

POINT PREVALENCE OF GASTROINTESTINAL PARASITISM IN STRAY DOGS OF BIKANER, RAJASTHAN: A PILOT STUDY

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ABSTRACT

Stray dogs are considered as a potential public health risk since they play an important role in transmission of parasitic infections to human. To estimate the status of gastrointestinal (GI) parasitic infections in stray dogs of Bikaner, a total of 150 fresh faecal samples were randomly collected from different locations of Bikaner and examined by standard parasitological methods. Of the total 150 faecal samples examined, 84 were found to be positive for parasitic infections with an overall prevalence rate of 56.00%. Six different types of GI parasitic infections were identified viz. *Ancylostoma caninum* (21.00%), *Toxocara* sp. (12.00%), *Trichuris* sp. (8.67%) and *Isospora* sp. (8.00%) in the decreasing order of prevalence. Meager infections of *Taenia* sp. (2.67%), *Spirocerca lupi* (1.33%) and mixed infections (2.00%) were also observed. The high prevalence of gastrointestinal parasitic burden demands comprehensive monitoring of parasitic infections in canine population.

Keywords: Bikaner, Canine gastrointestinal parasites, Dogs, Public health

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GI parasites are among the most common pathogenic agents and constitute one of the main causes of mortality in dogs, especially in newly whelped or neonates (Perera *et al.*, 2013). Although most of the GI parasites affect the dogs subclinically, severity depends on the burden and pathogenicity of the parasites and disease may become clinical presenting vomiting, diarrhoea, anaemia, anorexia, fever, weight loss, loss of condition as major signs and may prove fatal (Getahun and Addis, 2012).

Stray dogs are ownerless native dogs (*Canis familiaris*) of particularly non descriptive nature and are considered as a potential public health risk since they play an important role in transmission of several parasitic infections to human population (Yagoob *et al.*, 2014). Prime public health concerns of canine origin are hydatidosis, visceral and ocular larval migrans, cutaneous larva migrans, cryptosporidiosis and giardiasis (Martinez-Moreno *et al.*, 2007). Parasitic surveillance in dogs remained a neglected topic as compared to other domesticated animals especially in India with only a handful of small scale reports in this regard (Sahu *et al.*, 2014; Traub *et al.*, 2014). As per best of our knowledge, currently there is no comprehensive report available on the distribution and prevalence of GI parasitic infections in stray dogs in Rajasthan. Hence, the present study was designed with the aim to determine the prevalence of gastrointestinal parasites in stray dogs from different areas of Bikaner, Rajasthan.

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MATERIAL AND METHODS

Sample collection:

A total of 150 freshly voided faecal samples were collected from stray dogs using plastic gloves. Extra care was taken to avoid contamination of faecal sample with soil. Collected faeces were immediately transferred into a zip lock plastic bag and labeled mentioning date and time of collection. Samples were collected from apparently healthy adult stray dogs without any clinical manifestation. The samples were immediately transported to the Department of Veterinary Parasitology, CVAS, Bikaner in ice packs and refrigerated till further processing.

Coprological examination:

The faecal samples were first subjected to standard qualitative examination using direct smear method and concentration techniques (floatation and sedimentation) for detection of the parasitic eggs. The eggs were identified on the basis of the morphological features and measurement basis as described by Soulsby (1982).

RESULTS AND DISCUSSION

The present study revealed parasitic infection as a frequent problem in the stray canine population of the study area. Several workers have reported these parasitic infections commonly from other parts of the country and world (Mukaratirwaa and Singh, 2010; Perera *et al.*, 2013; Satyal *et al.*, 2013; Szwabe and Blaszkowska, 2017). From 150 dogs, 84 (56.0%) were found to be harboring parasitic infections. Such higher infection rate may be attributed to

low nutrition and improper routine veterinary care to the stray animals (Idika *et al.*, 2017). Several reports with lower overall prevalence rate from other parts of India *viz.* 31.29% in Uttar Pradesh (Sahu *et al.*, 2014), 39.10% & 48.80% in Delhi, and Mumbai, respectively (Traub *et al.*, 2014) and world *viz.* 29.6% in Iran (Yagoob *et al.*, 2014), 46.7% in Nepal (Satyal *et al.*, 2013) have been reported. On the contrary, reports of higher prevalence rate to this study have also been reported *viz.* Sudan *et al.*, 2015 (90.70%); Traub *et al.*, 2014 in Sikkim (71.30%), from India and Mukaratirwa and Singh, 2010 in South Africa (82.50%) and Adedoja *et al.*, 2014 (68.30%) in North Central, Nigeria from other countries of the world. Variation in the prevalence rates of parasitic infections in canine populations presented in the mentioned studies may be attributed to the difference in the ecological and environmental conditions as well as topography of respective study areas (Mirzaei and Fooladi, 2012). Also, the study area in the present study provides suitable environmental conditions conducive for the survival and transmission of the parasites. Additionally, negligence towards the surveillance and monitoring of canine parasitic infections and lack of public awareness, intensify the problem. Alongside this, other factors *viz.* age, living conditions, nutritional status, immune status and improper veterinary care when required (Idika *et al.*, 2017) with repeated exposure, free access to infection, poor health condition, paratenic infection (predatorship/hunting nature, offals) (Sahu *et al.*, 2014) may also influence the prevalence of GI parasites in stray canine population.

Important parasitic infections reported in the study were *Ancylostoma caninum* (21.33%) followed by *Toxocara canis* (12.00%), *Trichuris vulpis* (8.67%), *Isospora* sp. (8.00%), *Taenia* sp. (2.67%) and *Spirocerca lupi* (1.33%) in the decreasing order of prevalence with complete details in table 1. Similar infections have previously been documented by several workers from India as well as abroad (Qadir *et al.*, 2012; Perera *et al.*, 2013; Satyal *et al.*, 2013; Traub *et al.*, 2014; Szwabe and Blaszkowska, 2017). Parasite wise analysis revealed the dominance of helminth infection over protozoal specifically coccidial infection which is congruent to the findings of Mukaratirwa and Singh (2010); Perera *et al.* (2013). The increased helminth infection is most likely due to the fact that helminth eggs are more effectively transmitted to stray dogs and could survive better in the environment than protozoan oocyst (Bugg *et al.*, 1999).

Among various helminth infections, the highest overall contributor of helminth parasites was *Ancylostoma caninum* (38.09%) which is in agreement to the findings of Qadir *et al.* (2012); Perera *et al.* (2013); Satyal *et al.* (2013); Traub *et al.* (2014); Agustina *et al.* (2021) around

the globe. This is attributable to the high fecundity of the female *Ancylostoma* sp. leading to heavy contamination of the environment with hookworm eggs and larvae, as well as their high infectivity to dogs of all age (Soulsby, 1982). *Toxocara canis* (21.4%), the second most common helminth parasite reported in the study is a soil transmitted helminth thus habits like feeding of floors and sleeping on bare grounds in the study dogs could account for this observation (Amissah-Reynolds *et al.*, 2016). Both these parasites are serious public health threats as *Ancylostoma caninum*, the most pathogenic species in dogs causes cutaneous larva migrans in humans while *Toxocara canis* causes visceral larva migrans, covert toxocariasis and ocular migrans in humans. Occasionally *T. canis* larvae invade central nervous system and causes neurological problems such as epilepsy, neuropsychologic deficits and ataxia in humans (Akao *et al.*, 2003).

The prevalence rate of *Trichuris vulpis* (15.47%) in this study is higher than studies conducted by Mukaratirwa and Singh (2010); Szwabe and Blaszkowska (2017) and lower than reported by Perera *et al.* (2013) and Puebla *et al.* (2015). Zoonotic role of *T. vulpis* debatable due to lack of microscopic and molecular evidence (Traversa, 2011) but is equally eligible to be included under tactical control strategy development. Isosporosis is a serious problem leading to severe morbidity and mortality losses especially in young puppies, particularly in inadequate hygienic conditions. *Isospora* sp. was recovered with a considerable prevalence rate (8.00%) in the present study. Similarly, other workers *viz.* Mukaratirwa and Singh (2010); Perera *et al.* (2013) also reported the variable prevalence rates of *Isospora* sp. in their studies. Meager prevalence rate of *Taenia* sp. (2.67%) has also been reported in the present study. It has also been reported from other parts of the country as well as world *viz.* Satyal *et al.* (2013); Traub *et al.* (2014). *Spirocerca lupi* causative agent of spirocercosis is a potentially fatal disease in carnivores, especially canines (Rojas *et al.*, 2018). Higher rate of single infections (54.0%) as compared to mixed infections (2.00%) was reported and is congruent to the findings of Kimura *et al.* (2013). In contrast, other studies *viz.* Kutdang *et al.* (2010) and Parera *et al.* (2013) reported higher frequencies of mixed parasites compared to single parasites. Interestingly, mixed infection reported revealed *A. caninum* in common with *T. canis*, *T. vulpis* and *Isospora* sp. which may be attributed to the high survival as well as heavy contamination of the environment with hookworm eggs (Soulsby, 1982).

CONCLUSION

The present study presented a high prevalence rate of parasitic infection in the stray dog population of the region. Parasites reported in the study are of serious health

Table1. Prevalence of gastro-intestinal parasites in canine population of Bikaner, Rajasthan

Mono infections			Mixed infections		
Parasitic infection (n)	Positive (n)	Prevalence rate (%)	Parasitic infection (n)	Positive (n)	Prevalence rate (%)
<i>A.caninum</i>	32	21.33	<i>A.caninum</i> + <i>Toxocara canis</i>	1	0.67
<i>T. canis</i>	18	12.00			
<i>Trichuris vulpis</i>	13	08.67	<i>A.caninum</i> + <i>Trichuris vulpis</i>	1	0.67
<i>Taenia</i> sp.	04	02.67			
<i>I.canis</i>	12	08.00	<i>A.caninum</i> + <i>I. canis</i>	1	0.67
<i>Spirocercalupi</i>	02	01.33			

concerns of canine as well as human population. Easy access of stray dogs to local abattoirs and public parks is a threat to human beings especially to children and immune-compromised individuals. The findings of the study stipulate a critical attention to the monitoring, surveillance and transmission studies of canine parasitic infections for developing effective tactical control programs.

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