



Awareness and Attitude Regarding Roundworm Infection among Pet Owners of Punjab, India

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Authors' contributions

This work was carried out in collaboration between both authors. Author PJ designed the study and wrote the first draft of the manuscript. Author RT managed the analyses of the study and managed the literature searches. Both authors designed the questionnaire together and together asked the respondents the questions. Both authors read and approved the final manuscript.

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ABSTRACT

Aims: To access the awareness and attitude regarding roundworm infection among pet owners of Punjab, India.

Study Design: A cross-sectional questionnaire-based survey was conducted.

Place and Duration of Study: The present study was conducted on randomly selected pet owners who visited Teaching Veterinary Clinical Complex, GADVAS University, Ludhiana for the treatment of their pets. These owners belonged to different districts of Punjab. The data was collected between August 1st, 2016 and January 31st, 2017.

Methodology: A total of 150 pet owners were interviewed with a questionnaire. The respondents were presented with a questionnaire of 20 questions containing both open and close ended questions designed to obtain information on different aspects of roundworm diseases, i.e., awareness, knowledge, risks, etc.

Results: The results demonstrated that the very small proportion of pet owners (<35%) knew about the roundworm infection. Only forty four respondents (29.3%) reported that they knew this disease can spread from infected animal to a healthy animal and only 20% pet owners were aware of the zoonotic aspect of the disease as they knew the disease can spread from infected animals to

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healthy humans. More than 70% respondents indicated that veterinarians never discussed the potential hazards of zoonoses. The major proportion of pet owners had very poor knowledge, attitudes and practices in relation to roundworm infection.

Conclusion: It can be concluded that the pet owners do not have even a fair knowledge on parasitic helminths and are seriously unaware about risks and various preventive measures against roundworms. The study highlights that one of the major strategies in prevention and control of roundworms is to improve the information about knowledge, attitude and practices in this area. The extension agencies and veterinarians need to focus their attention towards providing information to pet owners on parasitic infections.

Keywords: Awareness; attitude; India; pet owners; roundworms; zoonoses.

1. INTRODUCTION

Toxocariasis and hookworms infection are serious helminthic zoonoses in temperate and tropical regions. Both of these diseases are major public health problem of low and middle-income countries [1]. It is caused by ingestion of L₃ infective larval stages of *Toxocara canis* and less frequently by *Toxocara cati*. Definitive host for *T. canis* are canids and for *T. cati* is felids. A wide variety of syndromes in human's like visceral larva migrans, ocular larva migrans, covert toxocariasis, common toxocariasis and cerebral toxocariasis results due to L₂ larvae [2]. The outcomes are mostly subclinical. Eggs of *Toxocara* spp. contaminate the soil as they are highly resistant to harsh environmental conditions and survive for longer periods, hence maintaining the host- parasite cycle. Mostly eggs are found in places like playgrounds, parks, gardens, backyards and beaches and act as potential source of infection hence presenting a viable public health threat. Previously various studies has been conducted which emphasis on the fact that eating raw vegetables, children with the habit of geophagia, contact or close association with dogs or presence of pet in house and drinking of water from streams, rivers, ponds and wells are predisposing factors for toxocariasis [3,4].

Hookworm infection is caused by skin penetration of L₃ infective larval stage of *Ancylostoma barziliense*, *A. caninum* and *A. ceylanicum* and undergo a prolonged migration causing cutaneous larvae migrans (CLM). Usually disease occurs when person walk barefoot on contaminated soil. Similar to *Toxocara* spp. infective larvae are found in playgrounds, parks, gardens, backyards and beaches [5-6].

Various studies has been conducted in India on prevalence estimation of toxocariasis where prevalence in adult stray dogs of *T. canis* in

Madhya Pradesh was 2.7% [7], 11% was in Assam [8]. According to a study [9] conducted in Andhra Pradesh, it was reported that 46% of public parks and 32% of school grounds were contaminated with *Toxocara ova*. Human cases of ocular toxocariasis were also reported from Chandigarh and New Delhi [10,11]. Similarly parasitic surveys were done to estimate the prevalence of *A. caninum* in Madhya Pradesh and Assam with the prevalence of 89% and 72%, respectively [7,8]. According to a study [8], it was concluded that high incidence of CLM reported in the human population among the tea estates was due to barefoot walking of individuals while outdoors.

Both of these helminth parasites of pets accidentally come into contact with human beings and cause diseases [12]. The pets remain in the very close proximity to the humans and hence helping in completion of host, parasite and environment triad. Hence to break the transmission cycle of these parasitic zoonoses, awareness among pet owners plays a key role. This study was planned to evaluate the awareness and attitude of the pet owners towards the roundworms infections.

2. MATERIALS AND METHODS

The present study was conducted on randomly selected pet owners who visited Teaching Veterinary Clinical Complex, Guru Angad Dev Veterinary and Animal Sciences University Ludhiana for the treatment of their pets. These owners belonged to different districts of Punjab. The data was collected between August 1st, 2016 and January 31st, 2017. A total of 150 pet owners were interviewed with a questionnaire. To learn about the awareness of pet owners regarding knowledge of roundworms and related attitudes and practices this questionnaire-based study was conducted. The informed consent was obtained from all the participants. The

respondents were presented with a questionnaire of 20 questions containing both open and close ended questions designed to obtain information on different aspects of roundworm diseases, i.e., awareness, knowledge, risks, etc. The participants chosen for the study were a minimum of 18 years or above. The questions were also provided in the local language of the respondents so that they could easily comprehend them. The respondents were asked questions about the knowledge and awareness of roundworms i.e. awareness of roundworm diseases, names of roundworm diseases, transmission of roundworm diseases, management, etc. Also the respondents attitude towards the prevention of the roundworm diseases such as washing of hands, use of boots, use of contaminated food and water, disposal of pet faeces, how regular they visited their veterinarians etc. were noted. It was also enquired whether they were updated about the important pet zoonoses by their veterinarians.

3. RESULTS AND DISCUSSION

A total number of 150 respondents were a part of this study. Majority of the people in the study were from the age group of 30-50 (59.3%). Ninety four respondents (62.6%) lived in urban areas and fifty six (37.3%) in rural areas with maximum respondents being male (88%). Most pet owners owned a dog as their pet (84.6%).

The study found out that only 34% of the respondents knew about roundworms. Of all the statements related to roundworm infection, the most commonly known among the pet owners was regarding the knowledge of deworming (72.6%) but 89.9% of these respondents agreed with the statement that they get their pet dewormed only in a diseased condition while only 10.1% got their pet regularly dewormed. One hundred and one respondents (67.3%) took prescriptions for deworming from their veterinarian before getting their pet dewormed. Only forty four respondents (29.3%) reported that they knew this disease can spread from infected animal to a healthy animal. Around 20% pet owners were aware of the zoonotic aspect of the disease as they knew the disease can spread from infected animals to healthy humans. This can be seen in direct relation that only twenty six respondents (17.3%) reported that their veterinarian discusses with them the about the potential zoonotic health hazards while treating their pet.

Only 18% of the respondents were aware of the fact that this disease can spread through the consumption of raw vegetables and fruits followed by 17.3% respondents being responsive that the disease can spread on consumption of contaminated water. In response to the questions related to practices, 69.3% pet owners practiced the washing of fruits and vegetables in general and 64% treated their water before drinking. The most common source of drinking water was tap water.

The study showed that twenty three (15.3%) and eighteen (12%) pet owners replied in positive that the disease can spread via contaminated faeces and contaminated soil respectively. The main method of faeces disposal used by majority of the respondents was in the neighbourhood while taking their pet for a walk. Merely 9.3% of the respondents got the faeces of their pet checked by veterinarian in absence of a disease.

The study also revealed that sixty two percent of the respondents showed an interest in gardening but only 4.3% used gloves as a source of protection. Eighty four respondents practised the wearing of boots while gardening followed by fifty seven respondents agreeing to washing of their hands after gardening. 64.6% owners admitted walking barefoot on grass/lawns/playgrounds/backyards during morning walk/playing etc.

Therefore, it can be understood from the present study that the awareness of pet owners regarding roundworms was not high. Most of the statements testing respondents' knowledge on roundworms were poorly known among the pet owners. Therefore, there is a dire need to educate pet owners about the parasitic disease and their preventive measures through awareness campaigns and training programmes. It will be important to upgrade knowledge of all respondents as this will help into preventing as well as control infections from the disease.

The study shows us that a very small proportion of the respondents were aware about the roundworms and zoonotic aspect of the parasites. Very few people were following the proper disposal methods of pet faeces and hence leading to environment contamination with infective stages. According to a study [9] conducted in Andhra Pradesh, it was reported that 46% of public parks and 32% of school grounds were contaminated with *Toxocara ova*.

Table 1. Characteristics of respondents

S. No.	Factor	Variable	Response
1.	Age	(a)18-30 (b) 30-50 (c) >50	(a) 43 (b) 89 (c) 18
2.	Residence area	(a) Urban (b) Rural	(a) 94 (b) 56
3.	Sex	(a) Male (b) Female	(a) 132 (b) 18
4.	Education	(a) Matric (b) Graduate (c) Post graduate	(a) 43 (b) 88 (c) 19
5.	Which pet do you own	(a) Dog (b) Cat	(a) 127 (b) 23

Table 2. Questionnaire designed to obtain extent of awareness of respondents on different aspects of roundworm diseases

S. No.	Question/ Item	Frequency of aware respondents (%)
1.	Do you know about roundworms? If yes, which of the following have you heard (a) <i>Toxocara</i> (b) Hookworms	52 (34) (a) 12 (8) (b) 11 (7.3)
2.	Do you know disease can spread from infected animals to healthy animals?	44 (29.3)
3.	Do you know disease can spread from infected animals to humans?	31 (20.6)
4.	Do you know this infection can spread from consuming raw vegetables and fruits?	27 (18)
5.	Do you wash your fruits and vegetables before consumption in general?	104 (69.3)
6.	Do you know infection can spread from consuming contaminated water?	26 (17.3)
7.	What is source of portable water? (a) Tap water (b) Well (c) Pond (d) Hand pump	(a) 112 (74.6) (b) 11 (7.3) (c) 9 (6) (d) 18 (12)
8.	Do you treat drinking water?	96 (64)
9.	Do you know this infection can spread from contaminated faeces?	23 (15.3)
10.	Where do you discard pet faeces? (a) Backyard (b) In the neighbourhood while taking pet for a walk (c) Municipality garbage collector	(a) 23 (15.3) (b) 117 (78) (c) 10 (6.6)
11.	Do you ever get faeces of your pet checked by veterinarian in absence of a disease?	14 (9.3)
12.	Do you know infection can spread through contaminated soil (contaminated with eggs)?	18 (12)
13.	Do you do gardening? If yes, (a) With gloves (b) Without gloves	93 (62) (a) 4/93(4.3) (b) 89/93 (95.6)
14.	Do you wash your hands after gardening?	57/93 (61.2)
15.	Do you wear boots during gardening?	84/93 (90.3)
16.	Do you walk barefoot on grass/lawns/playgrounds/backyards during morning walk/playing etc.?	97 (64.6)
17.	Do you know what is deworming/ Do you get your pet dewormed?	109 (72.6)
18.	If yes, after how much interval you do get your pet dewormed? (a) After every 3 months (b) Only in diseased condition of pet when veterinarian recommends it	(a) 11/109 (10.1) (b) 98/109 (89.9)
19.	Do you take prescription from veterinarian for deworming of your pet?	101 (67.3)
20.	Does your veterinarian discuss with you about the potential zoonotic health hazards when you take pet to him/her?	26 (17.3)

Due to poor reporting system in India actual numbers of cases are never known. However, some reports suggested the zoonotic aspect of the parasite indicating that disease is prevalent in India. Human cases of ocular toxocariasis were also reported from Chandigarh and New Delhi [10,11].

During survey people were questioned about walking barefooted on the grass lawns, parks, backyards and playgrounds and very few were aware about the fact that barefooted walking on grass can lead to disease. According to study on the dogs in tea-growing communities [8], it was found that up to 60% of dog's harboured *A. braziliense* while 37% of dogs were having mixed infections with *A. braziliense* and *A. caninum*. It was also concluded that high incidence of CLM reported in the human population among the tea estates was due to barefoot walking of individuals while outdoors.

Other risk factors and general attitudes and practices were too discussed indicating poor knowledge and awareness of the people towards these helminthic diseases. By making people aware about the simple practices like careful personal hygiene, regular deworming of pets, avoiding consumption of raw vegetables and fruits without washing, following precautionary measures while doing gardening, drinking of properly treated water and not allowing children to play in potentially contaminated environments are crucial points that will help in breaking transmission cycle of parasites. Veterinarians should inform pet owners and make them aware about the potential routes and preventive measures of toxocariasis and hookworms infestations. Deworming of the puppies against ascarids and hookworms should start at 2 weeks of age; further doing it at 4, 6 and 8 weeks of age and then regular deworming after every 2-3 months [13]. For kittens deworming can be started at 6 weeks of age; repeated at 8 and 10 weeks of age and then after every 4-6 months. Lack of awareness on the transmission of zoonotic diseases from pets to humans and lack of proper veterinary care for the pets possess a serious public health threat.

4. CONCLUSION

So, from the above findings, it can be concluded that the pet owners are seriously unaware about risks and various preventive measures against roundworms. The animals and their owners of

Punjab are at greater risk for roundworm infection. There is an immediate and dire need to initiate special educational programs to make the pet owners aware about various transmission routes and preventive measures against roundworms. Efforts should be made by intensifying awareness campaigns cum training programmes to update the knowledge of pet owners. This can be done by increasing extension activities and more interactive sessions between pet owners and veterinarians. The community does not have even a fair knowledge on parasitic helminths. The study highlights that one of the major strategies in prevention and control of roundworms is to improve the information about knowledge, attitude and practices in this area. The extension agencies and veterinarians need to focus their attention towards providing information to pet owners on parasitic infections.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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