CANINE ZOONOSIS; ITS POTENTIAL AND ASSOCIATION OF SOIL-BORNE HELMINTHES FROM PUBLIC PARKS AND ITS GASTRO-INTESTINAL HELMINTHES IN LAHORE, PAKISTAN

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ABSTRACT*: Canine helminthiasis is the major cause of zoonotic diseases globally. This study was designed to estimate the prevalence of canine zoonotic helminthes in Lahore, Pakistan. One hundred (100) faecal samples from pet dogs while Four hundred (400) soil samples along with grass contaminated with the faeces of stray dogs were collected from dog kennels, parks, playgrounds, backyards and streets of Lahore city. The faecal samples were analyzed by flotation and sedimentation techniques. Microscopic examination revealed that out of 400 soil samples 33 (8.25 %) were positive for Ancylostomacaninum, 37 (9.25%) for Toxocaracanis, 29 (7.25 %) were positive for Dipylidiumcaninum and 19 (4.75%) were positive for Echinococcusgranulosus. Similarly out of 100 faecal samples, 10 % were positive for Ancylostomacaninum, 13 % for Toxocaracanis, 8 %, for Dipylidiumcaninum and 6 % were positive for Echinococcusgranulosus. The results showed that out of 500 samples 155(31%) of the samples were positive for these helminthes. These results reflect heavy contamination of soil with zoonotically important helminthes. It is suggested that regular screening of pet animals and elimination of stray dogs should be adopted for public health importance. Furthermore, entry of the stray dogs in public areas should be restricted to minimize the risk of zoonotic diseases.*

Key words: canine, helminthiasis, public health, public parks, parasites, zoonosis

INTRODUCTION

The role of companion animals as carriers of zoonotic diseases has been potentiated as a significant public health problem worldwide [1]. Canine parasitic zoonoses, however, are far from confined to developed countries. In developing countries uncontrolled populations of stray dogs exist in close proximity to increasing densities of human populations in urban areas, and humans often share a close relationship with semi-domesticated dogs in rural settings [2]. In these socioeconomically disadvantaged communities, the poor levels of hygiene and overcrowding, along with a lack of veterinary attention and zoonotic awareness, exacerbates the risks of disease transmission [3].

Dogs suffer from so many bacterial, viral and parasitic diseases besides the metabolic and accidental problems. It is an established fact that parasitic diseases adversely affect the health of dogs. Few parasites are of zoonotic importance and transmit various diseases to man.[4]. It has been estimated that infectious and parasitic diseases contribute 25% of the global disease burden [5]. The four most common soil-borne helminthes are roundworms (*Ascarislumbricoides*), whipworms (*Trichuristrichiura*), and the anthropophilic hookworms (*Necatoramericanus*and *Ancylostomaduodenale*). Ascarids (*Toxocaracanis, T. cati*) and hookworms (*Ancylostoma spp.*), are common intestinal parasites of dogs and cats. Ascarids and hookworms can cause diseases not only in their respective hosts but they are also well-known causes of larval migrans syndromes in humans, especially in children. While ascarids and hookworms are most commonly diagnosed in puppies and kittens. These Infection can occur in dogs and cats of all ages [6].

Epidemiologic studies have implicated the presence of dogs, particularly puppies as the principal risk factors for human helminthic diseases. Play habits of children and their attraction to pets put them at higher risk for infection than adults. The humans become infected with ascarids and other parasitic diseases through ingestion of infective eggs in the environment. When human ingests infective eggs, they hatch and release larvae that can migrate anywhere in the body through visceral larval migrans. The common dog tape worm (*T. canis)* and cat tape worm (*T.cati*) cause disease in humans especially in children.[7].

Keeping in view the zoonotic importance of these parasites this study was designed to estimate the prevalence of various zoonotic helminthes of dogs in the densely populated city like Lahore, Pakistan.

MATERIALS AND METHODS

Study Area

Lahore city is located at Coordinates: 31°32′59″ N, 74°20′37″ E on the globe as shown in figure 1. It is the provincial capital of Punjab Province inhabiting more than 10 million people. Lahore is the second largest city of the country and has been a centre of cultural heritage for many civilizations.

Preservation of Samples

Samples collected in the field was either placed in the refrigerator or preserved in 10% formalin [8]. Then the samples were brought to the Diagnostic Laboratory, Department of Parasitology, University of Veterinary and Animal Sciences, Lahore for examination.

Collection and processing of samples

One hundred faecal samples were collected from pet dogs in the spring season from March to May in a separate pre

labelled polythene bag. Similarly Four hundred soil samples along with grass contaminated with pet faeces were also collected from different kennels, parks and playgrounds, backyards and streets of the selected area. Faecal samples collected from dogs were comprising 2 age groups namely pups (1-6 months of age) and adults (over 6 months of age). All the samples were examined using Direct Smear, centrifugal Floatation and sedimentation techniques for the detection of parasitic ova as described by [8]. Similarly the soil and Grass Samples were evaluated through Sedimentation-Floatation Method as proposed by [9].

Statistical analysis

Chi-squared test was performed using SPSS 17.0 (SPSS Inc., Chicago, Illinois, USA) to observe the significance difference between the parasite prevalence with study area and host age. Percentage of frequency was calculated by dividing the number of animals harbouring any helminth by the total animals examined. In all cases, 95% confidence intervals and $P < 0.05$, were set for significance.

RESULTS AND DISCUSSION

The present study provides qualitative estimates of zoonotic helminth parasites in dogs and soil and/or grass samples in Lahore city, Pakistan in the spring season from March to May. The result showed that zoonotic helminth species were abundant, and that prevalence of infection was high. For this purpose, total of 100 samples of dogs' faeces and 400 soil/grass samples contaminated with dog's faeces were collected and evaluated for the presence of helminthes.

1. Trends of higher prevalence in pups than adult dogs

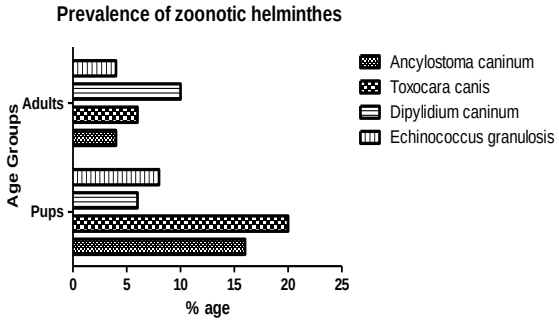

Figure 1: Bar graph showing prevalence of zoonotic helminthes in pups and adult dogs

50 faecal samples each taken from pups and adult dogs were collected. The result for the prevalence of *Ancylostomacaninum (A. caninum), Toxocaracanis (T. canis), Dipylidiumcaninum (D. caninum)* and*Echinococcusgranulosus (E. granulosus)*has been shown in figure 1. The occurrence of the zoonotic helminthes observed in pups was found significant as compared to the adult dogs.

Faecal samples from pet dogs comprising 2 age groups (pups<6 months old and adults>6 months old) were processed for the identification of the helminthic ova, overall 37% prevalence was recorded for the presence of 4 important zoonotic helminthes (*A. caninum, T. canis, D. caninum and E. granulosus*). Our results showed moderate infection as compared with the findings of Jones *et al*., who have reported high prevalence from 90 to 100% in stray dogs based on faecal examination and post-mortem findings in Wondo Genet, Southern Ethiopia [10]. The difference of results is due to fact that we have taken pet dogs for faecal sampling and the pet owners in Pakistan have habitude to deworm their animals regularly. There is abundant population of stray dogs in Lahore and the high prevalence might be encountered as observed in the study of Ashraf *et al*., 2008 who have found 72.7% prevalence in stray dogs as compared to pet dogs 54% [11]. The Pups were found more infected (50%) with the helminth parasites in our results as compared to the adult dogs (24%). The similar results were found by Okon*et al*., who have found higher prevalence of zoonotic helminthes in pups than in adult dogs [12]. The possible explanation could be due to their low resistance and/or due to the possibility of pre-natal infection of the foetus via intrauterine and lactogenic routes. Similarly the prevalence of parasite ova was high in pups as compare to adults in our study which are in line with the findings of [13-15] who also reported more parasitic infections in puppies than adult dogs.

2. Trends of higher prevalence in dog kennels

100 soil/grass samples each were collected from dog kennels, public parks, backyards and streets of Lahore city. The result is shown in figure 2.

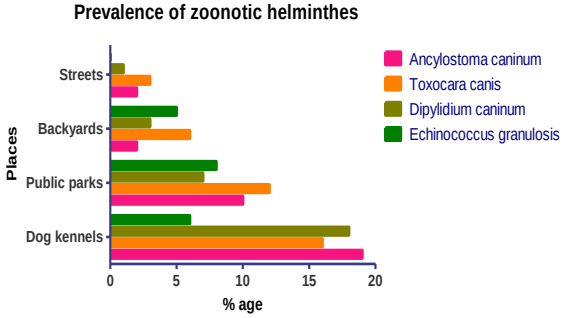

Figure 2: Bar graph showing prevalence of zoonotic helminthes from dog kennels, public parks, backyards and streets

The dog kennels were selected to estimate the burden of zoonotic parasites in soil samples. The dog owners deworm their animals routinely but in our study, soil samples are highly contaminated with zoonotic parasites as compared with other places. The possible explanation of the high prevalence of zoonotic helminthes might be due to the development of resistance against anthelmintic or to be under-dose treatment. Similar findings had been observed by Overgaauw and Boersema, they reported that dogs are frequently infected in breeding kennels in Netherlands with zoonotic nematodes. They observed overall 41% prevalence in the kenneled dogs even after routine deworming [16].

3. Trends of higher prevalence of*Toxocara spp., Anchylostoma spp.,* in soil samples

The results of 400 soil/grass samples indicating individual prevalence of zoonotic parasite of dogs as shown in figure 3.

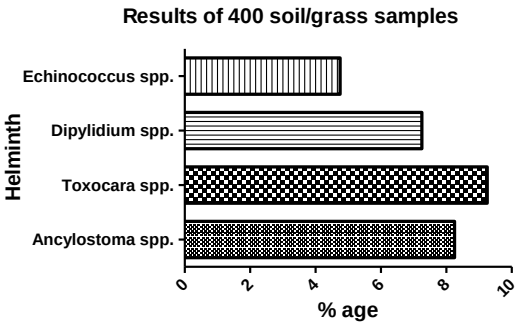

Figure 3: Bar graph showing percent prevalence of Anchylostoma spp., Toxocara spp., Dipylidium spp. And Echinococcus spp. in 400 soil samples

Stray dogs frequently visit public places, backyards and streets of densely populated cities like Lahore. The population of these dogs is uncontrolled. These stray dogs are the potential source of zoonosis for human especially children who routinely play in public places and streets of Lahore. In this work, the individual prevalence of zoonotic helminthes of dogs was found as shown in figure 4. Araujo *et al*. and Mukaratirwa and Taruvinga reported that canid helminthes are the source of zoonotic diseases [17, 18]. Masnik (2000) also observed that dogs play an important role in the transmission of human toxocariasis because these dogs contaminate the public parks and play grounds [19]. Zunino*et al*. (2000) and Alonso *et al*. (2001) also indicated that people visiting public places are more prone to be contaminated with the faeces of dogs [20, 21]. Dubna *et al*. had also observed highest incidence of *Toxocaracanis* out of 10% prevalence of zoonotic parasites in dogs from Prague, rural areas, and shelters of the Czech Republic through faecal microscopy [22].

CONCLUSION

These results suggest higher prevalence of zoonotic helminth parasites. Different studies performed in the public parks in various cities of world showed highly variable prevalence of different parasite species in samples from dog feces and/or soil [9, 23, 24]. In conclusion the soil of the kennels and public parks of the city is heavily contaminated with faeces of stray dogs. It is suggested to reduce the stray dogs in public parks and intervention measures are necessarily to be taken to reduce the risk of transmission of parasites from dogs to humans. Interventions should focus on health education provided to dog owners and strategic deworming of dogs Moreover; further epidemiological studies should be conducted seasonally in different towns/localities of Lahore city.

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