Dogs, Humans and Gastrointestinal Parasites: Unravelling Epidemiological and Zoonotic Relationships in an endemic Tea-Growing Community in Northeast India

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This thesis is presented for the degree of Doctor of Philosophy of Murdoch University
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I declare that this thesis is my own account of my research and contains as its main content work which has not been previously been submitted for a degree at any other tertiary educational institution.

..............................

Rebecca Justine Traub
Abstract

A simultaneous survey of canine and human gastrointestinal (GI) parasites was conducted in three socioeconomically disadvantaged, tea-growing communities in Assam, India. The aims of this study were to determine the epidemiology of GI parasites of zoonotic significance in dogs and geohelminth infection in humans using a combination of molecular biological and classical parasitological and epidemiological tools.

A total of 328 and 101 dogs participated in the study. The prevalence of GI parasites in dogs was 99%. Parasitic stages presumed to be host-specific for humans such as *Ascaris* spp., *Trichuris trichiura* and *Isospora belli* were also encountered in dog faeces. A polymerase chain reaction - linked restriction fragment length polymorphism (PCR-RFLP) was developed to identify the species of *Ascaris* eggs in dog faeces. The results supported the dog's role as a significant disseminator and environmental contaminator of *Ascaris lumbricoides*, in communities where promiscuous defecation by humans exist.

The prevalence, intensity and associated risk factors for infection with *Ascaris*, hookworms and *Trichuris* were also determined among the human population. The overall prevalence of *Ascaris* was 38% and 43% for both hookworms and *Trichuris*. The strongest predictors for the intensity of geohelminths included socioeconomic status, age, household crowding, level of education and lack of footwear when outdoors.

The zoonotic potential of canine *Giardia* was investigated by genetically characterising *G. duodenalis* isolates recovered from humans and dogs at three different loci. Phylogenetic analysis placed canine *Giardia* isolates within the genetic groupings of human isolates. Further evidence for zoonotic transmission was supported by strong epidemiological data.

A highly sensitive and specific PCR-RFLP based test was developed to detect and differentiate the species of canine hookworms directly from eggs in faeces. Thirty-six percent of dogs were found to harbour single infections with *A. caninum*, 24% single infections with *A. braziliense* and 38% mixed infections with both species. This newly
developed PCR-based test provided a rapid, highly sensitive and specific tool for the epidemiological screening of canine *Ancylostoma* species in a community.

A combination of canine population management, effective anthelmintic regimes and improvements in health education and sanitation is recommended for the control of canine and human gastrointestinal parasites in these communities.
Publications

Refereed journal articles:


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