



Parasite control practices and public perception of parasitic diseases: A survey of dog and cat owners



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ABSTRACT

Drugs used in the control of internal and external parasites in companion animals play a crucial role in Animal and Public Health. To ensure continuing protection, these drugs should be administered regularly and in intervals, as suggested by the manufacturers. To assess parasite control practices and other related factors, including the degree of public awareness on the topic, 312 dog and cat owners were surveyed while attending the Small Animal Hospital, Faculty of Veterinary Medicine, Lisbon University.

Results showed that 89.7% of the dogs were currently being treated with endoparasitic drugs. Of these, 74.3% were dewormed every four months or longer and merely 11.8% with the recommended treatment regimen (minimum quarterly). In cats, 63.6% were being treated with endoparasitic drugs and 85.7% of these were irregularly dewormed every four months or longer and merely 5.5% with the recommended treatment regimen (minimum quarterly). Combinations of praziquantel, pyrantel embonate and febantel were the most commonly used drugs in dogs, whereas macrocyclic lactones were more frequently used in cats. Regarding external parasitic control, 92.2% of the dogs were being treated, 50.5% of these at monthly intervals (all-year round or seasonally). The most common ectoparasitic drug formulation used on dogs was the spot-on imidacloprid + permethrin (89%). Only 28.4% of the dogs were uninterruptedly protected throughout the year from the main canine vector borne diseases transmitted by fleas, ticks, sandflies and mosquitoes. Merely 63.6% of the cats were being controlled with ectoparasitic drugs, most at infrequent drug intervals and imidacloprid was the most frequently used drug on cats (44.4%).

Additionally, 85% of the respondents had never heard of the word “zoonosis” and 37% of them did not collect their dog’s faeces in all public places. Scabies, toxoplasmosis and leishmaniasis were the most frequent parasitic diseases identified by the public in this survey.

Although the majority of pet owners give antiparasitic drugs, our results show that most of them do not follow the manufacturers recommendations, deworming at irregular and consequently ineffective intervals. Therefore, it is of utmost importance for the veterinarians to educate pet owners regarding parasite cycles, methods of prevention and transmission mechanisms, as well as to follow the drug recommendations, in order, respectively, to increase their awareness and thereby improve the effectiveness of the available control measures.

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1. Introduction

Despite advances regarding prophylaxis and treatment of parasitic diseases, parasites are still responsible for significant morbidity and mortality in companion animals. Furthermore, their

zoonotic potential frequently presents an environmental and Public Health menace (Page, 2008; Bowman, 2009).

The term endoparasites, apart from “traditional” intestinal worms, also covers other (extra-intestinal) parasites such as *Dirofilaria immitis*, *Aelurostrongylus abstrusus*, *Angiostrongylus vasorum* and other vector borne agents (protozoa), namely *Leishmania infantum* and *Babesia* spp. Recent attention from the scientific community to extra-intestinal parasites has caused the misconception that intestinal parasites in dogs and cats are no longer important, mainly because the routine use of certain anthelmintics (AH) is believed to have reduced their diffusion and impact on

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animal health and welfare (Traversa, 2012). In fact, intestinal protozoan infections caused by *Giardia* spp., *Cryptosporidium* spp. (both zoonotic) and *Cystoisospora* spp. (all endoparasites) are affecting more and more dogs and cats; in Portugal, studies have shown that *Giardia* spp., *Cystoisospora* spp., *Toxocara* spp., *Toxascaris leonina*, *Ancylostoma* spp., *Trichuris* spp. and *Dipylidium caninum* were the most prevalent endoparasites in small animals (Duarte et al., 2010; Ferreira et al., 2011; Lebre, 2011; Neves et al., 2013). Most of these studies show a higher prevalence of protozoan infections (especially *Giardia* spp.) than helminth infections, which may be due to the fact that most of the endoparasiticides used worldwide are AH, and are therefore ineffective against this sort of infection (Little et al., 2009).

Several studies conducted across the country revealed the presence of parasites of zoonotic concern, namely Ascarididae and Ancylostomatidae (Crespo et al., 2006), especially *Toxocara* spp., detected in 80% of public parks (Otero et al., 2013). This is also the reason why the European Scientific Counsel Companion Animal Parasites guidelines (European Scientific Counsel Companion Animal Parasites (ESCCAP), 2010) expresses the need to implement environmental control measures (namely dog faeces removal) along with effective worm control in dogs and cats. Worm control with appropriate AH is recommended on at least a quarterly basis, especially when the pet owner does not perform routine coprology tests, which are also suggested as an alternative to repeated treatments (European Scientific Counsel Companion Animal Parasites (ESCCAP), 2010). ESCCAP guidelines also mention what Sager et al. (2005) demonstrated: an increase of treatment frequency effectively reduces the occurrence of infected animals; deworming four times/year does not necessarily eliminate patent infections. However, a monthly worm treatment can largely prevent patent infections, as it takes into account the cycle of the parasites. It is important to note that repetitive AH use has been associated with the emergence of AH parasite resistance in small animals, mainly with pyrantel (Kopp et al., 2009) and macrocyclic lactones (Bowman, 2012).

In an ever-changing world, various factors may be potentiating an increase in exposure to old and new parasitic agents, with some even re-emerging. It is known that climatic factors are transforming the epidemiology of certain parasites, but other factors are also involved, such as urbanization and deforestation, demographic and political changes, making the spread of ectoparasites and their pathogens a no-boundaries global event (Colwell et al., 2011).

In Portugal, canine vector-borne diseases (CVBD) represent a growing concern amongst veterinarians and parasitologists. Recently, a national serological study in healthy dogs revealed that 14% were positive for one or more of the following agents: *D. immitis*, *Ehrlichia canis*, *Borrelia burgdorferi* sensu lato, *Anaplasma* spp. and *L. infantum* (Cardoso et al., 2012). Other national data showed an apparent prevalence for *L. infantum* in dogs ranging from 0.9% to 16.2%, with the highest prevalence in the interior regions (Cortes et al., 2012). Canine *L. infantum* is endemic in Portugal and lately the scientific community has been studying the role of cats as an alternative reservoir rather than an accidental host (Maia et al., 2010). This lends credence to the view that an effective ectoparasite control approach is of utmost importance in dogs and cats. European Scientific Counsel Companion Animal Parasites (ESCCAP) (2012a,b) recommend that animals with outdoor access must be treated with insecticides-acaricides at appropriate treatment intervals (generally monthly, according to product label recommendations) for effective prevention. They also state that acaricide treatment should continue throughout the year in warmer areas and that seasonal insecticide repellent treatment must take place to prevent mosquito and sandfly related diseases. Some authors are ultimately debating the “seasonality paradigm” of CVBD, warn-

ing that the occurrence of CVBDs should no longer be considered a seasonal phenomenon (Otranto et al., 2009).

Little is known about which parasitic control practices are in place and how pet owners implement them on their dogs and cats. Furthermore, the level of public knowledge about parasites and parasitic diseases, as well as, the safety measures partaken by the owners in public places, needs to be evaluated, to encourage general awareness about these topics. The present study is intended to answer those questions in a survey performed among pet owners in order to assess the way dogs and cats are being protected from parasites in Portugal, especially those attending a reference animal hospital in the Lisbon area.

2. Material and methods

2.1. Study design, topics and procedures

The authors conducted this survey as an oral personal interview. The interviewees included dog and/or cat owners who attended our Small Animal Hospital, Faculty of Veterinary Medicine, University of Lisbon, from January to April 2013. In order to assess and characterize the differential antiparasitic control strategies, priority was given to owners that visited the hospital for a second opinion/specialist appointment from other clinics.

Sixty sample interviews were conducted to test and assess the viability of different survey formats and questions (written and multiple-choice answers). The final format was a multiple-choice based interview that took approximately 7–10 min to complete, followed by a small period to clarify owner's doubts on the subject. The study included groups of questions on the following topics: (a) characterization of the use of endo- and ectoparasiticides on the animal; (b) respondent's knowledge concerning parasites and parasitic diseases; (c) animal characterization along with questions specially assigned for dog owners, about dog faeces removal in public places; and (d) interviewees characterization. The questions were formulated in order to be easy to understand and in a way to enable the owners to respond freely, without feeling constrained about any compromising answers that could lead them to give what they deem to be the “correct” answer rather than the truth.

ESCCAP guidelines (European Scientific Counsel Companion Animal Parasites (ESCCAP), 2010, 2012a,b) were considered to determine the adequate preventive antiparasitic control strategy for animals with regular outdoor access, which was at least quarterly for worm control (without faecal analysis) and monthly for ectoparasite control. In order to assess the number of dogs and cats that were adequately and continuously protected (considering ESCCAP guidelines), three parameters were defined: (a) owner compliance with the recommended treatment schedule; (b) treatment given at least quarterly; (c) at least one treatment in the last three months.

Owners were also asked a series of questions intended to assess their knowledge on parasites as a potential cause of infection and disease, and also about their perception of possible ways their pets may acquire endoparasitic diseases.

2.2. Statistical analysis

Statistical analysis was performed using R program 3.0.0 (The R Foundation for Statistical Computing, 2013). Summary statistics for continuous variables were expressed as mean and standard deviation (\pm), median, 25th, 75th percentiles (25, 75P) and interquartile range (IQR). Nevertheless, almost all variables were of categorical data, expressed as numerator, denominator and/or per cent. Association and comparison of categorical proportion outcomes between respondents were done with a two-sided X^2 test and two-sided

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