



***PREVALENCE OF INTESTINAL HELMINTHS OF HOUSEHOLD DOGS
AND CATS AND PERCEPTION OF RELATED ZONOSSES BY OWNERS
IN IPOH, PERAK, MALAYSIA***

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AND CATS AND PERCEPTION OF RELATED ZONOSSES BY OWNERS
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It is hereby certified that we have read this project paper entitled “Prevalence of intestinal helminths of household dogs and cats and perception of related zoonoses by owners in Ipoh, Perak, Malaysia”, by Chong Keo Lee and in our opinion it is satisfactory in terms of scope, quality, and presentation as partial fulfillment of the requirement for the course VPD 4999 – Final Year Project.



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DEDICATION

This thesis is dedicated to my parents, boyfriend and friends for their endless love,
support and encouragement



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ABSTRAK

Abstrak daripada kertas projek yang dikemukakan kepada Fakulti Perubatan Veterinar untuk memenuhi sebahagian daripada keperluan kursus VPD 4999 – Projek Ilmiah Tahun Akhir.

PREVALEN HELMIN USUS DIKALANGAN ANJING DAN KUCING DI KAWASAN IPOH DAN TAHAP KESEDARAN BERKAITAN ZONOSIS PARASIT DIKALANGAN PEMILIK HAIWAN KESAYANGAN

oleh

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Di Malaysia, dengan peningkatan bilangan haiwan-haiwan kesayangan, terdapat peningkatan dalam hubungan antara haiwan-haiwan domestik dan manusia. Kekurangan kesedaran dikalangan pemilik haiwan kesayangan terhadap potensi jangkitan penyakit zoonotik yang dibawa oleh haiwan kesayangan mereka

meningkatkan risiko mereka kepada pendedahan. Kajian ini bertujuan untuk mengemaskini prevalen helmin usus yang zoonotik dikalangan anjing dan kucing di kawasan Ipoh serta untuk mengetahui tahap kesedaran berkaitan zoonosis parasit dikalangan pemilik haiwan kesayangan. Pengenalpastian ova cacing dalam usus dilakukan dengan menggunakan teknik pengapungan.

Kaji selidik daripada 62 anjing dan 17 kucing menunjukkan prevalen untuk helmin usus adalah seperti berikut: Bagi anjing, *Ancylostoma* spp (27.4%), *Toxocara* spp. (8.1%) dan *Trichuris vulpis* (3.2%). Bagi kucing, hanya *Ancylostoma* spp. (47.1%). Prevalens keseluruhan parasitisme dalam kedua-dua anjing dan kucing adalah 38%. Prevalen parasitisme, terutamanya toksokariasis secara signifikannya lebih tinggi dalam kumpulan anjing umur kurang daripada 6 bulan ($p < 0.05$). Prevalen ansilostomiasis adalah kurang dipengaruhi oleh faktor usia. Anjing yang dibawa berjalan oleh pemiliknya adalah lima kali lebih berisiko untuk dijangkiti oleh cacing.

Daripada 79 pemilik yang ditemuramah, hanya 33% haiwan kesayangan mereka dinyahcacing lebih daripada dua kali setahun. Kebanyakan pemilik (33%) menghabiskan masa mereka selama dua jam sehari dengan haiwan kesayangan mereka. Lebih daripada separuh daripada pemilik, membenarkan haiwan kesayangan mereka untuk menjilat atau mencium muka mereka dan memasuki bilik tidur mereka manakala 34% daripada mereka tidur dengan haiwan kesayangan mereka. Akhir sekali, separuh (51%) daripada pemilik sedar tentang parasit zoonotik yang berkait dengan haiwan kesayangan.

Prevalens helmin usus dalam anjing dan kucing di kawasan Ipoh dianggap tinggi manakala tahap persepsi tentang zoonosis dikalangan pemilik adalah sederhana.

Kata kunci: *Ancylostoma* spp., *Toxocara* spp., zoonosis, anjing dan kucing, interaksi social, kesedaran pemilik



ABSTRACT

An abstract of the project paper presented to the Faculty of Veterinary Medicine in
partial fulfilment of course VPD 4999

PREVALENCE OF INTESTINAL HELMINTHS OF HOUSEHOLD DOGS AND CATS AND PERCEPTION OF RELATED ZONOSSES BY OWNERS IN IPOH, PERAK, MALAYSIA

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2015

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In Malaysia, with the increasing number of companion animals, there is more contact between domestic animals and people, exposing humans to various zoonotic agents. The lack of awareness among pet owners on potential zoonotic diseases harboured by their pets puts them in higher risk of exposure. This study was aimed to update the prevalence of zoonotic intestinal helminths in pet dogs and cats in Ipoh area and to know the level of awareness on parasite zoonoses among pet owners. Identification of intestinal helminth ova was done using the simple floatation technique.

The survey of 62 dogs and 17 cats revealed the prevalence rates for intestinal helminths as follow: In dogs, *Ancylostoma* spp. (27.4%), *Toxocara* spp. (8.1%) and *Trichuris vulpis* (3.2%). In cats, only *Ancylostoma* spp. (47.1%). The overall

prevalence of parasitism in both dogs and cats was 38%. Risk calculation revealed that prevalence of parasitism especially toxocariasis was significantly ($p < 0.05$) higher in the less than 6-months age group. Ancylostomiasis prevalence was less affected by the age factor. Dogs which were walked by their owners were five times more at risk of being infected with helminths.

Of the 79 owners interviewed, only 33% dewormed their pets more than twice per year. Most owners (33%) spent two hours a day with their pets. More than half of the owners allowed their pets to lick or kiss their face and enter their bedrooms while 34% of them slept with their pets. Lastly, half (51%) of the owners were aware of pet-associated zoonotic parasites.

The prevalence of intestinal helminths in pet dogs and cats in Ipoh area is considered high while the perception of zoonoses among owners is moderate.

Keywords : *Ancylostoma* spp., *Toxocara* spp. , zoonotic, dogs and cats, social interactions, owner awareness

INTRODUCTION

In Malaysia, dogs and cats are common pets in many households. With the increasing number of companion animals, there is more contact between domestic animals and people, thus exposing humans to various zoonotic agents. Pet ownership is an important risk factor for the occurrence of many zoonoses (Robertson *et al.*, 2000).

While many potentially zoonotic organisms are associated with dogs and cats, enteric pathogens are of particular concern (Robertson *et al.* 2000). Intestinal helminths are one of the most common pathogenic agents in dogs and cats.

Among intestinal helminths, *Toxocara* spp. and *Ancylostoma* spp. of dogs and cats are most important to public health (Ngu *et al.* 2014). In Malaysia, little information on the prevalence of intestinal helminthic infestations in household cats and dogs is available. As reported by Ngu *et al.* (2014), most surveys on intestinal helminths conducted in the past focused only on stray cats or dogs found either in urban or rural areas. Previous study by Erwanas *et al.* (2014) showed that 31% stray dogs in Ipoh are infected with intestinal helminths, which is considered high. Although previous studies on prevalence of helminth infestation in stray animals revealed significant results, it cannot be assumed that these results are indicative of the condition among household cats and dogs. Moreover, pets have intimate relationship with humans or their owners as compared to strays, thus increasing the chance of transmission of zoonotic diseases. Some close interactions that owners and pets shared put them in higher risk of exposure especially among children and immunocompromised individuals.

In Malaysia, there is no study done on the prevalence of intestinal parasitic infestations together with the possible risk factors associated with lifestyles or interactions that pet owners and pets share. Previous studies mostly focused on prevalence of intestinal parasites alone. Also, the current level of knowledge and awareness of pet owners about pet-associated zoonotic infections is believed to be low although in urban areas, veterinary services are readily available. This study will unfold the potential role of pet cats and dogs as possible reservoirs of pet-associated zoonotic parasite infestation. The level of awareness among pet owners will be known so that client awareness programmes can be planned as a community programme. Therefore, the objectives of this study are;

- i) To study the prevalence of zoonotic intestinal helminth infections of household dogs and cats in Ipoh.
- ii) To study possible risk factors of zoonotic intestinal helminth infections associated with the lifestyles that pet owners and their pets share.
- iii) To study the level of knowledge and the extent to which pet owners are aware of pet-associated zoonotic intestinal helminths.

REFERENCE

- Beiromvand, M., Akhlaghi, L., Fattahi Massom, S., Meamar, A., Motevalian, A., Oormazdi, H., & Razmjou, E. (2013). Prevalence of zoonotic intestinal parasites in domestic and stray dogs in a rural area of Iran. *Preventive Veterinary Medicine*, 109(1-2), 162-167.
doi:10.1016/j.prevetmed.2012.09.009
- Bowman, D., Montgomery, S., Zajac, A., Eberhard, M., & Kazacos, K. (2010). Hookworms of dogs and cats as agents of cutaneous larva migrans. *Trends In Parasitology*, 26(4), 162-167. doi:10.1016/j.pt.2010.01.005
- Bugg, R., Robertson, I., Elliot, A., & Thompson, R. (1999). Gastrointestinal Parasites of Urban Dogs in Perth, Western Australia. *The Veterinary Journal*, 157(3), 295-301. doi:10.1053/tvj.1998.0327
- Deplazes, P., van Knapen, F., Schweiger, A., & Overgaaauw, P. (2011). Role of pet dogs and cats in the transmission of helminthic zoonoses in Europe, with a focus on echinococcosis and toxocarosis. *Veterinary Parasitology*, 182(1), 41-53. doi:10.1016/j.vetpar.2011.07.014
- Erwanas, A., Chandrawathani, P., Premaalatha, B., Zaini, C., Lily Rozita, M., & Kumutha, M. et al. (2014). Parasitic infections found in pet and stray dogs in Ipoh, Malaysia. *Malaysian Journal Of Veterinary Research*, 5(1), 27-34.B
- Francis. J. J. (2002). Gastrointestinal parasites in dogs from a local animal shelter. DVM thesis. Faculty of Veterinary Medicine. Universiti Putra Malaysia, Serdang, Selangor Darul Ehsan.

Georgi, J. (1987). Tapeworms. *Veterinary Clinics Of North America: Small Animal Practice*, 17(6), 1341-1354.

Lee, A., Schantz, P., Kazacos, K., Montgomery, S., & Bowman, D. (2010). Epidemiologic and zoonotic aspects of ascarid infections in dogs and cats. *Trends In Parasitology*, 26(4), 155-161. doi:10.1016/j.pt.2010.01.002

Lim, L. L. (1999). Prevalence of blood and intestinal parasites in dogs. DVM thesis. Faculty of Veterinary Medicine and Animal Science. Universiti Putra Malaysia, Serdang.

Macadam, I., Gudan, D., Timbs, D., Urquhart, H., & Sewell, M. (1984). Metazoan parasites of dogs in Sabah, Malaysia. *Trop Anim Health Prod*, 16(1), 34-38. doi:10.1007/bf02248927

Mahdy, M., Lim, Y., Ngui, R., Fatimah, M., Choy, S., & Yap, N. et al. (2012). Prevalence and zoonotic potential of canine hookworms in Malaysia. *Parasites & Vectors*, 5(1), 88. doi:10.1186/1756-3305-5-88

Mohd Zain, S., Sahimin, N., Pal, P., & Lewis, J. (2013). Macroparasite communities in stray cat populations from urban cities in Peninsular Malaysia. *Veterinary Parasitology*, 196(3-4), 469-477. doi:10.1016/j.vetpar.2013.03.030

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Ngui, R., Lee, S., Yap, N., Tan, T., Aidil, R., & Chua, K. et al. (2014). Gastrointestinal parasites in rural dogs and cats in Selangor and Pahang states in Peninsular Malaysia. *Acta Parasit.*, 59(4), 737-744. doi:10.2478/s11686-014-0306-3

Overgaaauw, P., & van Knapen, F. (2013). Veterinary and public health aspects of *Toxocara* spp. *Veterinary Parasitology*, 193(4), 398-403.

doi:10.1016/j.vetpar.2012.12.035

Overgaaauw, P., van Zutphen, L., Hoek, D., Yaya, F., Roelfsema, J., & Pinelli, E. et al. (2009). Zoonotic parasites in fecal samples and fur from dogs and cats in The Netherlands. *Veterinary Parasitology*, 163(1-2), 115-122.

doi:10.1016/j.vetpar.2009.03.044

Robertson, I., Irwin, P., Lymbery, A., & Thompson, R. (2000). The role of companion animals in the emergence of parasitic zoonoses. *International Journal For Parasitology*, 30(12-13), 1369-1377. doi:10.1016/s0020-7519(00)00134-x

Robertson, I., & Thompson, R. (2002). Enteric parasitic zoonoses of domesticated dogs and cats. *Microbes And Infection*, 4(8), 867-873. doi:10.1016/s1286-4579(02)01607-6

Shirley, S. G. H. (2001). A study of endoparasitism in cats from a local animal shelter. DVM thesis. Faculty of Veterinary Medicine. Universiti Putra Malaysia, Serdang, Selangor.

Tan, B.D. (1997). Survey of intestinal parasites in dogs. DVM thesis. Faculty of Veterinary Medicine and Animal Science. Universiti Putra Malaysia, Serdang, Selangor.

Traub, R. (2013). *Ancylostoma ceylanicum*, a re-emerging but neglected parasitic zoonosis. *International Journal For Parasitology*, 43(12-13), 1009-1015.
doi:10.1016/j.ijpara.2013.07.006

