Prevalence Of Fasciolosis And Dicroceliosis In Sheep Slaughtered In Kashmir Valley

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Abstract: Trematodes (Liver flukes) constitute a significant veterinary health problem. The present study was undertaken to determine the prevalence of Fasciolosis and Dicroceliosis among the sheep slaughtered in Kashmir valley. A total number of 412 sheep livers were examined for the presence of parasites during a 2 year study period from January 2017 to December 2018. Out of 412 sheep examined, 100 were found to be positive for parasitosis representing an overall prevalence rate of 24.27%. The prevalence rate was 23.54% for Fasciolosis and 6.31% for Dicroceliosis. The co-infection of *Fasciola* and *Dicrocelium* was reported in 5.58% cases.The epidemiological parameters like gender and breed did not show any significant association with the prevalence of parasites ($p>0.05$). However the age of sheep proved to be a significant factor associated with the prevalence of infection with lambs being highly infected than young ones and adults ($p<0.05$). Seasonal survey revealed that prevalence rate was highest in autumn season followed by summer and least during spring.

Key words: Fasciolosis, Dicroceliosis, sheep, gender, Kashmir

INTRODUCTION

Trematode parasitism is considered as a major problem affecting the ruminant productivity around the world[1]. Among them, liver flukes (*Fasciola* sps. and *Dicrocoelium dendriticum)* are of considerable economic and public health importance. Liver flukes are regarded as the common cause of liver diseases in ruminants in different parts of world including Kashmir valley. They cause economic loss in terms of reduction in milk, meat and wool production, condemnation of infected livers, associated secondary infections, increased mortality and the expense of control measures[2]. Besides their global veterinary and economic importance, liver flukes are gaining public concern because of their zoonotic aspect. In the last few decades incidence of human Fascioliasis has been increasing with 2.4 million people currently infected, and a further 91.1 million living at risk of infection[3]. Vatsal et al.[4], and Ramachandran et al.[5], reported a few cases of human Fasciolosis from India. In state of Jammu and Kashmir, it was believed that this disease does not exist until 2016 when the first case of human Fascioliasis was reported at Department of Gastroenterology, Microbiology SKIMS[6] (Rising Kashmir, 28th April, 2016). In 2017, one more case of human Fasciolosis was reported at SKIMS, a 20 year old girl from district Handwara[7] (Rising Kashmir, 17th December, 2017). Although Dicroceliasis occasionally infects humans, however a few cases have been reported by various authors from different parts of world[8,9]. Paucity of information on prevalence of liver fluke infections in Kashmir valley and its possible impacts on humans necessitates the need for carrying out this study. So this study was undertaken to study the presence and distribution of liver flukes in sheep slaughtered in Kashmir valley during a two year period from January2017- December 2018.

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METHODOLOGY

Two-year prospective study was carried out from January 2017 to December 2018 to determine the relative occurrence of liver fluke infection among the sheep slaughtered in Kashmir valley. The livers of 412 sheep were examined for presence of parasites from easily accessible slaughterhouses in district Srinagar and Anantnag. The age, gender, breed of animal, site of collection and time of the year was recorded. The flukes were carefully removed and placed in separate petridishes containing 0.06M phosphate buffered saline solution (PBS; pH 7). The parasites were stored in collection tubes containing PBS and transported to the parasitological laboratory in the Department of Zoology, University of Kashmir for further processing. Inorder to prepare the permanent mount of the collected flukes, the parasites were fixed in Carnoy's fixative, stained in aceto-alum caramine, dehydrated in ascending grades of alcohol and finally mounted in DPX. Identification was carried as per standard keys[10]. Data was recorded and managed in MS Excel work sheet and analyzed using Minitab Version 13. Chi square test was used to determine the effect of various epidemiological determinants on the level of parasitism in host.

RESULTS AND DISCUSSION

Overall prevalence of liver parasites

During the present study 412 sheep livers were screened for presence of parasites and 100 sheep were found to be infected representing an infection rate of 24.27%. The liver parasites recovered during study were *Fasciola* sps. and *Dicrocelium* dendriticum. As shown in Table 1, among the examined animals, 97(23.54%) were positive for Fasciolosis and 26(6.31%) were positive for Dicroceliosis. The co-infection of *Fasciola* sps. and *Dicrocelium dendriticum* was reported in 23(5.58%) cases. Our results agree with those of Gul et al.[11] who recorded the prevalence rate of 26.86% for Fasciolosis in Kashmir valley. The prevalence rate for *Dicrocelium dendriticum* was recorded to be 6.31% in this study. Similar observations were made by Mir et al. [12] and Daryani et al.[13] Mir et al.[12] from his study in Kashmir valley reported the prevalence rate of 4.45% for *Dicrocoelium dendriticum*. Daryani et al.[13] from his study in Irbil province

also reported the prevalence rate of 6.8% for *Dicrocoelium dendriticum* in sheep.

Table 1: *Prevalence of different liver parasites*

Parasite	Examined	Infected	Prevalence	χ2 (p-value)
Fasciola	412	97	23.54	35.862 (<0.001)
Dicrocelium	412	26	6.31	

SEASONAL PREVALENCE

While studying the seasonal effect on prevalence rates of parasites, it was observed that the overall trend in prevalence of both the parasite species remained almost same with the parasites having peak prevalence in the Autumn season and least during spring (Table 2). The prevalence of *Fasciola* sps. was 15.15%, 26.6%, 33.63% and 17.02% in Spring, Summer, Autumn and Winter seasons respectively. Similarly *Dicrocelium dendriticum* showed the prevalence of 2.02%, 5.5%, 10% and 7.44% in Spring, Summer, Autumn and Winter seasons respectively. Our results are in good agreement with those of Magray et al.[14] who found the higher infection rate of Fasciolosis during autumn season. Fatima et al.[15] also reported a higher infection rate of Fasciolosis in autumn season in Kashmir valley. The high prevalence rate during autumn season may be attributed to favourable temperature and moisture available for rapid development of the parasite.[16,17]

Table 2: *Seasonal prevalence of different parasites*

Parasite	Season	Examined	Infected	Prevalence	χ2(p)
Fasciola	Spring	99	15	15.15	7.927 (0.04)
	Summer	109	29	26.6	
	Autumn	110	37	33.63	
	Winter	94	16	17.02	
Dicrocelium	Spring	99	2	2.02	5.273 (0.1)
	Summer	109	6	5.5	
	Autumn	110	11	10	
	Winter	94	7	7.44	

GENDER WISE PREVALENCE

As shown in table 3, the gender of the animals did not prove to have a significant association with the prevalence of parasites ($p<0.05$). The possible reason for it may be that both the genders get equal chances of ingesting the infective larvae at the time of grazing. However the prevalence rate was slightly higher in case of female sheep as compared to male sheep. It may be due to the stress and decreased immune status during pregnancy and peri-parturient period which makes females more susceptible to infectious diseases[18]. The prevalence rate of Fasciolosis and Dicroceliosis was 22.65% and 5.85% respectively in males. While it was 25% and 7.05% in case of females. Our findings are in good agreement with those of Sissay et al.[19]; Yeneneh et al.[20], Tagesse et al.[21] and Khanjari et al.[21]

Table 3: *Gender wise prevalence of liver parasites*

	Gender	Examined	Infected	%	χ2(p)
Fasciola	Male	256	58	22.65	0.182 (0.6)
	Female	156	39	25	
Dicrocelium	Male	256	15	5.85	0.205 (0.6)
	Female	156	11	7.05	

AGE WISE PREVALENCE

Age of the animals proved to be an important factor in the prevalence of infection with the lambs having highest infection rate than the young ones and adults. As shown in table 4, the prevalence of *Fasciola* sps. was 33.66%, 23.95%, and 15.97% in lambs, young and adults respectively. While that of *Dicrocelium dendriticum* was 11.88%, 5.38% and 3.47% in lambs , young and adults respectively. The high infection rate in young sheep as compared to adults may be due to high susceptibility and low resistance in young animals. While the low level of infection reported in adult animals may be attributed to the immunity

of the host as previous infection and age of the host provide effective protection against re-infection[23]. Our results are in agreement with those of Poddar et al.[24] who reported the peak prevalence of infection in sheep of age group 1-2 years (74.2%) and the least infectivity rate in sheep with age group of >2 years (62.2%). Similar results were recorded by Singh et al.[25] and Asif et al.[26]

Table 4: *Age wise prevalence of different parasites*

	Age	Examined	Infected	Prevalence	χ2(p)
Fasciola	lambs	101	34	33.66	6.320 (0.04)
	Young	167	40	23.95	
	Adult	144	23	15.97	
Dicrocelium	lambs	101	12	11.88	6.429 (0.04)
	Young	167	9	5.38	
	Adult	144	5	3.47	

Breed Wise Prevalence

The prevalence of parasites was higher in case of local breeds of sheep as compared to non-local breed. The local breeds here refer to sheep which are reared locally but they may be exotic or indigenous, whereas, non-local breed refer to sheep which are not reared locally but are brought from other states for slaughter purpose. As shown in Table 5, the prevalence of *Fasciola* sps. was 15.53% and 36.02% in non-local and local sheep respectively. While that of *Dicrocelium dendriticum* was 3.98% and 9.93% in non-local and local sheep respectively. This could be attributed to the difference in climatic conditions under which the sheep were reared and natural resistance based on genetic background and genetic variations among different breeds of sheep[27]. Similar results were obtained by Mir et al.[12] who reported differential prevalence rates among different breeds of sheep[28]. Teklu et al. also made similar observations.

Table 5 : *Breed wise prevalence of different trematode parasites*

	Breed	Examined	Infected	%	χ2(p)
Fasciola	Non-Local	251	39	15.53	13.746 (< 0.001)
	Local	161	58	36.02	
Dicrocelium	Non -Local	251	10	3.98	5.124 (0.02)
	Local	161	16	9.93	

CONCLUSION

The present abattoir survey reflects the current situation of Fasciolosis and Dicroceliosis in the Kashmir Valley and reveals that the prevalence of Fasciolosis and Dicroceliosis among sheep is 23.54% and 6.31%. Further studies based on identifying the potential risk factors associated with spread of the disease are recommended so as to formulate the proper control strategies.

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