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EPIDEMIOLOGICAL INVESTIGATION OF DIFFERENT DISEASES OF PET ANIMALS AT DHAKA CITY, BANGLADESH

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ABSTRACT

A cross sectional prospective study was carried out to determine the prevalence of demographic status associated with pet owners and animals, and pattern of drugs used in prescription during study period from February 2019 to April 2019 at Central Veterinary Hospital (CVH), Dhaka, Bangladesh. A total of 493 clinical cases were analyzed and found that educated and illiterate calculated as 64.2% and 13.8% of dog owners, and 89.4% and 10.6% of cat owners. Among the pet animals, males were higher (dogs 64.3%, cats 52.1%) compared to females (dogs 35.7%, cats 47.9%). In relation to breed of pet animals, local breed was higher in both cases of dogs (33.4%) and cats (55.9%). Tendency of pet owners for deworming (36.4% in dogs, 23.9% in cat) and vaccination (45.3% in dogs, 37.8% in cats) were not satisfactory. The prevalence of non-infectious diseases was 40.7% in dogs and 59.6% in cats followed by infectious diseases (26.6% in dogs, 14.9% in cats). Overall prescribed antimicrobials were higher (49.5% in dogs, 62.2% in cat) than others. Among them, most frequently used antimicrobials in dogs were fluroquinolone with metronidazole/beta lactams (93.7%) in infectious case followed by Cephalosporin (56.3%) due to non-infectious case. On the contrary, metronidazole was used (100%) due to non-infectious case followed by cephalosporin (28.3%) in infectious case in cats. These results indicate the level of awareness of vaccination and deworming practice, management styles of their pets in Dhaka and socio economic condition of owners.

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INTRODUCTION

Companion animals like dogs and cats are commonly considered as family members, and play a role in human-animal relationship. They are recognized to everywhere in the world as household pets. Although pet animals are not reared commercially, they play an important role on human life which provides recreation, pleasure and company and thus may lead a peaceful life instead of monotonous life. Dogs and cats have significant benefits to the society like companionship, play with children, guard the house and from any adverse condition alert the owner, used as gift to special one and economic purpose (Parvez et al., 2014). Pet ownership is associated with many benefits for people including companionship and physiological and psychological health (Cutt et al., 2008; Headey & Grabka, 2007; Herzog, 2011). In order to maximize these benefits it is also important to understand any risks to public health from zoonosis (Jackson, 2005). Dogs and cats in their life span, suffer from many fatal diseases like bacterial, viral, protozoal, nutritional deficiency and systemic diseases (Singh & Singh, 2016).Today, dogs in Western Europe primarily live indoors, share living spaces with their owners, and assume integral roles as companions, family members, or service animals (Katz, 2004; Franklin, 2006) and this more intimate relationship between pet and their owners has the potential to increase the risk of human exposure to zoonotic diseases (Sato et al.2000). Zoonotic diseases have among others a major impact on the welfare of pets. They may also represent a constant risk to humans due to their zoonotic nature, which emphasizes the importance of pets as reservoirs (Biobaku & Amid, 2018; Maggi & Krämer, 2019).

The lack of sensitive awareness of animal welfare and disease issues, the restricted economic and technological access to proper veterinary care, and the absence of responsible pet ownership, have created conditions for the emergence and persistence of many diseases that ultimately affect people, livestock, and wildlife (Jenkins *et al.*, 2011; Fung et al., 2014; Weston et al., 2014). Besides, socioeconomic, demographic and ecological factors, including globalization, increase in international trade, tourism and travel, climate change and its effect on disease distribution in time and space, have also to be reconsidered. Due to high prevalence of infectious diseases in pets and the close bonds in which dogs and cats live together with people, the risk of transmission of the diseases to humans seems to be obviously high in densely populated Dhaka city of Bangladesh (Tarafder & Samad, 2010). Considering the close association of pet animals and human beings and increasing trend of pet rearing, it is important to know the status of diseases of pet and stray dogs and awareness of owners about this in Dhaka city, Bangladesh. Literature reveals that limited study regarding the prevalence of diseases of pet animals in Dhaka city of Bangladesh has been conducted so far. Keeping in view these facts, the present study was carried out to estimate the proportionate prevalence of different disease of dog and cat recorded in CVH along with patients and owners demography, and the most frequently prescribed drugs in different pet species was also quantified.

MATERIALS AND METHODS

Location of the Study

This study was conducted in the central veterinary hospital located at 48 Kazi Alauddin Road, Dhaka of Bangladesh which is a renowned Government Veterinary Hospital where 90 to 100 patients came everyday among which 50% is pet. As a diagnostic facility the hospital has parasitology, pathology and microbiology laboratories and facilities for imaging techniques (X-ray, Ultrasonography). The hospital has a well-structured paper based data recording system.

Type and duration of the study

High degree of patient load in CVH make the author interested to conduct a cross sectional study based on the data recorded from February to April 2019.

Categorization of population

A total of 493 pet animals were considered during this study where dogs and cats were 305 and 188 respectively. All patients were first registered in the patient register book including date, age, sex, breed of the animals and complaint of the owners. Owners were also categorized as male, female, educated, illiterate etc. Diagnostic procedures were systematically performed of the registered patient as described by (Samad, 2008).

Collection of history

Details history of the patients admitted at CVH and owners were recorded such as age, sex, breed, vaccination and deworming status, diet, environmental history, management history etc. Owners' history and complaint were recorded as well.

Physical and Laboratory examination

Distant and close inspection of the patient, pulse, respiration and rectal temperature recording were performed. To investigate the clinical findings, examination of the different organs and systems of the body using physical examination techniques of palpation, percussion and auscultation were conducted. The animals were properly restrained using mouth gag and local anesthesia whenever required. Fecal samples were collected and examined at CVH, Dhaka for parasitological examination. Samples of skin scrapings, blood and urine were collected for pathological and microbiological examinations at the Central Disease Investigation Laboratory (CDIL), Dhaka. Radiography or ultrasonography was subjected as well in some cases. Post mortem examination was also conducted in case of dead animals for necropsy findings and samples collection.

Categorization of diseases and treatment

According to diagnosis, diseases were classified as infectious, non-infectious, gynecological, surgical etc. Drugs were divided as per treatment prescribed in individual patient like antimicrobial, anthelmintic, NSAID, antihistaminic, nutritional etc.

Statistical analysis

Recorded data were assembledin Microsoft Excel-2007. The data were transferred from MS Excel- 2007 to STATA-14.2 (College station road, Texas, USA) for analysis. The results were expressed in frequency number and percentage.

RESULTS AND DISCUSSION

Demographic characteristics of pet owners

The demographic characteristics consist of owner gender, educational status, pattern of animal sources are listed table 1. In this study, a total number of pet owners recorded in register book at CVH, Dhaka were 493, of which dog owners and cat owners encountered 305 and 188 respectively. Among the dog owners, males (79.7%) and females (19.7%) were investigated and in case of cat owners, males and females were 53.2% and 46.8% respectively. The study of Rijken & van Beek (2011) was in line with this findings. They reported that number of male pet owners was higher than female owners but gender was not an important predictor except for loneliness. In respect of educational status of pet owners, educated and illiterate calculated as 64.2% and 13.8% of dog owners and 89.4% and 10.6% of cat owners. Moreover, when sources of animals were observed, most of the owners purchased (64.2% of dog and 59.6% of cat) their animals from market or pet farms.

Table 1. Pet owners' demographic information

Variable	Category	Dog Owner (N=305)		Cat Owner (N=188)	
		Frequency, n (%)	95% CI	Frequency, n (%)	95% CI
Gender	Male	243 (79.7)	74.7-84	100 (53.2)	45.8-60.5
	Female	60 (19.7)	15.4-24.6	88 (46.8)	39.5-54.2
	3rd	2 (0.7)	0.07-2.3	-	-
Educational status	Educated	263 (64.2)	81.8-89.9	168 (89.4)	84-93.4
	Illiterate	42 (13.8)	10.1-18.1	20 (10.6)	6.6-16
Source of animal	Purchase	196 (64.2)	58.6-69.6	112 (59.6)	52.2-66.7
	Own	89 (29.2)	24.1-34.6	65 (34.5)	27.8-41.8
	Street	20 (6.6)	4-9.9	11 (5.9)	3-10.2

Table 2. Frequency distribution of Pet's demography and physical status

Variable	Category	Dog (N=305)		Cat (N=188)	
		Frequency, n (%)	95% CI	Frequency, n (%)	95% CI
Sex of animal	Male	196 (64.3)	58.6-69.6	98 (52.1)	44.7-59.5
	Female	109 (35.7)	30.4-41.4	90 (47.9)	40.5-55.3
Breed	Local[DC]	102 (33.4)	28.2-39	105 (55.9)	48.4-63.1
	German Spitz[D], Persian[C]	69 (22.6)	18-27.7	75 (40)	32.8-47.3
	German Shepherd[D]	56 (18.4)	14.2-23.2	-	1.5-7.5
	Retriever,Bengal[C]	16 (5.3)	3-8.4	1 (0.5)	0.01-2.9
	Cross[DC]	13 (4.3)	2.3-7.2	7 (3.7)	
	Lhasa Apso[D]	12 (3.9)	2-6.8	-	
	Pitt bull[D]	11(3.6)	1.8-6.4	-	
	Great Dane[D]	5 (1.6)	0.53-3.8	-	
	Rottweiler[D]	5 (1.6)	0.5-3.8	-	
	Sarail[D]	3 (1)	0.2-2.8	-	
	Dachshund[D]	3 (1)	0.2-2.8	-	
	Poodle[D]	3 (1)	0.2-28	-	
	Husky[D]	2 (0.7)	0.08-2.3	-	
	Doberman[D]	2 (0.7)	0.08-2.3	-	
	Dalmatian[D]	1 (0.3)	0.0083-1.8	-	
	Chihuahua[D]	1 (0.3)	0.0083-1.8	-	
	St. Bernard[D]	1 (0.3)	0.008-1.8	-	
Rearing system	Intensive	117 (38.4)	32.9-44.1	86 (45.7)	38.5-53.2
	Free range	106 (34.8)	29.4-40.4	81 (43.1)	36-50.5
	Semi intensive	82 (26.9)	22-32.2	21 (11.2)	7-16.6
De worming	No	194 (63.6)	57.9-69	143 (76.1)	69.3-82
	Yes	111 (36.4)	31-42.1	45 (23.9)	18-307
Vaccination	No	167 (54.8)	49-60.4	117 (62.2)	54.9-69.2
	Yes	138 (45.3)	39.6-51	71 (37.8)	30.8-45.1
Physiological status	Un castrated	185 (60.7)	54.9-66.2	78 (41.5)	34.4-48.9
	Dry	105 (34.4)	29.1-40.1	75 (39.8)	32.8-47.3
	Castrated	11 (3.6)	1.8-6.4	23 (12.2)	7.9-17.8
	Estrus Period	2 (0.7)	0.08-2.3	11 (5.9)	3-10.2
	Pregnant	2 (0.7)	0.08-2.3	1 (0.5)	0.01-2.9
Health status	Good	209 (68.5)	63-73.7	119 (63.3)	56-70.2
	Emaciated	60 (19.7)	15.4-24.6	36 (19.2)	13.8-25.5
	Cachectic	22 (7.2)	4.6-10.7	22 (11.7)	7.5-17.2
	Obese	14 (4.6)	2.5-7.6	11 (5.9)	3-10.2

[D]: Dog breed; [C]: Cat breed

Demographic distribution of pet animals

Demographic characteristics of pet animals considered in this study like sex, breed, deworming and vaccination status, rearing systems, physiological and health status were given in Table 2. A total of 493 pet animals were listed in the registered book where numbers of dogs were 305 and cats were 188. Male dogs and female dogs were found 64.3% and 35.7% among the total pet dogs. On the other hand, in case of cat, males and females were 52.1% and 47.9% respectively. In relation to breed of pet animals, local breed was higher in both case of dogs (33.4%) and cats (55.9%). This results were in agreement with (Sarker et al., 2015) who reveals that male and female were 57.37% and 42.67% in dogs respectively, and 42.67% and 38.0% in case of cat respectively. In context of breed distribution, local breed and exotic breed were equal in frequency in case of cat (50% and 50% respectively) and German shepherd was higher in dog breed. In another inland study, (Hossain et al., 2017) found higher number of dog breed was local breed. This difference may be due to less diseases prevalence, less costly and easy management of local breed. The owners reared their animals mostly in intensive care which were 38.4% in dogs and 45.7% in cats. Furthermore, deworming and vaccination were routinely implemented in their pets where percent value were 36.4% and 45.3% in dogs respectively and 23.9% and 37.8% in cats respectively. In view of physiological status like castrated, un-castrated, dry, estrus period, pregnant were observed. In this context, un-castrated dogs and cats were found as 60.7% and 41.5%. Pregnant dogs were 0.7% whereas 5.9% was in cat. Dogs and cats having good health were found 68.5% and 63.3% which were higher than that of cachectic dogs (7.2%) and cats (11.7%). These results supported the previous works conducted by Sarker et al., (2015) and Hossain et al., (2017).

Table 3. Proportionate prevalence of different pet diseases recorded in CVH, Dhaka

Category	Dog (N=305)		Cat (N=188)	
	Frequency, n (%)	95% CI	Frequency, n (%)	95% CI
Non infectious	124 (40.7)	35.1-46.4	112 (59.6)	52.2-66.7
Infectious	81 (26.6)	21.7-31.9	28 (14.9)	10.1-20.8
Regular check up	64 (21)	16.6-26	21 (11.2)	7-16.6
Surgical	32 (10.5)	7.3-14.5	22 (11.7)	7.5-17.2
Gynecological	4 (1.3)	0.4-3.3	5 (2.6)	0.8-6.1

Table 4. Drug prescribing pattern on different pets in CVH, Dhaka

Species	Antimicrobials			Anthelmintic			Antihistaminic		
	n	%	95%CI	n	%	95% CI	n	%	95% CI
Dog N=305	151	49.5	43.8-55.3	88	28.9	23.8-34.3	97	31.8	26.6-37.4
Cat N=188	117	62.2	54.9-69.2	22	11.7	7.5-17.2	35	18.6	13.2-24.9

Table 5. Antimicrobial used in different cases recorded in CVH, Dhaka

Species and name of antibiotics		Non infectious			Infectious			Surgical			Gynecological		
		n	%	95% CI	n	%	95% CI	N	%	95% CI	n	%	95% CI
Dog	Cephalosporin	27	56.3	41.2-70.5	10	20.8	10.5-35	10	20.8	10.5-35	1	2.1	0.05-11.1
Cat	Cephalosporin	33	55	41.6-67.9	17	28.3	17.5-41.4	9	15	7.1-26.6	1	1.7	0.04-8.9
Dog	Fluoroquinolones	15	39.5	26.3-60.6	20	52.6	35.8-69	-	-	-	-	-	-
Cat	Fluoroquinolones	12	80	51.9-95.7	3	20	4.3-48.1	-	-	-	-	-	-
Dog	Beta-Lactams	13	54.2	32.8-74.4	-	-	-	11	45.8	25.6-67.2	-	-	-
Cat	Beta-Lactams	15	62.5	40.6-81.2	1	4.2	0.1-21.1	8	33.3	15.6-55.3	-	-	-
Dog	Aminoglycoside	5	41.7	15.2-72.3	5	41.7	15.2-72.3	2	16.7	2.1-48.4	-	-	-
Cat	Aminoglycoside	4	80	28.4-99.5	1	20	05-71.6	-	-	-	-	-	-
Dog	Fluoroquinolones & Metronidazole/ Beta-Lactams	1	6.3	0.2-30.2	15	93.7	69.8-99.8	-	-	-	-	-	-
Cat	Fluoroquinolones & Cephalosporin/ Sulfonamide	1	50	1.3-98.7	-	-	-	1	50	1.3-98.7	-	-	-
Dog	Cephalosporin	27	56.3	41.2-70.5	10	20.8	10.5-35	10	20.8	10.5-35	1	2.1	0.05-11.1
Cat	Cephalosporin	33	55	41.6-67.9	17	28.3	17.5-41.4	9	15	7.1-26.6	1	1.7	0.04-8.9
Dog	Fluoroquinolones	15	39.5	26.3-60.6	20	52.6	35.8-69	-	-	-	-	-	-
Cat	Fluoroquinolones	12	80	51.9-95.7	3	20	4.3-48.1	-	-	-	-	-	-
Dog	Beta-Lactams	13	54.2	32.8-74.4	-	-	-	11	45.8	25.6-67.2	-	-	-
Cat	Beta-Lactams	15	62.5	40.6-81.2	1	4.2	0.1-21.1	8	33.3	15.6-55.3	-	-	-
Dog	Aminoglycoside	5	41.7	15.2-72.3	5	41.7	15.2-72.3	2	16.7	2.1-48.4	-	-	-
Cat	Aminoglycoside	4	80	28.4-99.5	1	20	05-71.6	-	-	-	-	-	-
Dog	Fluoroquinolones & Metronidazole/ Beta-Lactams	1	6.3	0.2-30.2	15	93.7	69.8-99.8	-	-	-	-	-	-
Cat	Fluoroquinolones & Cephalosporin/ Sulfonamide	1	50	1.3-98.7	-	-	-	1	50	1.3-98.7	-	-	-

Prevalence of diseases in dogs and cats

The overall prevalence (Table 3) of non-infectious diseases in this study in dogs was 40.7% followed by infectious diseases (26.6%), regular checkup (21%), surgical case (10.5%) and gynecological case (1.3%). On the other hand, in case of cat, average prevalence of non-infectious diseases was 59.6% followed by infectious diseases (14.9%), regular checkup (11.2%), and surgical case (11.7%) and gynecological case (2.6%). With the relation of this results, (SARKER et al., 2015) reported that the prevalence of clinical diseases were found in infectious diseases (dogs 8% and cats 8%), non-infectious diseases (dogs 5.78% and cats 6%) and surgical cases (dogs 14.44% and cats 16%) and vaccination and health check-up (dogs 13.33% and cats 15.33%). The variation of the diseases prevalence with the present results may be due to variation of season, management, lack of vaccination etc.

Pattern of drug prescription

The pet animals admitted in CVH, Dhaka were prescribed according to specific causes (Table 4). In relation to this, in case of dog, overall drug suggested by veterinary doctors was 49.5% of antimicrobials followed by 45.2% of nutritional, 36.4% of others drugs like fluid therapy, disinfectant etc.,31.8% of antihistaminic, 28.9% of anthelmintic, 27.5% of non-steroid anti-inflammatory or steroid drugs and 2.2% of vaccine. Furthermore, 62.2% of antimicrobials was prescribed in case of cat followed by 52.7% of others drugs like fluid therapy, disinfectant etc., 49.5% of non-steroid anti-inflammatory or steroid drugs, 41%of nutritional, 18.6% of antihistaminic, 11.7% of anthelmintic, and 9.6% of vaccine. In the relation with these results, Tanaka et al., (2017) resulted that corticosteroids were administered about 30%, antibiotics 67.4%, interferon 66%, antihistamines 60%.

Frequency of antimicrobial uses

In case of dogs, most frequently used antimicrobials (Table 5) were Cephalosporin (56.3%) due to non-infectious case followed by fluoroquinolones with metronidazole/beta lactams (93.7%) in infectious case, only beta lactams (45.8%) in surgical case and also cephalosporin (2.1%) in gynecological case. In contrast with cat, most frequently used antimicrobials were metronidazole (100%) due to non-infectious case followed by cephalosporin (28.3%) in infectious case, fluoroquinolones with cephalosporin/sulfonamide (50%) in surgical case and cephalosporin (1.7%) in gynecological case. Murphy et al., (2012) reported in accordance with this results, 65% of the antimicrobials prescribed in dogs and 67% in cats were b lactams. Most frequently prescribed in dogs were cephalexin (33%) and amoxicillin clavulanic acid (16%), and in cats, amoxicillin-clavulanic acid (40%) and cefovecin (17%); 7% of the prescriptions in dogs and 12% in cats were for fluoroquinolones. Murphy et al., (2012).

CONCLUSION

From the study it may be concluded that male in both cases of owners and pets were higher than that of females. Educated owners reared intensively local pets which were mostly good in health. Furthermore, tendency of pet owners for deworming and vaccination were not satisfactory. Uncastrated dogs and cats were found as higher prevalence. The overall prevalence of non-infectious diseases was higher than infectious diseases. Prescribed antimicrobials were higher than others. Among them, most frequently used antimicrobials in dogs were fluroquinolone with metronidazole/beta lactams in infectious case followed by Cephalosporin due to non-infectious case. On the contrary, metronidazole was frequently used due to non-infectious case followed by cephalosporin in infectious case in cats. This finding may exert awareness of the pet owners for rearing their pets and of zoonotic diseases as well.

CONFLICT OF INTEREST

There is no conflict of interest.

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