

A survey of pet ownership, awareness and public knowledge of pet zoonoses with particular reference to roundworms and hookworms in Harare, Zimbabwe

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Abstract A cross-sectional questionnaire-based survey was carried out in Harare to assess pet ownership and public awareness with regard to pet zoonoses. The questionnaire was designed to obtain information on pet ownership, health and welfare of pets, pet owners' knowledge and awareness of pet zoonoses with particular emphasis on hookworms and roundworms. The results demonstrated that the proportion of pet owners who knew helminths as zoonoses in dogs (21.3%) and cats (1.1%) was low compared to rabies (95.7%) with ancylostomosis (4.3%) and toxocariosis (2.1%) being the specific parasitic zoonoses known to occur in dogs and toxoplasmosis (2.1%) in cats. More than 50% of the pet owners indicated that veterinarians never discussed the potential hazards of zoonoses or discussed it only when asked and 33% indicated that veterinarians initiated discussion of the subject whenever zoonoses were diagnosed in pets. Over 90% of the pet owners indicated that veterinarians should discuss zoonoses

with them. Further investigations are necessary to determine the current prevalence of intestinal nematode infections in dogs and cats in the various regions of the country.

Keywords Hookworms · Pet ownership · Public awareness · Rabies · Roundworms · Zimbabwe · Zoonoses

Introduction

Humans and pets have lived in close proximity for thousands of years. Pets provide companionship and also probably confer physiological health and psychological benefits as pet owners have been reported to have fewer doctors' visits and longer survival following heart attack compared to non-pet owners (Friedmann et al. 1980; Heady et al. 2002). Katcher and Friedmann (1982) pointed out that companionship, something to care for, touch and fondle, something to keep one busy, a focus of attention, exercise and safety are some of the important functions of pet ownership. Pets have also been reported to have important roles in enhancing child development (Endenburg and Baarda 1995) and the wellbeing of older people especially when used in therapeutic settings (Hart 1995).

However, despite the important roles played by pets in human wellbeing it has become increasingly

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apparent that pets are important sources of zoonotic infections. Approximately 30 to 40 organisms that cause zoonotic infections are known in companion animals such as cats and dogs (Greene and Levy 2006). In many cases, normal human immunological response would eliminate these diseases, preventing any clinical signs of disease (Carithers 2002). However, some pet zoonotic diseases, such as rabies are fatal while others such as leptospirosis are debilitating to healthy humans. In addition, these same infections can be especially dangerous for people with compromised immune systems. Among those at risk are patients with acquired immunodeficiency syndrome (AIDS), malnutrition, diabetes mellitus, chronic kidney and liver disease, and congenital immunodeficiencies (Angulo 1994). Another high-risk group includes people receiving immunosuppressive therapy for cancer, autoimmune disease, and organ or bone marrow transplants (Wilson et al. 1996). Other groups such as young children, the elderly, pregnant women, veterinarians or animal nurses are also at a greater risk of acquiring zoonotic infections due either to their immune system or behaviour or occupation.

Many helminth parasites of pets can cause zoonotic infection when people accidentally come into contact with the parasites' infective stages (Glickman and Magnaval 1993; Smyth 1995). Ascarids and hookworms are particularly important because they commonly cause *Larva migrans* in humans (Kazacos 2002). However, surveys on pet ownership and knowledge of zoonotic diseases in the United States have shown that pet owners do not know that their pets might carry diseases transmissible to people (Schantz 1989). Furthermore, pet owners have been reported to be well informed about rabies and the need to vaccinate their animals; but however, their knowledge of other zoonotic risks such as ascarids and hookworms is usually absent or incorrect (Fontaine and Schantz 1989). Hence, without such information, pet owners are neither informed nor motivated to take the simple precautions necessary to protect themselves and their families. Given the occurrence of ancylostomosis (38%) and toxocarosis (7%) in dogs in Zimbabwe (Mukaratirwa and Busayi 1995), there is need to assess public awareness with regard to these zoonoses. Thus, the aim of this study was to evaluate pet ownership and public knowledge of parasitic zoonoses such as roundworms and hookworms.

Materials and methods

Study location and selection of study sites

The study was carried out in Harare, Zimbabwe for the period January to April 2008. Veterinary practices and a veterinary clinic owned by the Society for the Prevention of Cruelty against Animals (SPCA) where pet owners present their pets for consultation on various disease conditions were used as the study sites. Six randomly selected veterinary practices and one veterinary clinic owned by SPCA were used for the study. The SPCA veterinary clinic was included in the study as it caters for the less affluent society in Harare.

Data collection and analysis

A cross-sectional questionnaire-based study was employed to investigate pet ownership and public knowledge of pet zoonoses. A systematic sampling technique was used to select pet owners attending the selected veterinary practices in and around Harare. The inclusion criteria for pet owners was designed to target those who had attended the practice within the last 6–12 months or have attended the practice for more than a year; while those who were attending the practice for the first time were excluded. Self-completion questionnaires were administered to at least 10% of pet owners attending each veterinary practice.

The questionnaire was designed to obtain information on pet ownership, health and welfare of pets, pet owners' knowledge and awareness of pet zoonoses with particular emphasis on hookworms and roundworms. A standard questionnaire with 25 multiple-choice and open-ended questions was used. Pet owners were asked to name the pets they own, number and ages of the pets they own, purpose of keeping the pets, disposal of their pets' stools, how often they visited their veterinarians and reasons for visiting the veterinary practice. They were asked on their general knowledge of pet zoonoses, their awareness on hookworms and roundworms, their sources of information with regard to pet zoonoses and whether their veterinarians discuss with them issues with regard to pet zoonoses.

The data analysis focused on generation of descriptive statistics (frequencies/proportions) related

to pet ownership, health and welfare of pets, pet owners' knowledge and awareness of diseases transmissible from pets to humans with particular emphasis on hookworms and roundworms.

Results

Characteristics of respondents

A total of 122 (87%) pet owners of 140 contacted responded. Sixty-five percent (79/122) were male and 35% (43/122) were female with most respondents (91.8%) being aged 21 years and above. Approximately 35% (43/122) of the respondents were from the less affluent society serviced by the SPCA clinic.

Pet ownership, demographics and management of pets

Pets owned were dogs and cats with all respondents from the less affluent society keeping dogs and only 2 (4.7%) of them keeping cats. Most of the respondents (92.6%) had kept pets for over a year. The purpose of keeping pets were for protection and pet (48%), protection only (22%), pet only (21%), breeding, pet and protection (7%) and for breeding only (2%).

Pet ownership by the respondents and the demographics of the pets owned are presented in Table 1. Most owned 1–3 dogs (88.9%) or 1–2 cats (90.9%) and the respective number of dogs and cats owned ranged from 1–10 and 1–4. The median number of dogs per respondent was 2 and that for cats was 1. Forty percent and 36% of the respondents owned dogs and cats less than one month to 12 months, respectively. Only 7 (6%) and 8 (36%) of dog and cat owners, respectively all from the more affluent

society kept their dogs and cats within their home-steads. Over 50% of dog owners, with all from the less affluent society allowed their dogs to roam within their neighbourhoods. In contrast, only 9% allowed their cats to roam within their neighbourhoods. A total of 54 (44.3%) of pet owners dispose off their pets' faeces with 48% of them putting the faeces in the garden as manure or putting in the garbage bin (Fig. 1).

Pet health

Most respondents (62%) had been visiting their veterinarian for over a year. Thirty-six per cent of them visited their veterinarian at least once in every six months, 25% at least once every one to two months, 15% at least once every year and 24% only when there is a problem. Most pet owners (59%) visited their veterinarian for either the treatment of sick pets and/or vaccination and 41% for deworming, education and guidance on pet health and any other information related to their pet health.

Awareness of zoonoses

When asked generally on their awareness of pet zoonoses, 77% (94/122) of pet owners were aware. Most of them (60%) cited veterinarians as their source of information with human doctors, media, friends and relatives (40%) also being cited as a source of information about zoonoses. Of the 77% who were aware of zoonotic diseases in pets a higher proportion knew rabies as a zoonotic disease in dogs (95.7%) compared to cats (11.7%). The percentage of pet owners who knew parasites as zoonoses in dogs (21.3%) and cats (1.1%) was low compared to rabies with ancylostomosis (4.3%) and toxocariosis (2.1%)

Table 1 Respondents' pet ownership and the demographics of the pets

Variable	Dogs	Cats
*Number owning pet (%)	100 (82.0)	5 (4.1)
Total pets owned	263	31
Range of pets (% owning)	1–3 (88.9) 4–10 (11.1)	1–2 (90.9) 3–4 (9.1)
Age range of pets in months (% owning)	<1–12 (40.2) >12 (59.8)	<1–12 (36.4) >12 (63.6)
[†] Housing of pets (%)	Indoor (6.0) Outdoor (52.1)	Indoor (36.4) Outdoor (9.1)

* 17 (13.9%) of owners kept both pet species

[†] 41.9% of dog owners and 54.5% of cat owners kept them indoor or allowed them to roam their neighbourhoods (outdoor)

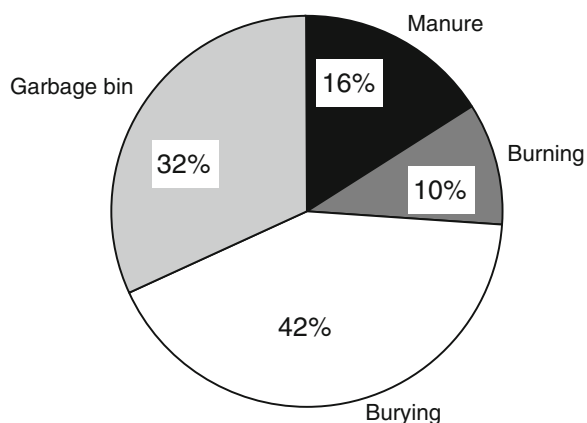


Fig. 1 Respondents' method of pets' faeces disposal

being the specific parasitic zoonoses known to occur in dogs and toxoplasmosis (2.1%) in cats. Other zoonotic diseases cited were salmonellosis (3.2%) and ringworm (2.1%) in dogs and 'Cat Scratch' disease (3.2%) in cats. A few pet owners responded that fleas (0.7%) and ticks (0.7%) were zoonoses.

When asked specifically on whether they were aware of parasites as zoonoses in pets, only 40% (49/122) were aware. Of the 40% who were aware of parasites as zoonotic diseases in pets, named hookworms (53%), roundworms (35%), tapeworms (35%) and toxoplasmosis (4%).

Approximately 55% of pet owners indicated that veterinarians never discussed the potential hazards of zoonotic diseases, or discussed them only when asked (Table 2) and about 33% of them indicated that veterinarians initiated discuss of this subject whenever zoonotic diseases were diagnosed in pets. Most (97.5%) of the pet owners indicated that veterinarians should discuss zoonoses with them and 93% responded that they would continue keeping pets

Table 2 Pet owners' perception on the frequency with which veterinarians discuss with them on the potential zoonotic hazards of hookworms and roundworms

	Number	%
Only when asked	40	32.8
Whenever helminths zoonoses diagnosed	40	32.8
Never discuss	27	22.1
Always discuss	11	9.0
Discuss when new client	4	3.3
Total	122	

irrespective of zoonotic parasites being diagnosed in their pets.

Discussion

The results of the present study have shown that a relatively higher proportion of pet owners in the survey area are well informed on rabies as a zoonotic disease but however, a relatively smaller proportion of them are aware that intestinal helminths of pets may infect human beings. Similar surveys on pet ownership and knowledge of zoonotic diseases in the United States have shown that pet owners do not know that their pets might carry other diseases transmissible to people (Schantz 1989). Pet owners are reported to be well informed about rabies and the need to vaccinate their animals; but however, their knowledge of other zoonotic risks such as ascarids and hookworms is usually absent or incorrect (Fontaine and Schantz 1989). Hence, highly fatal pet zoonoses like rabies have been reported to overshadow other parasitic zoonoses such as toxocarioris and ancylostomosis as they rarely cause death (Carithers 2002). However, ascarids and hookworms are particularly important because they commonly cause *Larva migrans* in humans (Kazacos 2002). Because *Larva migrans* syndromes are not reportable diseases in Zimbabwe, the total numbers of clinical cases are unknown and hence, reliable data are not available on the frequency of human infection with zoonotic hookworms and roundworms. However, surveys on the occurrence of these intestinal helminths in dogs in the city of Bulawayo, south-western Zimbabwe demonstrated a prevalence of 38% for ancylostomosis and 7% for toxocarioris (Mukaratirwa and Busayi 1995). Further investigations are necessary to determine the current prevalence of intestinal nematode infections in dogs and cats in the various regions of the country.

From the results of this survey more than half of the pet owners indicated that veterinarians never discussed the potential hazards of zoonotic parasites or discussed it only when asked. Thirty-three percent of the pet owners indicated that veterinarians initiated discussion of the subject whenever zoonotic diseases were diagnosed in pets. Similar studies have demonstrated veterinarians to be ambivalent about discussing the questions of the potential zoonotic hazards of

roundworms and hookworms with clients (Kornblatt and Schantz 1989; Harvey et al. 1991). Probably, practicing veterinarians do not want to alarm their clients, particularly if this might lead them to give up their pets. However, from the results of the present survey, fear of disease transmission is not a factor associated with keeping or not keeping pets as over 90% of pet owners responded that they would continue keeping pets irrespective of zoonotic parasite being diagnosed in their pets. In addition, pet owners indicated that they would seek advice from veterinarians once their animals are diagnosed with zoonotic diseases. Without information on pet zoonoses, pet owners are neither informed nor motivated to take the simple precautions necessary to protect themselves, their families and pets. Thus, pet owners rely upon veterinarians to provide the best possible protection for their pets, including preventive deworming (Carithers 2002). From this study over 90% of the pet owners indicated that veterinarians should discuss zoonoses with them. Hence, veterinarians are a crucial link in keeping pet owners fully informed of ways to reduce the risk of zoonotic parasite transmission and, awareness and education is key to this mission. Veterinarians are uniquely suited to provide pet owners with sound advice by virtue of their special training and their rapport with clients and because, as supported by this survey and other studies (Troutman 1988; Schantz 1989, 2002) a high proportion of pet owners use veterinary services.

Current veterinary practises and recommendations to pet owners have been reported to be much less than ideal to prevent roundworm and hookworm transmission as less than half of surveyed veterinarians took the preventive or prophylactic approach to treatment of zoonotic intestinal helminths (Kornblatt and Schantz 1989; Harvey et al. 1991). Current recommendations for the prevention of parasitic zoonoses are to deworm all puppies for ascarids and hookworms beginning at 2 weeks of age wherever possible, with additional treatments at 4, 6 and 8 weeks of age (Parsons 1987; Barriga 1991; Kazacos 2000). Since prenatal transmission does not occur in cats, treatment of kittens can begin at 6 weeks of age and be repeated at 8 and 10 weeks. Nursing dams should be treated concurrently because they often develop patent infections about the same time as their offspring. For maximum protection and control, strategic deworming should be combined with a

program of environmental clean up and decontamination of contaminated areas (Kazacos 1991, 2000). Further investigations are necessary to determine the current veterinary practises and recommendations to pet owners on the prevention and control of roundworm and hookworm transmission in the country.

Most cases of human toxocarosis and zoonotic hookworm infection are preventable by simple measures such as careful personal hygiene, eliminating intestinal parasites from pets through regular deworming, and not allowing children to play in potentially contaminated environments. Despite that some of the pet owners dispose off their pet's faeces however, pet owners should be educated on proper disposal methods of pet faeces as some of the disposal methods, like using as garden manure, can further predispose children playing in lawns to infective eggs and larvae.

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