

## Association of dogs (*Canis lupus familiaris*, Linnaeus, 1753) and risk perception of zoonotic infection for humans.

Hamida Khanum

Department of Zoology, University of Dhaka, Bangladesh

### Abstract

*Dogs were used by the early age people for various important purposes before being domesticated. They perform many roles for people, such as—hunting, herding, pulling loads, protection, assisting police and military, companionship and more recently, aiding handicapped individuals. However, dogs are also a source of meat in many countries like—Korea. In this modern world dogs are not just pets but they are treated like members of the family. As pets have a close bond with human, there is a major risk of health hazard. Dogs harbor a number of infective stages of disease causative agents transmissible to man. They become infected with an internal or external parasite at some point in its lifetime. Parasites can affect the pets in a variety of ways, ranging from simple irritation to causing life-threatening conditions if left untreated. Some parasites can even infect and transmit diseases to human. To date, domestic animals represent an important source of zoonotic diseases. A zoonotic disease is a disease that can be passed between animals and humans. Household pets play a direct role in transmitting zoonosis.*

**Keywords:** *Canis lupus*, Zoonotic, Parasites, Infection, Helminthosis.

Accepted on March 16, 2017

Zoonotic disease such as visceral and ocular larval migrans caused by *Toxocara canis* and cutaneous larval migrans caused by *Ancylostoma braziliense* are some intestinal helminth infections in dogs. The temperature and humidity also determine the distribution and survival of eggs, helminthic larvae and cysts. The development of the parasite larvae in the soil and their transmission to people need conditions such as; moderate temperature, a high percentage of humidity, and certain chemical and biological conditions. More than, 60 zoonotic diseases are also associated with dogs, among which helminthosis in particular is concerned with serious public health problems around the globe. Many canine gastrointestinal parasites eliminate their dispersion elements such as; eggs, larvae and oocysts through feces. Especially in pups the hookworms, if present with *Ascaridia* may cause death resulting from serious blood loss due to its blood sucking activity and acute gastrointestinal hemorrhages. These parasites cause diseases in their respective hosts, but also causes migrans syndrome in humans especially in children. The transmission of zoonotic agents could be through indirect contact with animal secretions and excretions, infected water and food, fecal samples and through direct contact with the animals. The distribution and intensity of parasitism in dogs are influenced by geographical, climatic, culture and economic factors. More than, 100 zoonotic diseases are also associated with dogs and cats, among which helminthosis in particular is concerned with serious public health problems around the globe. This is especially of concern in pregnant women, because the immature worms may wander into the tissues of the developing fetus. Another condition of particular importance in pregnant women is toxoplasmosis, which is caused by a microscopic intestinal parasite *Toxoplasma* spp., which can also cause serious problems if it infects the developing fetus [1-20].

In the United States, about 10,000 cases of *Toxocara canis*

infection are reported in humans each year, and almost 14% of the U.S. population is infected. In Great Britain, 24% of soil samples taken from public parks contained *T. canis* eggs. Besides all this parasites, there are many zoonotic parasites which are found in dogs and cats. *Toxocara cati*, *Gnathostoma* spp., *Heterophyes* spp. and *Opisthorchis* spp. are also found in cats. *Ascaris lumbricoides*, *Capillaria* spp., *Hymenolepis diminuta*, *Hymenolepis nana* and *Taenia* spp. these are found in both dogs and cats.

In Australia a survey was done to educate the pet owners about the existence of zoonotic parasites in their locality and the deworming protocols. Treatment was more common in urban areas (87.3%) than the rural (12.7%). There is a relationship between human behaviour and epidemiology of parasites zoonoses. Many parasites (protozoa, trematode, cestode, nematode) cause zoonoses and spread due to human behavior. Appropriate education, management and anthelmintic regimes can minimize the parasitic transmission. Due to so much intimacy with pet animals and not maintaining the proper hygiene status, these diseases are spreading rapidly here. Different zoonotic helminthes and protozoan parasites in dogs and cats are found in Bangladesh.

As in many countries, the use of dogs and cats as pet is increasing day-by-day, so the risk of infection by zoonotic parasites is also increasing. Pet market is one of the places from where lots of pet dogs and cats are sold, so there needs a survey on these animals to know their health status. If the animals present here are free of parasites then the buyers will also be safe. But if they have parasites in infectious level, then some important steps must be taken by the sellers and buyers to avoid the parasitic infection. In our country a few works have been done about the parasites of pet dogs in different districts.

All the variations in the frequency of different parasitic infection

occurred here is due to the geographical, seasonal, social or ecological variations of the study areas. Sex of the hosts does not exert any significant association with the occurrence of parasitism. This might be happens due to the physiological peculiarities of the hosts which usually constitute stress factors thus reducing their immunity to infections.

Age of the hosts affect the prevalence of parasites prevalence. At young age, the immunity power against any infection is low. With increase of age, immunity power also increases and it creates an effective defense system against any infection. Some young animals might be infected by parasites due to transplacental and transmammary passage of larvae. Bangladesh is a tropical country. It is a very favorable place for the growth of parasites. So here parasitic infestation is high. During summer, the temperature is very hot. This higher atmospheric temperature is an important factor for the release of larvae from the parasites' egg. During monsoon, heavy rainfall influences higher parasitic infections by water logging and spreading of infective eggs and larvae. In winter, the cold is enough to lessen the immunity of animals, which makes a way for the parasites to attack. The presence of zoonotic parasites in dogs indicates a threat to our health.

Specific groups of the population have been identified as having a higher risk of acquiring parasitic zoonosis than others. These groups include small children, pregnant women and the immuno-compromised. These groups are at a higher risk partly because of behavioral characteristics and partly because of immunological reasons. Some parasites, like *Toxoplasma* spp. in dogs can cause congenital toxoplasmosis. That means, if it infects a pregnant woman, it will often infect her developing fetus. This can cause spontaneous abortion and death or disability to newborns in human and other animals also.

Since infections of pets and humans are often the result of human activity, and a major aim in controlling zoonotic infections is to break the cycle of transmission, education must play a key role in their control. So the animal sellers and buyers must be given proper knowledge about zoonotic parasites and their transmission process. They have to take proper hygienic treatment to avoid the transmission. Anthelmintic treatments for dogs have been recommended as an important tool in the control of parasites. De-worming is most effective for averting morbidity and preventing environmental contamination. Dogs must be vaccinated and treated regularly for deworming and by following proper prevention methods; we can enjoy the companion of these animals [21-37].

## References

- Abbasi IHR, Sahito HA, Abbasi F, et al. Study on the isolation and identification of *Ascaris lumbricoides* from Sindh, Pakistan. *J Agr Sci Tech*. 2013;1:015-8.
- Barutzki D, Schaper R. Result of parasitological examinations of fecal samples from cats and dogs in Germany between 2003 and 2010. *Parasitol Res*. 2011;109:545-60.
- Basu J, Islam MM, Rhaman MW, et al. Study on identification and prevalence of common gastrointestinal parasitic infection in domestic dog in Chittagong district. *Int J Anim Fish Sci*. 2010;3:354-6.
- Becker AC, Rohen M, Epe C, et al. Prevalence of endoparasites in stray and fostered dogs and cats in Northern Germany. *Parasitol Res*. 2012;111:849-57.
- Chatterjee KD. *Parasitology-Protozoa and Helminthology* (13<sup>th</sup> edn.). CBS Publishers. 2009;298.
- Cheng TC. *General Parasitology* (2<sup>nd</sup> edn.). Academic Press College Division, Orlando. 1986;827.
- Coati N, Hellmann K, Mencke N, et al. Recent investigation on the prevalence of gastrointestinal nematodes in cats from France and Germany. *Parasitol Res*. 2003;90:146-7.
- Dada BJO, Adegboye DS, Mohammed ANA. A survey of gastrointestinal parasites of stray dogs in Zaria Negeria. *Vet Record*. 1979;104:145-6.
- Das S, Alim MA, Sikder S, et al. Prevalence and Worm Load of Enteric Helminthiasis in Stray Dogs of Chittagong Metropolitan, Bangladesh. *Yüzüncü yıl Üniversitesi Veteriner Fakültesi Dergisi*. 2012;23(3):141-5.
- Downes M, Canty MJ, More SJ. Demography of the pet dog and cat population on the island of Ireland and human factors in fluencing pet ownership. *Prev Vet Med*. 2009;92:140-9.
- Dubná S, Langrová I, Nápravník J, et al. The prevalence of intestinal parasites in dogs from Prague, rural areas, and shelters of the Czech Republic. *Vet Parasitol*. 2007;145:120-8.
- Fok E, Szatmari V, Busak K, et al. Epidemiology: prevalence of intestinal parasites in dogs in some urban and rural areas of Hungary. *Vet Quart*. 2001;23:96.
- Fontanarrosa MF, Vezzani D, Basabe J, et al. An epidemiological study of gastrointestinal parasites of dogs from Southern Greater Buenos Aires (Argentina):Age, gender, breed, mixed infections, and seasonal and spatial patterns. *Vet Parasitol*. 2006;136:283-95.
- Gates MC, Nolan TJ. Endoparasite prevalence and recurrence across different age groups of dogs and cats. *Vet Parasitol*. 2009;166:153-8.
- Gingrich EN, Scorza AV, Clifford EL, et al. Intestinal parasites of dogs on the Galapagos Islands. *Vet Parasitol*. 2010;169:404-7.
- Harkiral S, Jyoti HM, Singh NK, et al. Prevalence of canine parasitic infections in and around Ludhiana, Punjab. *J Vet Parasitol*. 2012;25:179-80.
- Komatangi MC. Prevalence of gastrointestinal helminths of dogs in Dschang, Cameroon. *J Cam Acad Sci*. 2005;5:11-14.
- Lefebvre SL, Waltner-Toews D, Peregrine AS, et al. Prevalence of zoonotic agents in dogs visiting hospitalized people in Ontario: implications for infection control. *J Hosp Infect*. 2006;62:458-66.
- Lorenzini G, Tasca T, Carli GAD. Prevalence of intestinal parasites in dogs and cats under veterinary care in Porto Alegre, Rio Grande do Sul, Brazil. *Braz J Vet Res Ani Sci*. 2007;44(2):137-45.
- Mahmud MAA, Belal S, Uddin FMJ. Prevalence of

- Protozoan diseases in pet dogs at the district hospital, Sirajganj, Bangladesh. Bangladesh. J Vet Med. 2014;12:191-6.
21. Manwell C, Baker CM. Domestication of the dog: hunter, food, bed-warmer, or motional object. Zeitschrift für Tierzüchtung und Züchtungsbiologie 1984;101:241-56.
  22. Mehlhorn H. Encyclopedic Reference of Parasitology (2<sup>nd</sup> edn.). Springer-Verlag. 2004
  23. Molyneux DH. Neglected diseases but unrecognized successes-challenges and opportunities for infectious disease control. Lancet. 2004;364:380-3.
  24. Moudgil AD, Mittra S, Agnihotri RK, et al. Prevalence of gastrointestinal parasites in dogs of Palampur, Himachal Pradesh. J Parasit Dis. 2014;1:3-10.
  25. Nash JQ, Chissel S, Jones J, et al. Risk factors for toxoplasmosis in pregnant women in Kent, United Kingdom. Epidemiol Infect. 2005;133:475-83.
  26. Palmer CS, Robertson ID, Traub RJ, et al. Intestinal parasites of dogs and cats in Australia: The veterinarian's perspective and pet owner awareness. Vet Parasit. 2010;183:358-61.
  27. Papazahariadou MFA, Papadopoulos E, Chliounakis S, et al. Gastrointestinal parasites of shepherd and hunting dogs in the Serres Prefecture, Northern Greece. Vet Parasitol 2007;148:170-3.
  28. Macotela MP, Peralta-Abarca GE, Martinez-Gordillo MN. *Giardia intestinalis* and other zoonotic parasites: Prevalence in adult dogs from the southern part of Mexico City. Vet Parasitol. 2005;131:1-4.
  29. Rahman MH. Incidence of some helminth parasites of zoonotic significance in street dogs in some districts of Bangladesh. Bangladesh Veterinary Journal. 1973;7:14-16.
  30. Robertson ID, Thompson RC. Enteric parasites zoonoses of domesticated dogs and cats. Microbe Infect 2002;4:867-73.
  31. Shaikh H, Huq MM. Zoonotic parasites of Bangladesh. Bangladesh Agriculture Research Council. City Press, Mymensingh. 1984;14-15.
  32. Sardar SA, Islam A, Akm A. Helminths and ectoparasites of pet dogs in dhaka city. Int J Biores. 2007;2:5-13
  33. Schmidt GD, Roberts LS. Foundations of Parasitology (6<sup>th</sup> edn.). McGraw Hill Test, NT. 2000;670.
  34. Soulsby EJJ. Helminths, Arthropods and Protozoa of Domesticated Animals (7<sup>th</sup> edn.). Baillire Tindall and Cassell Ltd., London. 1982;792.
  35. Szabová E, Juriš P, Miterpáková M, et al. Prevalence of important zoonotic parasites in dog populations from the Slovak Republic. Helminthologia 2007;44:170-6.
  36. Tarafder M, Samad MA. Prevalence of clinical diseases of pet dogs and risk perception of zoonotic infection by dog owners in Bangladesh. Bangladesh J Vet Med. 2012;8:163-74.
  37. Traub RJ, Robertson ID, Irwin PJ, et al. The role of dogs in transmission of gastrointestinal parasites in a remote tea-growing community in northeastern India. The American Society of Tropical Medicine and Hygiene. 2002;67:539-45.

**\*Correspondence to:**

Hamida Khanum  
 Department of Zoology  
 University of Dhaka  
 Dhaka-1000, Bangladesh  
 Mobile: +88 01712-039756  
 E-mail: hamida\_khanum@yahoo.com