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Prevalence of trichostrongylus in sheep from the Zhob District, Balochistan

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Abstract

The prevalence of gastrointestinal Trichostrongylid in sheep was studied in District Zhob, Balochistan. A total of 120 gastrointestinal tracts of sheep from the abattoir of District Zhob were collected. These samples were processed for isolation and identification of trichostrongylids nematodes in District Veterinary Hospital Laboratory. The overall prevalence rate was 39.1% in male and 60.8% in female animals. The prevalence rate in two breeds viz Balochi and Rakhshani was 58.3% and 41.6%, respectively. The specie wise prevalence observed was as *Trichostrongylus* 19.1%, *Haemonchus* 20.8%, *Cooperia* 29.1%, and *Nematodirus* 30.8%. As for as the burden of number of species infested the sheep as single type of parasite was in 32.5% animals, two types of parasite species in 36.3% animals and three types of parasite species in 30.8% animals. Altogether, these results suggest that sheep may act reservoir of Trichostrongylid in Zhob, Balochistan. As such, strict preventive measures should be taken to avoid the risk of mortality and morbidity in sheep in Balochistan.

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Introduction

Balochistan is the largest province of Pakistan with a total land mass of 347190 sq. km. Out of the total land area almost 92% consists of arid grazing lands, barren Rocky Mountains and deserts. Balochistan has diverse topography in elevation ranging from sea level to 3520 meters. Physiographic units are mountain ranges (52.6%), alluvial fans (21.9), piedmont plains (11.8%), sand plains (7.6%), valley bottom (3.3%), tidal plains (0.8%) and 2.0% plains (Saleem and Ashiq, 2000). the average annual rain fall varies from less than 50 mm in the southwest to above 400 mm in northeast. Cold winters and mild summers characterize the north region including District Zhob. Most winters receive snow, frost and rainfall ranging between 250 to 350 mm. In the southwestern desert region, the annual rainfall ranges between 50 to 125 mm and the region experiences the hottest summer with temperatures rising occasionally to over 51°C. Animals are mostly dependant on open grazing.

The economy of Balochistan is dominated by agriculture, including livestock and fisheries. It accounts for 52% of the province's GDP and employs 65% of the labour force. Of the total agriculture GDP, livestock contributes 40%, fruit 30%, field crops 17%, vegetables 12% and fisheries 1% (Annonymous, 2004-2005). The nomadic people solely depend on livestock whereas, the transhumants and sedentary people derive up to 40% income from livestock. Sheep population estimated at 27.4 million heads in Pakistan (Annonymous, 2008-09) plays an important role in the national economy. Whereas 12.8 million (48%) of these, respectively are raised in Balochistan (Annonymous, 2006). In addition to food of high protein value, products such as skin, wool, hair, pellets and goods made from them are a big source of earning foreign exchange.

In developing countries like Pakistan, heavy economic losses in livestock sector have been reported due to parasitic diseases. Theses parasitic diseases are one of the principal problems in the development of livestock industry. Factors like constant exposure to parasitic infection, variable climatic conditions lack of knowledge on the part of livestock owners regarding parasitic infection play an important role in the development of ecto and endo parasites (Durani, 1991).

Throughout the world, internal parasites pose one of the major health limitations for grazing animals. Sheep and goats are more susceptible to internal parasites than other livestock, due to their grazing behavior and poor immunity (Martin 1983). The impact of parasitic diseases varies greatly between countries and between regions, depending on climate and the intensification of farming in the area (Radostits *et al.,* 1994). Parasites exert adverse effects on the health and productivity of animals in Pakistan (Javed *et al.,* 1992). Khan *et al.* (1988) reported 100% sheep in upland Balochistan get infected with internal parasites.

Trichostrongylid nematodes of sheep, because of their adverse effect lead to lowered productivity, retarded growth rate and even death of lambs (FAO, 1974: Barger,1982: Steel and Symons,1982). The prevalence of gastrointestinal nematodes of sheep has also been reported very high (25.1 to 92%) by many workers in Pakistan (Durrani *et al.*, 1981; Mohiuddin *et al.*, 1984; Khan 1985; Iqbal *et al.*, 1993; Qayyum, 1996).

Parasitic diseases remain a major constraint to livestock production across all agro-ecological zones and animal production systems throughout the world. Gastrointestinal parasitism in ruminants has emerged as having the highest global index within a wide range of disease constraints that affect the livelihood of the poor farmers. Haemonchosis, caused by *Haemonchus* (H.) *contortus*, is among the top 10 most important conditions having an impact on sheep and goat production (Githiori *et al.*, 2004). As such, the present study was planned to study the prevalence of trichostrongylid in sheep in District Zhob, Balochistan.

Materials and methods

A total 120 gastrointestinal tracts of sheep were collected randomly from the abattoir of district Zhob and were shifted to lab for further investigation. The duration of the study was three months (June to August 2009). A complete record of the sheep (age, sex and breed) was maintained on the prescribed pro-forma (Annexure-1). The trichostrongylid worms

were collected according to the standard procedures. Nematodes collection was made from the abomasum, small and large intestine within four hours after slaughtering of animals. Abomasum, small and large intestine were ligated at omasal-abomasal, Abomasal-duodenal and ileo-caecal junctions to prevent worms spilling from one location to another. Collected worms from each organ were counted as per technique described by Charles and Baker (1988). The nematodes were washed in physiological saline and fixed in 70% alcohol for 24 hours and then transferred to a vial containing a hot mixture of 70% ethyl alcohol and glycerol 50 parts each. The worms were kept in this vial partially covered until all ethyl alcohol is evaporated and worms left in pure glycerol. Worms were identified under low power microscope and identified as per technique described by Yamaguti (1961), MAFF (1979) and Soulsby (1982).

In addition, abomasal, small and large intestinal contents were subjected to McMaster's egg counts as described by Urquhart *et al.* (1996). Briefly weighed 3 gram of faeces. Broken up thoroughly in 42 ml of water in a 100 ml glass beaker. Filtered through a fine mesh sieve of 250 µm. Collected filtrate was agitated and filled a 15 ml centrifuge tube and centrifuged at 2000 rpm for 2 minutes. Discarded the supernatant, agitated the sediment and filled the centrifuge tube to previous level with floatation solution (saturated solution of sodium chloride. Inverted the tubes six times and took the fluid with pipette to fill both chambers of McMaster slide. Examined two chambers and multiplied the numbers of eggs by 50, to arrive at the number of eggs per gram of faeces.

Statistical Analysis

To check the association between outcome variable and independent variables, Chi Square was used for more precise results. In the analysis, all the statistical analysis is done using SPSS 11.5.

Results and discussion

The present study was designed to assess the prevalence of trichostrongylids in sheep in District Zhob. For this purpose initially 120 gastrointestinal tracts of sheep were collected randomly from the abattoir of district Zhob and analysed to assess the prevalence of nematodes.

Prevalence of nematodes infestation with respect to age, sex and breeds of sheep

It was observed that younger sheep are more susceptible to be a victim to parasite than older ones, also reported by Shafique *et al.* (1999). Among 120 infected animals, 47(39.1%) were male and 73 (60.8%) were female sheep as reported by Shafique *et al.* (1999). Two breeds were selected for this study viz Balochi and Rakhshani, and it was observed that Balochi breed have more susceptibility than Rakhshsani i.e. 70 (58.3%) and 50 (41.6%) respectively.

Urquhart *et al.* (1996) stated that a significant immunity develops with age against a few parasites in adult stock. Susceptibility by various breeds of animal to parasites varies and is genetically determined. Male are more susceptible than female due to androgen hormones.

Table 1. Prevalence of nematodes in two breeds of sheep with respect to sex.

			Kinds of Breed		Total
			Rakhshani	Balochi	
Sex	Male	Count	20	27	47
		Expected Count	19.6	27.4	47.0
	Female	Count	30	43	73
		Expected Count	30.4	42.6	73.0
Total		Count	50	70	120
		Expected Count	50.0	70.0	120.00

Table 2. Prevalence of different nematode species in two breeds of sheep.

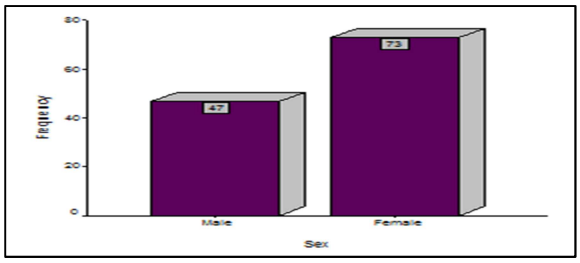
			Parasite				
			Nematodirus	*Cooperia*	*Trichostrongylus*	*Haemonchus*	Total
Breed	Balochi	Count	13	21	16	20	70
		Expected Count	21.6	20.4	13.4	14.6	70.0
	Rakhshani	Count	24	14	7	5	50
		Expected Count	15.4	14.6	9.6	10.4	50.0
Total		Count	37	35	23	25	120
		Expected Count	37.0	35.0	23.0	25.0	120.0

Young animals also get infested with internal parasitic ova from the contaminated pastures being

spared for the female animals during gestation period because of higher parasitic load at this stage. This is also mentioned by Vlassoff *et al.* (1999) that pre-parturient rise of helminth egg output is noted extensively in many breeds of sheep and goats.

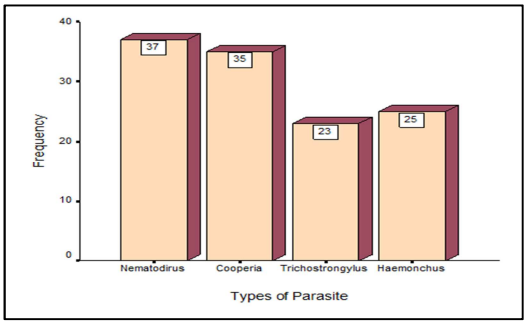
Table 3. Number of species of nematode infestation in two breeds of sheep.

			Infestation with no of Parasites			Total
			Single	Double	Triple	
Kind of Breed	Rakhshani	Count	19	12	19	50
		Expected Count	16.3	18.3	15.4	50.0
	Balochi	Count	20	32	18	70
		Expected Count	22.8	25.7	21.6	70.0
Total		Count	39	44	37	120
		Expected Count	39.0	44.0	37.0	120.0



The above bar chart showed that out of 120 Sheep surveyed at Zhob, 47 male sheep (39.1%) and 73 female sheep (60.8%) infested with mix nematodes.

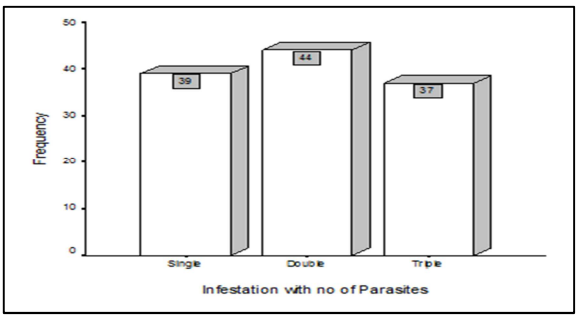
Fig. 1. Distribution of Parasite with Respect to Sex.



Above graph demonstrates that 23 sheep infested with *Trichostrongylus* (19.1%), 25 contained *Haemonchus* (20.8%), 35 got infested from *Cooperia* (29.1%), while 37 sheep contained *Nematodirus* (30.8%), out of the total selected population of 120 sheep.

Fig. 2. Distribution of Parasite with Respect to Types of Parasite species.

Furthermore, the pre-parturient rise in egg output has serious epidemiological implications, since the rise in faecal egg output can increase the number of infective larvae in the pasture, thus increasing the probability of new born animals being infected (Blackburn *et al.*, 1991; Coop and Kyriazakis, 1999).



It is clear from above bar chart that 39 sheep, out of 120 infested with single type of parasite species i.e. one type of parasite (32.5%) whereas 44 (36.3%) contained two and 37 sheep (30.8%) infested with three types of parasite species.

Fig. 3. Distribution of Parasite among Sheep with Respect to Number of Parasite species.

Prevalence of different nematodes species in sheep

A majority of the infected sheep harbored more than one species of nematode parasites, having minimum one and maximum all the four species of the parasite under study. The maximum occurring number of parasite in sheep was 44/120(36.6%) followed by single parasite 39/120(32.5%) and then double i.e.37/120 (37.83%).

The recovered species of parasite included *Trichostrongylus axei*, *Haemonchus contortus*, *Cooperia* and *Nematodirus*. *Nematodirus* was found to be the highest in prevalence i.e. 30.8%; 37/120 of the total flock, followed by *Cooperia* (35/120; 29.1%), *Haemonchus* (20.8%; 25/120), and *Trichostrongylus* (19.1%; 23/120).

Overall higher (100%) internal parasitic incidence was recorded by Malik *et al.* (1995) in ovine and caprine species in Punjab. Al-Yousaf (1997) recorded 86.9% infestation with internal parasites in goats in Riyadh area of Saudi Arabia. While the infestation was comparatively low in the present study that might be due to different climatic conditions i.e., Punjab areas are mostly irrigated and more humid while Balochistan and Saudi Arabia are dry-land areas.

Other researchers have identified a few other species of internal parasites. Khan *et al.* (1988a) reported prevalence of twelve species of internal parasites in sheep of Kovak valley in Balochistan. Durrani *et al.* (1981) also reported similar species in sheep/goats in Jhelum valley of Punjab Province. While Khan *et al.* (1988b) also reported eighteen similar types as in the present study. Difference in the incidence may be due to differences in environment and susceptibility as stated by Durrani *et al.* (1981). Radostits *et al.* (1994) mentioned that most suitable conditions for the translation of eggs to larvae in the majority of helminth parasites are provided by warm, wet weather. In the areas with a severe winter and dry summer, the parasitic burden of the local livestock may be light in most years as seen in the present study. But during the years when winter is mild and summer is wet, the normal light burdens are rapidly multiplied so that severe out breaks of parasitic diseases occur. Altogether, these results suggest that sheep may act reservoir of Trichostrongylid in Zhob, Balochistan. As such, strict preventive measures should be taken to avoid the risk of mortality and morbidity in sheep in Balochistan.

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Author contributions

N.K (Conceptualization, design, investigation, writing), M.L (Conceptualization, design and funding acquisition and supervision), S.J (Review, Conceptualization, design and supervision), S.M.T & D.K, A.R & M, S contributed equally in reviewing, analyzing & sampling. All authors critically reviewed the manuscript and approved the final version of the manuscript.

Conflicts of interest

All other authors declare no conflicts of interest

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