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Prevalence of Clinical Conditions in Dogs and Cats at Central Veterinary Hospital (CVH) in Dhaka, Bangladesh

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SUMMARY   A period of two months cross sectional prospective study was conducted at Central Veterinary Hospital, Dhaka to estimate the prevalence of clinical conditions in dogs and cats from June to July 2014. A total of 600 clinical cases, 450 (75%) dogs and 150 (25%) cats were observed with different clinical conditions. Prevalence of clinical conditions was analyzed on the basis of age, sex and breed. It was revealed that highest number of dogs 325 (72.22%) and cats 103 (68.67%) occupied in Medicinal cases followed by surgical cases 65 (14.44%) in dogs and 24 (16%) in cats and vaccination and health check up 60 (13.33%) in dogs and 23 (15.33%) in cats. Among of the medicinal cases special sense organ diseases occupied highest prevalence 78 (17.33%) in dogs and 25 (16.67%) in cats. Prevalence of vaccination and health check up condition in dogs (≤6 month) and male cats was higher with significant P-value (P ≤ 0.05). Another prevalence of non infectious diseases in exotic breed and male cats was higher (P ≤ 0.05). These findings address the vaccination practice in dogs and cats, variation of management within different topography in Dhaka and socio economic condition of owners.

Key Words: *Dog, Cat, Prevalence, Vaccination, Dhaka*

ÖZET   **Bangladeş Dhaka'da Merkez Hayvan Hastanesine Getirilen Kedi ve Köpeklerin Sağlık Durumlarının Prevalansı.**

Bu araştırmada 2014 yılı Haziran ve Temmuz aylarında 2 aylık bir süre boyunca Dhaka (Bangladeş) Merkezi Hayvan Hastanesi'ne getirilen kedi ve köpeklerde sağlık durumunun prevalansının ortaya konulması amacıyla kesitsel prospektif çalışıldı. Hastaneye getirilen 450 (%75) köpek ve 150 kedi (%25) olmak üzere toplam 600 klinik vakanın farklı klinik durumları değerlerdirildi. Klinik durumlar, prevalans, yaş, cinsiyet ve üreme özellikleri temel alınarak değerlendirildi. Yapılan uygulamalar arasında 325 (%72.22) köpek ve 103 (%68.67) kedi olmak üzere en yüksek düzeyde uygulamanın tıbbi müdahale olduğu; bunu 65 (%14.44) köpek ve 24 (%16.0) kedi ile cerrahi vakaların takip ettiği ve bunu da 60 (%13.33) köpek ve 23 (%15.33) kedi ile de aşılama ve sağlık kontrolünün izlediği belirlendi. Tıbbi vakalar içerisinde en yüksek prevalans 78 (%17.33) köpek ve 25 (%16.67) kedi ile özel duyu organ hastalıklarında gözlendi. Köpeklerde (≤6 ay) ve erkek kedilerde yapılan aşılama ve sağlık kontrollerinin prevalansı istatistiksel olarak önemli (P≤0.05) bulunmuştur. Ayrıca erkek kediler ve ekzotik hayvanlarda non-infeksiyöz hastalıkların prevalansı istatistiksel olarak önemli düzeyde (P≤0.05) bulunmuştur. Bu bulgular, köpeklerde ve kedilerde aşılama uygulamalarının, hayvan sahiplerinin sosyo-ekonomik durumlarına ve Dhaka'daki farklı bölgelerin yönetim değişikliklerine bağlı olarak değiştiğini göstermiştir.

Anahtar Kelimeler: *Köpek, Kedi, Prevalans, Aşılama*

INTRODUCTION

The pet animals are kept by a significant percentage of people all over the world irrespective of their social status. Dogs and cats play an important role in the societies of Dhaka in Bangladesh. In many households, contributing to the physical, social and mental development of children and the well-being of their owners, they act as important companions (Dohoo et al., 1998; Robertson et al., 2000). Dogs and cats have significant benefits to our 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 keeping is usually connected with certain responsibilities like housing, control of disease and responsible for pet ownership with consequences for public health when mistreated (William et al., 2002). Pet animals make up an important reservoir of zoonotic diseases as they share the same environment with humans (Kornblatt and Schantz 1980). Household pets have been found to play a direct role in transmitting zoonosis (Dada et al., 1979; Kornblatt and Schantz 1980).

Animal bites and allergy from pets are the commonest health hazards, however a diverse range of infections, including parasitic, bacterial, fungal and viral diseases are transmitted to humans from domestic pets (Plant et al., 1996; Geffray 1999).

Therefore, the ultimate goal of this study to determine the prevalence of clinical conditions in dogs and cats presented at Central Veterinary Hospital (CVH) in Dhaka, capital of Bangladesh. These data may be helpful for the veterinary practitioners as well as pet owners to take the necessary preventive measure to control the diseases among dogs and cats and also useful for control of different types of zoonotic diseases like rabies control program.

MATERIALS and METHODS

Study area and population

The study was conducted from June to July 2014, at Central Veterinary Hospital (CVH) in Dhaka, capital of Bangladesh. A total of 600 pets were registered where 450 dogs and 150 cats.

Clinical case investigation record

The pets were admitted at CVH with specific individual case registration number having full history of vaccination, owner's complaint, clinical and physical examination, diagnosis, treatments, advice and prognosis. Clinical examination was carried out of each of the patient thoroughly as described by Samad (2008). Age of the dog was categorized as young (≤6 month), adult (7- 36 month) and old (>36 month) and in case of cat young (≤6 month), adult (7-24 month) and old (>24 month) according to the different age of puberty. Breed of the dogs and cats were determined by "The Pedigree® guide to the dog breeds of the world" and "Cat Breeds of the world, Whiskas®". Clinical conditions were categorized as medicinal, surgical and vaccination and health checkup. Medicinal cases were subcategorized as disease of digestive and respiratory system, parasitic disease, infectious and non infectious diseases and special sense organ. Surgical cases were subcategorized as general surgery includes wound, myiasis, accidental injury, abscess, trauma, hematoma, tumor and nail trimming. On the other hand special surgery includes castration, ligation, ovariectomy, hernia, laparotomy and orthopedic surgery.

Statistical analysis

The data obtained were stored and coded accordingly using Microsoft Excel-2007. The data were exported from MS Excel- 2007 to STATA/IC-13.0 (Stata Corporation College Station) for analysis. The results were expressed in percentage with p-value of Chi-Square Test. Significance was determined when P≤0.05.

RESULTS

A total of 600 cases of different clinical conditions were encountered during the study period 2014, among of them dogs and cats were 75% and 25%. Medicinal cases comprise highest percentage (dogs 72.22% and cats 68.67%) in compare to surgical cases (dogs 14.44% and cats 16%) and vaccination and health check up (dogs 13.33% and cats 15.33%). Among of the medicinal cases highest prevalence was found in special sense organ diseases (dogs 17.33% and cats 16.67%). Disease prevalence of digestive system (dogs 12.89% and cats 12%), within the digestive system digestive disorder (dogs 7.78% and cats 4.67%). Ectoparasitic diseases showed higher prevalence (dogs 8.22% and cats 6.67%) in compare to endoparasitic diseases. Prevalence of clinical diseases were found in infectious diseases (dogs 8% and cats 8%), non infectious diseases (dogs 5.78% and cats 6%), upper respiratory tract infection (dogs 8.89% and cat 7.33%), pneumonia (dogs 4.89% and cat 5.33%), general surgery (dogs 7.78% and cats 9.33%) and special surgery (dogs and cats 6.67%) (Table-1).

Table 1. Prevalence of clinical conditions in dogs and cats admitted to the Central Veterinary Hospital (CVH) in Dhaka during June to July of 2014.

Parameters of clinical conditions	Number of dogs (%)	Number of cats (%)
Digestive disorder	35 (7.78)	7 (4.67)
Loss of appetite	23 (5.11)	11 (7.33)
Digestive system	58 (12.89)	18 (12)
URTI	40 (8.89)	11 (7.33)
Pneumonia	22 (4.89)	8 (5.33)
Respiratory System	62 (13.78)	19 (12.67)
Ectoparasite	37 (8.22)	10 (6.67)
Endoparasitic	28 (6.22)	10 (6.67)
Parasitic diseases	65 (14.44)	20 (13.33)
Infectious diseases	36 (8.00)	12 (8.00)
Noninfectious diseases	26 (5.78)	9 (6.00)
Infectious and non infectious diseases	62 (13.78)	21 (14)
Eye disorders	26 (5.78)	9(6.00)
Ear infection	31 (6.89)	10 (6.67)
Skin diseases	21 (4.67)	6 (4.00)
Special sense organ	78 (17.33)	25 (16.67)
General surgery	35 (7.78)	14 (9.33)
Special surgery	30 (6.67)	10 (6.67)
1. Total Medicinal cases	325 (72.22)	103 (68.67)
2. Surgical cases	65 (14.44)	24 (16)
3. Vaccination & Health check up	60 (13.33)	23 (15.33)
Total conditions of dogs and cats	**450 (100)**	**150 (100)**

URTI- Upper respiratory tract infection

Table 2. Prevalence of clinical conditions in dogs and cats according to the Age (%)

Parameters	≤6 Months	> 7 to 36 Months	> 36 months	P-Value	≤ 6 Months	> 7 to 24 Months	> 24 months	P-Value
Digestive disorder	14 (3.11)	11 (2.44)	10 (2.22)	0.918	4 (2.67)	3 (2.0)	0 (0.0)	0.646
Loss of appetite	8 (1.78)	9 (2.0)	6 (1.33)		5 (3.33)	3 (2.0)	3 (2.0)	
URTI	9 (2.0)	17 (3.78)	14 (3.11)	0.223	4 (2.67)	3 (2.0)	4 (2.67)	0.094
Pneumonia	4 (0.89)	9 (2.0)	9 (2.0)		0 (0.0)	4 (2.67)	4 (2.67)	
Ecto parasitic	15 (3.33)	14 (3.11)	8 (1.78)	0.523	5 (3.33)	3 (2.0)	2 (1.33)	0.971
Endo parasitic	6 (1.33)	13 (2.89)	9 (2.0)		5 (3.33)	3 (2.0)	2 (1.33)	
Infectious	13 (2.89)	18 (4.0)	5 (1.11)	0.112	8 (5.33)	1 (0.67)	3 (2.0)	0.103
Non infectious	9 (2.0.0)	6 (1.33)	11 (2.44)		4 (2.67)	5 (3.33)	0 (0.0)	
Eye disorders	10 (2.22)	11 (2.44)	5 (1.11)		6 (4.0)	2 (1.33)	1 (0.67)	
Ear infection	11 (2.44)	11 (2.44)	9 (2.0)	0.907	3 (2.0)	4 (2.67)	3 (2.0)	0.717
Skin diseases	6 (1.33)	7 (1.56)	8 (1.78)		3 (2.0)	1 (0.67)	2 (1.33)	
General surgery	7 (1.56)	16 (3.56)	12 (2.67)	0.236	5 (3.33)	5 (3.33)	4 (2.67)	0.756
Special surgery	10 (2.22)	8 (1.78)	12 (2.67)		6 (4.0)	3 (2.0)	1 (0.67)	
Vaccination & Health check up	29 (6.44)	18 (4)	13 (2.88)	0.023*	6 (4.0)	10 (6.67)	7 (4.67)	0.217
Total	**151 (33.5)**	**168 (37.33)**	**131 (29.1)**		**64 (42.67)**	**50 (33.33)**	**36 (24.0)**	

*Significant P ≤ 0.05

Table 3. Prevalence of clinical conditions in dogs and cats according to the Sex (%)

Parameters	Male Dog	Female Dog	P-Value	Male Cat	Female Cat	P-Value
Digestive disorder	16 (3.56)	19 (4.22)	0.291	6 (4.0)	1 (0.67)	0.377
Loss of appetite	12 (2.67)	11 (2.44)		6 (4.0)	5 (3.33)	
URTI	23 (5.11)	17 (3.78)	0.775	7 (4.67)	4 (2.67)	0.304
Pneumonia	11 (2.44)	11 (2.44)		7 (4.67)	1 (0.67)	
Ectoparasite	22 (4.89)	15 (3.33)	0.476	4 (2.67)	6 (4.0)	0.323
Endoparasitic	19 (4.22)	9 (2.0)		6 (4.0)	4 (2.67)	
Infectious	21 (4.67)	15 (3.33)	0.929	4 (2.67)	8 (5.33)	0.030*
Non infectious	14 (3.11)	12 (2.67)		8 (5.33)	1 (0.67)	
Eye disorders	18 (4.0)	8 (1.78)		7 (4.67)	2 (1.33)	
Ear infection	21 (4.67)	10 (2.22)	0.335	4 (2.67)	6 (4.0)	0.328
Skin diseases	11 (2.44)	10 (2.22)		3 (2.0)	3 (2.0)	
General surgery	23 (5.11)	12 (2.67)	0.301	8 (5.33)	6 (4.0)	0.082
Special surgery	14 (3.11)	16 (3.56)		3 (2.0)	7 (4.67)	
Vaccination & Health check up	33 (7.33)	27 (6.00)	0.815	20 (13.33)	3 (2.0)	0.007*
Total	**258 (57.33)**	**192 (42.67)**		**93 (62.0)**	**57 (38.0)**	

*Significant P ≤ 0.05

Table 4. Prevalence of clinical conditions in dogs and cats according to the Breed (%)

Parameters	German Shepherd	Samoyed	Grey Hound	Doberman	Spaniel	Dachs-hund	Local Breed	Others Exotic	P-Value	Local cat	Exotic cat	P-Value
Digestive	10(2.22)	5(1.11)	3(0.67)	1(0.22)	2(0.44)	2(0.44)	8(1.78)	4(0.89)	0.220	4(2.67)	3(2)	0.261
Loss of appetite	6(1.33)	3(0.67)	7(1.56)	0(0)	0(0)	1(0.22)	6(1.33)	0(0)		8(5.33)	3(2)	
URTI	8(1.78)	5(1.11)	4(0.89)	4(0.89)	3(0.67)	6(1.33)	8(1.78)	2(0.44)	0.720	8(5.33)	3(2)	0.242
Pneumonia	4(0.89)	6(1.33)	2(0.44)	1(0.22)	1(0.22)	1(0.22)	5(1.11)	2(0.44)		3(2)	5(3.33)	
Ecto parasitic	9(2)	4(0.89)	5(1.11)	5(1.11)	3(0.67)	2(0.44)	4(0.89)	5(1.11)	0.789	8(5.33)	2(1.33)	0.127
Endo parasitic	8(1.78)	3(0.67)	4(0.89)	4(0.89)	3(0.67)	0(0)	5(1.11)	1(0.22)		4(2.67)	6(4)	
Infectious	6(1.33)	5(1.11)	4(0.89)	3(0.67)	5(1.11)	4(0.89)	6(1.33)	3(0.67)	0.863	7(4.67)	5(3.33)	0.05*
Non infectious	9(2)	4(0.89)	4(0.89)	3(0.67)	1(0.22)	0(0)	3(0.67)	2(0.44)		1(0.67)	8(5.33)	
Eye disorders	6(1.33)	4(0.89)	3(0.67)	4(0.89)	2(0.44)	2(0.44)	2(0.44)	3(0.67)		4(2.67)	5(3.33)	
Ear infection	4(0.89)	2(0.44)	3(0.67)	1(0.22)	4(0.89)	3(0.67)	10(2.22)	4(0.89)	0.587	6(4)	4(2.67)	0.756
Skin diseases	7(1.56)	2(0.44)	1(0.22)	2(0.44)	3(0.67)	0(0)	4(0.89)	2(0.44)		2(1.33)	4(2.67)	
General surgery	8(1.78)	4(0.89)	4(0.89)	3(0.67)	4(0.89)	5(1.11)	5(1.11)	2(0.44)	0.884	6(4)	8(5.33)	0.710
Special surgery	12(2.67)	2(0.44)	3(0.67)	2(0.44)	1(0.22)	2(0.44)	5(1.11)	3(0.67)		6(4)	4(2.67)	
Vaccination & Health check up	20(4.44)	9(2)	6(1.33)	4(0.89)	2(0.44)	6(1.33)	8(1.78)	5(1.11)	0.721	8(5.33)	15(10)	0.113
Total	**117 (26.0)**	**58 (12.89)**	**53 (11.78)**	**37 (8.22)**	**34 (7.56)**	**34 (7.56)**	**79 (17.56)**	**38 (8.44)**		**75 (50.0)**	**75 (50.0)**	

*Significant P ≤ 0.05

Dogs and cats were divided into age groups as young, adult and old. Results showed that the prevalence of clinical conditions was highest in adult age of dogs (37.33%) and young age of cats (42.67%). The prevalence of vaccination and health check up in young age of dogs (6.44%) with significant P value (P=0.023). So that prevalence of clinical conditions was higher in young and adult pets than old one. Prevalence of clinical conditions in dogs and cats according to age group are shown in the Table-2.

Prevalence of clinical conditions in dogs and cats in relation with their sex revealed that highest number of male pets was admitted at CVH. Based on sex 258 (57.33%) of the clinical cases occurred in male dogs while 192 (42.67%) occurred in female dogs. In cats 93 (62%) of the cases occurred in male cat, 57 (38%) occurred in female cats. Prevalence of vaccination and health check up and non infectious diseases in male cats with significant P value (P≤0.05). Prevalence of clinical conditions in dogs and cats according to their sex are shown in the Table-3.

Prevalence of clinical conditions in dogs and cats in relation with the breed showed that the highest clinical conditions were found 117 (26%) in the dog breed German shepherd and 75 (50%) in both local and exotic cat breed. Among of others exotic dog breed, prevalence of clinical conditions were found Samoyed 58 (12.89%), Grey Hound 53 (11.78%), Doberman 37 (8.22%), Spaniel 34 (7.56%), Dachshund 34 (7.56%), and other exotic breed 38 (8.44%) along with local breed 79 (17.56%) (Table-4).

DISCUSSION

Among 600 clinical conditions, 75% dogs and 25% cats were observed of the present study agreed with the result of Parvez et al. (2014) who observed 76.42% dogs and 23.58% cats. In medicinal cases highest prevalence of

special sense organ diseases were recorded 17.33% during the study period contrasting with the findings of Chaudhari and Atsanda (2002) who reported that highest prevalence was parasitic diseases in dogs and cats. The recorded prevalence of skin disease was 4.67% agreed with the results of Tarafder and Samad (2010) and disagreed with the results of Freeman et al. (2006) and Chaudhari and Atsanda (2002) who reported lower prevalence 1.26 % and 3.70% in dogs. It may be caused by deficiency or overactivity of immune responses, hereditary, different bacterial, viral and parasitic agents and poor management. The reported prevalence of eye problem was 5.78% in dogs and 6% in cats, disagreed with results of Parvez et al. (2014). The most common causes of eye infections in dogs are allergies, blocked tear ducts, and corneal ulcers. For cats, the most common causes are allergies and infectious organisms like calicivirus (FCV), herpes, and chlamydia. Other causes are foreign object or irritant in the eye like dirt or pollen, developed or congenital (from-birth) defect of the tear ducts, bacteria, viruses, fungus and parasites.

The prevalence of ectoparasitic diseases, 8.22% in dogs and 6.67% in cats was supported by the result of Parvez et al. (2014). It may be resulted from different arthropods, such as flea, lice, mice, mosquito etc. Fleas are significant vectors of various infections including pathogens and zoonotic infections. Present study showed that the prevalence of endoparasitic diseases 6.22% in dog and 6.67% in cats, contrarily higher prevalence reported by Chaudhari and Atsanda (2002); Edosomwan and Chinweuba (2012); Subhagata et al. (2012) who observed 19.19% in dog and 26.67% in cat; 28% in dogs and 95% in dog respectively. It may be due to different endoparasites and irregular deworming. Disease prevalence of the respiratory system in the present study was 13.78% in dogs and 12.67% in cats, contrasting with the results of

Tarafder and Samad (2010); Chaudhari and Atsanda (2002) who reported respiratory infection 6.70% in dogs; 1.68% in dogs and 12% in cats. Respiratory tract infections can be caused by viruses, bacteria and less often fungi and sometimes from faulty medication. The reported prevalence of digestive disorder 7.78% in dogs similarity with the results of Chaudhari and Atsanda (2002) 7.73% diarrhea in dogs but in case of cats it was higher than the present study. Prevalence of loss of appetite 5.11% in dogs in contrast with the result lower prevalence recorded by Chaudhari and Atsanda (2002) 2.69% anorexia in dogs. There are many causes of digestive disorder which includes abnormal eating, sudden change in diet, food allergies, parasitic infestation, bacterial and viral infectious agents. In the present study, the prevalence of infectious disease was found 8% in both dogs and cats, but lower prevalence of infectious diseases recorded by Freeman et al. (2006). Infectious diseases may result from bacterial, viral, parasitic, fungal and many other agents. This variation may be due to different geographical region and period. The prevalence of non infectious diseases of this study was 5.78% disagreed with the results of Parvez et al. (2014) who recorded prevalence as 3.08%. Non infectious diseases arise from inside the body as a result of hereditary conditions or other causes, such as dietary deficiencies, trauma etc.

Prevalence of clinical conditions according to age group in this study was similarity with the results of (Tarafder and Samad, 2010) in adult one but dissimilarities with young and old one. Higher prevalence of clinical conditions was found in German shepherd and local dog breed agreed with the findings of (Tarafder and Samad, 2010). It may be due to different topographic region, different places and environment. Local and exotic cat breed showed the same prevalence 50% and this result disagreed with Parvez et al. (2014). Present study indicated that dogs (57.33% male and 42.67% female) and cats (62% male and 38% female) were admitted at CVH with their clinical conditions. This indicates that the pet owner had their tendency to rear the male pet animals rather than female one due to unaware about the reproductive physiology of female dogs and cats (Parvez et al. 2014). Prevalence of surgical cases (dogs 14.44 % and cats 16%) and vaccination and health check up (dogs 13.33% and cats 15.33%) revealed the lower values than reported by Parvez et al. (2014).

CONCLUSION

The study has given an in general idea about the prevalence of clinical conditions of dogs and cats on the basis of age, sex and breed at the study area. However, poor management, lack of awareness of owners, different topographic region, different places and environment enhances the high incidence and prevalence of diseases and disorders. Extensive studies are necessary to design preventive and control measures against this clinical conditions in Bangladesh.

REFERENCES

Chaudhari AWSUR, Atsanda NN (2002). Prevalence of some disease of dogs and cats atthe state government veterinary clinic in Maidugury (Nigeria). *Pak Vet J*, 22, 2.

Dada BJO, Adegboye DS, Mohammaed ANA (1979). A survey of gastrointestinal parasites of stray dogs in Zaria Nigeria. *Vet Rec,* 104, 145-146.

Dohoo IR, McDonell WN, Rhodes CS, Elazhary YL (1998). Veterinary research and human health. *Can Vet J*, 39, 549-556.

Edosomwan EU, Chinweuba CR (2012). A survey on helminth parasites of dogs in Benin city, Edo State, Nigeria. *J Vet Med Anim Health,* 4,4, 56–60.

Freeman LM, Abood SK, Fascetti AJ, Fleeman LM, Michel KE, Laflamme DP, Bauer C, Kemp BL, Van Doren JR, Willoughby KN (2006). Prevalence among dogs and cats in the United States and Australia and proportions of dogs and cats that receive therapeutic diets or dietary supplements. *J Am Vet Med Assoc,* 229, 4,

Geffray L (1999). Infections associated with pets. *Rev Med Interne,* 20, 888 -901.

Kornblatt AN, Schantz PM (1980). Veterinary and public health considerations in canine roundworm control. A survey of practicing veterinarians. *J Am Vet Med Assoc*, 195, 1212-1215.

Parvez MA, Md. Prodhan MAM, Das BC, Khatun R (2014). Prevalence of clinical conditions in dogs and cats at teaching veterinary hospital (TVH) in Chittagong Veterinary and Animal Sciences University, Bangladesh. *Res J Vet Prac,* 2,6, 99-104.

Plant M, Zimmerman EM, Goldstein RA (1996). Health hazards to humans associated with domestic pets. *Annu Rev Public Health,* 17,221-245.

Robertson ID, Irwin PJ, Lymberg AJ, Thompson RCA (2000). The role of companion animals in the emergence of parasitic disease. *Int J Parasitol,* 30,1369–1377.

Samad MA (2008). Animal Husbandry and Veterinary Science. Volume 2, LEP Pub. No. 11, BAU Campus, Mymensingh.

Subhagata DAS, Alim MA, Sikder S, Gupta AD, Masuduzzaman M (2012). Prevalence and Worm Load of Enteric Helminthiasis in Stray Dogs of Chittagong Metropolitan, Bangladesh. *YYU Vet Fak. Derg,* 23, 3, 141–145.

Tarafder M, Samad MA (2010). Prevalence of clinical diseases of pet dogs and risk perception of zoonotic infection by dog owners in Bangladesh. *Bangladesh J Vet Med,* 8,2, 163 – 174.

William A, Chaudharti SUR, Atsanda NN (2002). Prevalence of some diseases of dogs and cats at the State Government Veterinary Clinic in Maiduguri-Nigeria. *Int J Agr Biol*, 4, 568-569.