A slaughter house study on prevalence of gastrointestinal helminths among small ruminants at Mhow, Indore

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Received: 18 June 2013 / Accepted: 9 December 2013 / Published online: 21 December 2013
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Abstract A total of 1,405 faecal samples (960 goat and 445 sheep) were examined from animals slaughtered at slaughter house, Mhow, Indore, for a period of 1 year (Feb. 2011–Jan. 2012). Examination of faecal samples by qualitative method exhibited 90.05 % prevalence of gastrointestinal (GI) helminths. Among the various helminths, the highest prevalence was of strongyles (85.40 %) followed by amphistomes (21.78 %), *Trichuris* spp. (21.70 %), *Strongyloides* spp. (12.24 %), *Moniezia* spp. (5.77 %) and *Fasciola* spp. (4.56 %). In monsoon season maximum prevalence (92.96 %) was recorded followed by winter (89.20 %) and summer (87.76 %). Age and sex wise prevalence was higher in less than 1 year of age group (91.05 %) and in females (90.96 %). Percent prevalence of GI helminths was slightly higher in sheep (90.11 %) as compare with goats (90.00 %).

Keywords Goats · Helminths · Prevalence · Sheep · Slaughter house

Introduction

Sheep and goats have enormous share in economy of developing countries like India as they provide a major source of income especially to marginal farmers and landless labors. It has been seen that the gastrointestinal (GI) helminthic infections are one of the major constraints for profitable sheep and goat husbandry in tropical and

subtropical countries including India. Sheep and goats are vulnerable to a number of GI-helminths that not only undermine their health but also play a role in lowering the overall production (Sanyal 1996).

The economic impact of GI helminths encompasses mortality and morbidity losses (measured in terms of decreased production of meat, milk), enhanced susceptibility to diseases, losses resulting from condemnation of carcasses and organs as well as cost of drugs and veterinary aids (Rajakaruna and Warnakulasooriya 2011). In spite of significant production losses, the problem is neglected due to its chronic and insidious nature (Sanyal 1998). Therefore, information on prevalence of GI-helminths is mandatory for evolving effective strategies for their management (Jithendran and Bhat 1999).

Materials and methods

Collection of sample

Freshly laid or rectal faecal samples were collected in individually labeled polythene bags from 445 sheep and 960 goats presented at Slaughter house Mhow randomly on daily basis for a period of one year (Feb 2011–Jan 2012). Informations related to age, species and sex of the host were recorded in a questionnaire at the time of collection.

Processing of sample

Faecal samples were brought to the laboratory and were processed by faecal floatation technique using saturated salt solution for detection of nematode and cestode eggs and sedimentation techniques for trematode eggs (Soulsby 1982).

This study is a part of M.V.Sc thesis of first author.

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Statistical analysis

Statistical analysis of data was performed with SPSS 13.0 software by applying χ^2 test to validate the effect of seasons, age, sex and species on the prevalence of GI-helminths and values of $p < 0.05$ was considered as significant.

Results and discussion

Seasonal prevalence of gastrointestinal helminths

Out of total 1,405 faecal samples examined 90.05 % animals were found positive for helminth parasites. A significant association ($p < 0.05$) in the prevalence of GI-helminths in different seasons has been recorded. The overall prevalence was highest in monsoon season (92.96 %) and lowest in summer (87.76 %). Strongyle group of worms were the predominant parasite in all three seasons with a high prevalence rate in monsoon (88.93 %). The prevalence of *Strongyloides* spp. (16.70 %) was found highest in monsoon whereas the prevalence of amphistomes and *Fasciola* spp. were highest in summer seasons and were 35.89 and 8.09 %, respectively. No significant effect of season has been recorded on the prevalence of *Trichuris* spp. and *Moniezia* sp. although percent prevalence of both the parasites was higher in monsoon season (Table 1).

Strongyles were recorded to be the predominant gastrointestinal helminths in small ruminants. This may be due to their direct life cycle and the typical grazing habit of small ruminants facilitating the transmission of the parasite. A significantly higher prevalence was recorded during monsoon season as the ambient temperature and high relative humidity due to rainfall favor the development of pre-parasitic larval stages. Similar findings were reported earlier from India and abroad (Talukdar 1996; Faizal et al. 1999; Kandhara et al. 2000; Haque et al. 2011). The highest prevalence of *Strongyloides* spp. during monsoon season may be due to the availability of moist environment and particular molarity of salt which are essential for ecdysis (Soulsby 1982). Similar observations were also recorded in past by Sutar et al. (2010). Higher prevalence of trematodes (i.e. amphistome and *Fasciola* spp.) may be due to the practice of free range grazing system near water body or marshy lands. The prevalence of these parasites depends on the availability of suitable intermediate hosts which varies with different seasons. Generally snails are predominant during monsoon season but due to comparatively long prepatent period the animal passes eggs in winter or even in summer season once it gets infection in monsoon or late monsoon season (Al-Kandari et al. 2000). Similar observations were recorded by Lalbiaknunji (2002) in Jabalpur and Kuchai et al. (2011) in Ladakh.

Age and sex wise prevalence of gastrointestinal helminths

The overall prevalence of GI helminths was higher in less than one year of age group (91.05 %) as compared with more than one year of age group (88.54 %). Also, the overall prevalence of GI-helminths was significantly higher ($p < 0.05$) in females (90.96 %) as compare with male (87.39 %). However, except *Trichuris* spp. (significantly higher in young animals) no statistical significant effect of age and sex was observed in the prevalence of other GI-helminths in the current study (Table 1).

Young animals are more susceptible as compare to their adult counter part due to incomplete development of immune system (Sangvaranond et al. 2010). Further, the hypothesis that older animals can acquire immunity against gastro-intestinal parasites through frequent challenge and can expel the ingested parasites before their establishment of infection has been supported experimentally by different studies (Knox 2000). The influence of sex on the susceptibility of animals to infections could be attributed to genetic predisposition and differential susceptibility owing to hormonal control. Female animals were affected with higher infection rate than males despite similar husbandry practice (Maqsood et al. 1996; Valcárcel and García 1999) as females are more prone to parasitism during pregnancy and peri-parturient period due to stress and decreased immune status (Urquhart et al. 1996). In spite of high overall prevalence in young and female animals, GI-helminths were evenly distributed irrespective to their age and sex as the free range husbandry practice is preferred for raising sheep and goat in this part. Similar observations were recorded earlier by Kandhara et al. (2000) and Lalbiaknungi (2002).

Species wise prevalence of gastrointestinal helminths

The overall percent prevalence of GI helminths was slightly higher in sheep (90.11 %) as compare with goats (90.00 %). The percent prevalence of strongyle, *Strongyloides* sp., *Trichuris* spp. amphistomes, *Fasciola* spp. and *Moniezia* spp. were recorded higher in sheep (Table 1).

The higher susceptibility in sheep as compare with goats may be associated to their foraging behavior. Goats are natural browsers, prefer to eat leaves, twigs, vines and shrubs and they stand on their hind legs to reach vegetation. Goat likes to eat the tops of plants above soil surface where as sheep graze close to the soil surface, preferring to eat short, tender grasses and clover and are thus exposed to more parasitic infection in the form of infective larvae or eggs (Asif et al. 2008; Kumari et al. 2010). Comparatively higher prevalence of GI-helminths in sheep may be due to the fact that the immunological response of sheep for helminth infections is limited as compared to goat (Urquhart et al. 1996).

Table 1 Prevalence of gastrointestinal helminths among small ruminant at Slaughter house, Mhow

Category	Examined	Positive	Strongyle	<i>Strongyloides</i> sp.	<i>Trichuris</i> sp.	Amphistome	<i>Fasciola</i> sp.	<i>Moniezia</i> sp.
Season								
Summer	482	423 (87.76)	399 (82.78)	52 (10.79)	89 (18.46)	173 (35.89)	39 (8.09)	24 (4.98)
Monsoon	497	462 (92.96)	442 (88.93)	83 (16.70)	123 (24.75)	17 (3.42)	3 (1.00)	316.24
Winter	426	380 (89.20)	359 (84.27)	37 (8.69)	93 (21.83)	116 (27.23)	22 (5.16)	26 (6.10)
χ^2 value	–	7.84*	8.07*	15.16*	5.69	16.21*	32.08*	0.84
Age								
<1 year	838	763 (91.05)	728 (86.87)	104 (12.41)	197 (23.50)	177 (21.12)	32 (3.82)	55 (6.56)
>1 year	567	502 (88.54)	472 (83.25)	68 (11.99)	108 (19.05)	129 (22.75)	32 (5.64)	26 (4.59)
χ^2 value		2.38	3.57	0.06	3.96*	0.53	2.59	2.44
Sex								
Male	365	319 (87.39)	305 (83.56)	37 (10.14)	70 (19.18)	77 (21.09)	16 (4.38)	21 (5.75)
Female	1,040	946 (90.96)	895 (86.06)	135 (12.98)	235 (22.59)	229 (22.02)	48 (4.62)	60 (5.77)
χ^2 value		3.83*	1.66	2.03	1.86	0.14	0.03	00
Species								
Goat	960	864 (90.00)	819 (85.31)	115 (11.98)	200 (20.83)	202 (21.04)	39 (4.06)	55 (5.73)
Sheep	445	401 (90.11)	381 (85.62)	57 (12.80)	105 (23.59)	104 (23.37)	25 (5.62)	26 (5.84)
χ^2 value		0.004	0.02	0.19	1.37	0.97	1.69	0.007
Total	1,405	1,265 (90.05)	1,200 (85.40)	172 (12.24)	305 (21.70)	306 (21.78)	64 (4.56)	81 (5.77)

* $p < 0.05$

Therefore, it can be concluded that GI helminths are highly prevalent in sheep and goat population of this area with maximum infection rates in monsoon. The data generated would be helpful to formulate effective control strategies against GI helminths in sheep and goat population of this region by development of strategic deworming programme.

Acknowledgments The authors are thankful to Dean, College of Veterinary Science & A.H and Incharge, Slaughter House, Mhow for proving necessary help for conducting the study.

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