	3	0.12	5	0.19
Influenza	-	-	2	0.08	36	1.42	-	-	-	-	-	-
Weakness	8	0.32	26	1.03	22	0.87	10	0.39	12	0.47	24	0.95
Vomiting	7	0.28	32	1.26	71	2.80	2	0.08	14	0.55	21	0.83
Conjunctivitis	-	-	7	0.28	3	0.12	-	-	3	0.12	5	0.19
Epistaxis	-	-	6	0.24	4	0.16	-	-	4	0.16	6	0.24
Total	528	20.84	587	23.15	720	28.41	228	8.99	175	6.90	297	11.70

F = Frequency

The seasonal distributions of diseases or conditions of the animals are presented in Table 4. The occurrences of different diseases or conditions in dogs were higher in the winter (28.41%) followed by the rainy (23.15%) and summer (20.84%) seasons. Likewise, cat diseases or conditions were more frequently observed in the winter (11.70%), followed by the summer (8.99%) and rainy (6.90%) seasons.

The distribution of different types of clinical cases in dogs and cats has been presented in Figure 4. The non-surgical cases (51.68%) were slightly more prevalent than the surgical cases (48.32%) in the animals.

Discussion

In the present study, several clinical conditions and disorders of dogs and cats admitted to the BAUVTH were investigated based on 12 years of hospital records. The recorded cases of those animals have consecutively increased over the

years of the study period. This might be due to the increase in the number of dogs and cats in that region, which reveals that people nowadays are keeping more pets and companion animals, indicating a developed socio-economic status. Thus, the number of diseases or conditions of these animals is increasing, and animal owners often visit the BAUVTH for the treatment and management of their pet animals. In addition, the latest record of cat diseases or conditions revealed noticeable increase in the number than those of the dogs, which might be due to the greater preferences of people to keep cats as recreational animals rather than dogs. As a consequence, cases of this species (i.e., cat) were found much more frequently than before.

The most frequent disease was recorded as a cutaneous wound in the animals. Ihrke (1987) reported that wounds may be superficial and involve only the epidermis, or they may affect deeper structures in the dermis or subcutaneous tissue, and it is therefore divided into surface, superficial and deep pyoderma; and these lesions are more common in dogs than in cats (Moriello, 2011). This study observed that the male dogs were frequently affected by cutaneous wounds which might be due to the greater tendency of fighting, biting and self-inflicted injuries than the female dogs and cats for which accidental trauma, lacerations, bacterial, viral or fungal dermatitis, ulcers, scabies or other parasitic infestations, and injuries after superficial surgical approaches are the common causes of different types of superficial wounds (Shahar *et al.*, 1997; Holt and Griffin, 2000; Moselemi *et al.*, 2012; Ghasemzadeh and Namazi, 2015; Kim and Park, 2016; Diwakar and Diwakar, 2017; Abd-Alfatah, 2019). Despite this, all these incidences are often found in all dogs and cats. However, the male dogs during the winter were frequently observed with this type of lesion. This might be due to weather and environmental facts, i.e., non-humid and arid airflow with less prevailing moisture; and there is a tough, dull, and fragile skin tone which easily gets injured in the form of tears,

splits, or cuts of various sizes and shapes than in the other seasons.

The second most prevalent clinical condition was observed as inappetence in this study. This is often due to a sequel of other diseases or disorders, or an indicator of progressive illness in dogs and cats (Brooks, 2020). The probable causes of inappetence or anorexia in these animals might be any systemic disease or organ dysfunction involving the liver, kidney or gastrointestinal tract, diabetes, immune disorders, oral cavity affections (i.e., gingivitis, stomatitis, esophagitis, pain in mastication, periodontal diseases, salivary gland disorders, tumor or neoplastic growth, etc.); environmental factors, habitual inadequate food taking, and side effects of medications (Vansteelandt *et al.*, 2013; Llera and Downing, 2022). In this study, the male dogs during the rainy season were typically found to suffer from this clinical condition, which might be attributed to the environmental changes during this season along with some psychological factors derived from stress, altered dietary and work routine, increased shelter time involving idle sitting and resting rather than outside roaming and searching, and changes in food and ambient temperature. In addition, water-borne diseases such as diarrhea, dysentery, and typhoid resulting in imbalances in body fluid and electrolytes might be the possible reasons for anorexia in dogs.

Alopecia and trauma were moderately found in the dogs and cats during this study. The causes of alopecia include allergies and itching followed by biting, rubbing, rolling, licking, etc. from an insect bite, food and drug adverse reactions, pyoderma, *Malassezia* dermatitis, dermatophytosis, demodicosis as well as scabies; and hypothyroidism, hyperadrenocorticism, and follicular dysplasia are also reported as the reasons of canine and feline alopecia (Scott *et al.*, 1995; Frank, 2009; Shipstone, 2013; Coyner, 2019). Whilst traumas in these animals are usually associated with sharp objects, traffic accidents, animal bite, avulsion, fall, crush, burn,

gunshot, and iatrogenic as well as surgical origins; and are mainly involved in the limbs and extremities (Cojocaró *et al.*, 2021). The male dogs in the summer and winter were especially found to have the highest proportion of alopecia and trauma, respectively, during the present study. The optimal environmental conditions for external parasites (i.e., fly, flea, tick, lice, and mite), pollen grains, allergen dust, and sun exposure during the summer might be the possible predisposing factors for eliciting the conditions of allergy and rubbing-related alopecia; whereas during the winter, environmental stress, apathy, dullness, musculoskeletal tonicity and rigidity due to cold weather, fighting characteristics in search of food and mate, difficulties in visibility and movement during early morning and late night due to the foggy atmosphere, road accidents and injuries might be the possible reasons for trauma.

Diarrhea and vomiting were recorded as mild cases during this survey. During the winter, the adult cats were frequently observed to be affected by diarrhea, whereas the young male dogs were mostly found to have vomiting. Diarrhea is a common problem in dogs and cats (Battersby and Harvey, 2006) secondary to disorders affecting the small or large intestines, or both (Hall, 2009). It is often reported as a self-limiting disorder. The exact etiology is not always established. Despite this, the common causes of canine and feline diarrhea often include dietary indiscretion, food intolerance, sudden change in dietary composition, infectious organisms (e.g., parvovirus, adenovirus, enterovirus, *Salmonella* spp., pathogenic *Escherichia coli*, *Campylobacter jejuni*, *Clostridium difficile*, *Clostridium perfringens*, *Yersinia* spp., *Giardia*, *Cryptosporidium*, *Coccidia*, *Isospora*, *Tritrichomonas fetus*, *Toxocara* spp., *Taenia* spp., *Dipylidium caninum*, *Trichuris vulpis*, *Uncinaria stenocephala* etc.), anatomical abnormalities (e.g., intussusception), toxin exposure, and metabolic or systemic diseases (Battersby and Harvey, 2006; Hall and Day, 2017). Most of these causes are also found as the reasons for vomiting in dogs and cats. Acute gastrointestinal

upset, acute hepatic and renal failure, pancreatitis, motion sickness, dietary abnormalities (i.e., garbage-eating, ingestion of foreign bodies, sudden change in diet, etc.), poisoning, and specific gastrointestinal ailments (i.e., parasites, gastrointestinal viruses, dietary intolerances, cancers, and congenital abnormalities) can definitely lead to vomiting (Simpson, 2005).

Around 4% of animals of either species were found with surgical cases such as castration and spaying. Spaying was found more frequently than castration in both dogs and cats. Castration is often performed to eliminate male aggressive behavior, urine spraying, vocalization, mounting, etc., whereas spaying is often carried out to control unnecessary breeding as well as to prevent potential female reproductive diseases, e.g., pyometra, metritis, dystocia, vaginal bleeding and neoplasms (Gobello *et al.*, 2001; Kustritz, 2007).

Apart from these, some less frequent cases were observed as weakness, fracture, myiasis, lice infestation, and influenza. Dogs were found to suffer more from general weakness than cats, and the causes might be nutritional deficiencies as well as chronic wasting diseases. In the case of fracture, the young male dogs during the winter showed this trouble most frequently than the others. Most fractures are the results of trauma such as being hit by a car, falling from a height, being stepped on or from a fight, and sometimes from abnormally weak bones due to cancer and severe nutritional imbalance (Drisko and Edwards, 2011). In the case of myiasis, the male dogs during the summer were affected most, and the possible cause might be the warm and humid climate that had a great effect on developing myiasis, as also reported by Bolognia *et al.* (2008). Besides these, the male dogs were comparatively more susceptible to having lice infestations during the winter. The reliable cause might be the dirty and patchy hairs due to irregular washing and showers during cold weather, and lice, being the common ectoparasite, might get a hospitable environment to live and spread (Bowman, 1995). Moreover, the dogs in winter were typically found to suffer from

influenza. In fact, young and adult small animals are equally susceptible to influenza. About 80% of infected dogs with H₃N₈ usually show mild signs, and the fatality rate for Greyhounds in early outbreaks was 5 to 8% (Carter *et al.*, 2006). However, the overall fatality rate of influenza in the general pet and shelter population is probably less than 1% (Morais and Aufran, 2006).

The least common diseases and disorders in dogs and cats were recorded as conjunctivitis and epistaxis. Chronic or intermittent epistaxis is more common with oronasal fistulas, allergic rhinitis, and nasal tumors; often, these diseases begin with mucoid nasal discharge that later progress to epistaxis (Hawkins *et al.*, 1998; Taylor *et al.*, 2000; Forrester *et al.*, 2002). However, this study showed that the non-surgical cases were somewhat greater in percentage than the surgical cases. This might be attributed to the core etiology of non-surgical cases derived from a wide variety of clinical diseases or conditions mostly subjected to medicinal treatment and management.

Conclusion

Both surgical and non-surgical cases were common among the dogs and cats in the study area. Overall, the recorded diseases or conditions were more frequently observed in the male dogs and female cats than in the female dogs and male cats. Animal age as well as seasonal variations also play vital roles as predisposing factors for disease occurrence. The insights of this study might be helpful in the formulation of effective disease control and therapeutic management strategies, including appropriate vaccination programs and public awareness campaigns.

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Competing Interest Statement

The authors declare that they have no competing interests.

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