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Original Research Article

Prevalence of *Hemonchus Contortus* in Naturally Affected Sheep and Goat Population of District D.I.Khan and Lakki Marwat

Umm-E-Aimen[1], Arsalan Khan[1*], Akhtar Ali[1], Imtiaz Ali Shah[1], Wasim Ullah[1]

[1]Veterinary Research and Disease Investigation Center, Dera Ismail Khan-29050, Pakistan

***Corresponding Author:** Arsalan Khan
Veterinary Research and Disease Investigation Center, Dera Ismail Khan-29050, Pakistan

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Abstract: Small ruminants are preferably raised for meat production and hair or wool and milk as by-products and the population of sheep and goats has been growing exponentially among all species of livestock in Pakistan. But the small ruminants' production has faced huge implications of gastrointestinal worms' infestations and thereby significant reduction in the production of the animals. The parasitic burden is not only health devastating but also caused severe parasitic infections and production losses. Therefore, a cross-sectional study was conducted to investigate the prevalence of *Haemonchus contortus* in small ruminants in District Dera Ismail Khan (D. I. Khan) and Lakki Marwat, Khyber Pakhtunkhwa, Pakistan and to determine the worm burden of *Haemonchus contortus* in terms of Egg per gram and to study the risk factors of the disease. For this purpose, a total of 480 fecal samples were collected randomly from the sheep and goat population of the District D.I. Khan and Lakki Marwat, during the four seasons of the year 2020-21 and 2021-22, for the determination of the prevalence of *Haemonchus contortus*. The results revealed that 12.97 and 13.30% were the overall prevalence of *Haemonchus contortus* in sheep and goats, respectively. The area-wise incidence of *Haemonchus contortus* in sheep and goats population, in District D. I. Khan and Lakki Marwat, was 11.25 and 15.68% in sheep and 12.50 and 15.51% in goats population. There was a significant difference ($P<0.05$) in the prevalence of the parasite in both districts D. I. Khan and Lakki Marwat, whereby the incidence was significantly higher ($P<0.05$) in Lakki Marwat. The males showed a prevalence of 11.57% while, females showed a prevalence of 13.64%, thus the difference was non-significant ($P\geq0.05$). As the *Haemonchus contortus* bears major economic importance in both species of small ruminants and decline the production significantly and badly affects the health and growth of the animals, the results of the current study revealed that both the Districts of Pakistan are endemic for the *Haemonchus contortus* infestation and requires special attention to its control.

Keywords: Small ruminants, gastrointestinal worms' infestations, *Haemonchus contortus*, Goat Population.

INTRODUCTION

A wide variety of gastrointestinal (GIT) helminths have been implicated in huge morbidity and mortality rate in small ruminants like goats and sheep. The parasitic burden in these animals is characterized by diarrhea, gastritis, stunted growth, poor weight gain, reduced milk production, lack of appetite, and loss of wool/hairs (Rahman *et al.*, 2014), causing devastating effects on the health and production of these animals. Livestock rearing in Pakistan is primarily a subsistence activity and is characterized by small herds/flocks with wide-spread ownership, one million of which are landless.

Goats and sheep are primarily reared for meat production with hair/wool and milk as by-products. Over the last few decades, populations of goats have been growing exponentially among all species of livestock in Pakistan (Hasnain and Usmani, 2006). Currently, Pakistan is home to 53.7 million heads of goats and 26.4 million heads of sheep with an annual growth rate of 4.48% and 2.63%, respectively. In Pakistan, Khyber Pakhtunkhwa province is rich in livestock where 9.5 million heads of goats and 3.3 million heads of sheep are reported. District D.I.Khan shares 0.29 million heads of goats and 0.10 million heads of sheep (PBS, 2006). Several studies regarding (GIT) helminthiases in sheep and goats

have been conducted in Punjab and Sindh provinces.

However, very little is known about *Haemonchus contortus* in these animals in Khyber Pakhtunkhwa province of Pakistan (Ijaz, 2009). Therefore, the study was designed and aimed to investigate the prevalence of *Haemonchus contortus* and its associated risk factors in small ruminants of District D.I.Khan and Lakki Marwat.

MATERIALS AND METHODS

Sample collection

For this purpose, the fecal samples were collected randomly from the sheep and goat population of the district D.I.Khan and Lakki Marwat. The fecal samples were collected from the animals directly from the rectum of the animal using disposable rubber gloves by inserting the fingers in rectum of the animal. The samples were transported to the laboratory facility in sterile specimen bottles of 60ml volume.

Sample size

A total of 480 fecal samples were collected from the sheep and goat population randomly, to determine the prevalence of gastrointestinal nematodes.

Study Area: District D.I.Khan District Lakki Marwat and their peripheral areas.

Study Period

The study was carried out for the period (2020-21 & 2021-22) including the four seasons

A. B. Moon soon (July, August)
B. Post moon soon (September, October & November)
C. Winter (December, January & February)
D. Pre Moon soon (March, April, May & June)

Selection indicators

The indicators were:

i. Animal of age 1-5 years.
ii. Deworming should not be done 02 months before the collection of samples.

Description of the animals

The flocks in this study included a total of 480, goats and sheep. A well-structured questionnaire was prepared, including owner details (location, contact number and owner's name); details about animals including flock size, grazing type, age, sex, breed, morbidity, mortality and health condition *etc.* Subjects were randomly selected from the population without knowledge of the disease status. To prevent biased sampling, randomization was done, so that variations in the data are evenly distributed among the subjects. From each farmer, 10% of the animals of the flock randomly achieved equal representation. Samples were collected directly from the rectum and were kept in plastic bottles that were labeled. Then samples were transferred to the Veterinary Research and Disease Investigation Center (VR&DIC, D. I. Khan) for further processing.

Sample collection

Fecal samples were collected and preserved in a plastic bottle properly labeled and transported to the Parasitological Section of Veterinary Research and Disease Investigation Center, D.I. Khan. The sample collection and examination were performed throughout the study period.

Laboratory protocols

Parasitological protocols included the determination of eggs of *Haemonchus contortus* in the fecal samples, collected from animals, using the floatation method. The eggs were identified using the standard key. The positive samples were determined for EPG by Mc Master Method, at a sensitivity of 50 eggs per gram (EPG) of feces.

RESULTS & DISCUSSION

The results of our study revealed that the prevalence of *Haemonchus contortus* in sheep and goats out of the 480 collected fecal samples was 12.97 and 13.30%, respectively. There was non-significant difference ($P \geq 0.05$) regarding the incidence of the *Haemonchus contortus* in both species of the small ruminants (Table 1). Our study was supported by the results of the study conducted in sheep population for the determination of the prevalence of the *Haemonchus contortus,* in which it was reported that 23.92% sheep were infested and a remarkable incidence of the parasite was found (Brik *et al.,* 2019). In another study, the overall prevalence of 21.7% was recorded in the sheep population in District Faisalabad Pakistan (Iqbal *et al.,* 1993). Our results are not coinciding with the results of the study in which the overall prevalence of

75.7% of *Haemonchus contortus* was reported in Nyagatare district, Rwanda (Mushonga *et al.,* 2018). The difference in the results was due to the difference in specimen collection technique because in our study the samples were randomly collected from healthy flocks of small ruminants, randomly while in the reported study the fecal samples were collected from the suspected animals.

Table 1: Prevalence of *Haemonchus contortus* in sheep and goats out of the 480 fecal samples collected randomly

Specie	No. of samples collected	No. of positive samples	Prevalence (%)
Sheep	262	34	12.97
Goat	218	29	13.30
Total	480	63	13.12

The area-wise prevalence was also determined in our study and the results of our study showed a significant difference ($P<0.05$) in the prevalence of the parasite, the *Haemonchus contortus* in both Districts D. I. Khan and Lakki Marwat, Khyber Pakhtunkhwa, Pakistan, whereby the incidence was significantly higher ($P<0.05$) in Lakki Marwat (Table 2).

Table 2: Area wise incidence of *Haemonchus contortus* in sheep and goats

District	No. of fecal samples collected from Sheep	Positive sheep samples for *Haemonchus contortus*	Prevalence %	No. of fecal samples collected from goats	Positive goat samples for *Haemonchus contortus*	Prevalence %
Dera Ismail Khan	160	18	11.25	160	20	12.50
Lakki Marwat	102	16	15.68	58	09	15.51
Total	**262**	**34**	**12.97**	**218**	**29**	**13.30**

The sex-wise incidence of *Haemonchus contortus* was also determined in this study and the non-significant difference ($P\geq0.05$) was found in the prevalence of *Haemonchus contortus* in both male and female sexes of the sheep and goat species. The prevalence of the *Haemonchus contortus* in males was 11.57%, while, in females, the prevalence percentage was 13.64% (Table 3). The results of our study have been strongly supported by the studies conducted in the small ruminants like Iqbal *et al.,* (1993), Hussain *et al.,* (1996), Vanimisetti (2003), Mandonnet *et al.,* (2003) and Tasawar *et al.,* (2010).

Table 3: Sex-wise incidence of *Haemonchus contortus* in sheep and goats

Sex	No. of fecal samples collected	Positive samples for *Haemonchus contortus*	Prevalence %
Male	121	14	11.57
Female	359	49	13.64
Total	**480**	**63**	**13.12**

REFERENCES

- Barone, C. D., Zajac, A. M., Manzi-Smith, L. A., Howell, A. B., Reed, J. D., Krueger, C. G., & Petersson, K. H. (2018). Anthelmintic efficacy of cranberry vine extracts on ovine Haemonchus contortus. *Veterinary parasitology*, *253*, 122-129.
- Brik, K., Hassouni, T., Elkharrim, K., & Belghyti, D. (2019). A survey of Haemonchus contortus parasite of sheep from Gharb plain, Morocco. *Parasite Epidemiology and Control*, 4, 94.
- Hussain, B., Hayat, C. S., & Kazmi, S. E. (1996). The incidence of gastrointestinal parasites in buffalo calves. *Pakistan Journal of Agriculture Sciences*, 23: 44-27.
- Ijaz, M., Khan, M. S., Avais, M., Ali, K. A. M. M., & Khan, M. Z. U. (2009). Infection Rate and Chemotherapy of Various Helminthes in Diarrhoeic Sheep in and Around Lahore. 19(1), 13–16.
- Iqbal, Z. M., Akhtar, M. N., & Riaz, M. (1993). Prevalence and economic significance of Haemonchosis in sheep and goats slaughtered at Faisalabad abattoir. *Pakistan Journal of Agriculture Sciences*, 30: 51-53.
- Leine, N., Gjerde, B., Mason, P., & Torgerson, P. (n.d.). Prevalence of gastrointestinal helminths , lungworms and liver fluke in sheep and goats in Norway.
- Mandonnet, N., Ducrocq, V., Arquet, R., & Aumont, G. (2003). Mortality of Creole kids during infection with gastrointestinal strongyles: a survival analysis, *Journal of Animal Science*, 81: 2401-2408.
- Mushonga, B., Habumugisha, D., Kandiwa, E., Madzinngira, O., Samkange, A., Segwagwe, B. E., & Jaja, I. F. (2018). Prevalence of Haemonchus contortus Infections in Sheep and Goats in Nyagatare District, Rwanda. *Journal of Veterinary Medicine*, 1-9.

- Rahman, M., Islam, R., Hossain, M. K., Biswas, D., & Rashid, H. (2014). Prevalence of Helminth infestation of Goats relative to Season, Host, Sex, Age and Breed in. 39–42.
- Squire, S. A., Robertson, I. D., Yang, R., Ayi, I., & Ryan, U. (2019). Acta Tropica Prevalence and risk factors associated with gastrointestinal parasites in ruminant livestock in the Coastal Savannah zone of Ghana. 199 (August).
- Tasawar, Z., Ahmad, S., Lashari, M. H., & Hayat, C. S. (2010). Prevalence of Haemonchus contortus in Sheep at Research Centre for Conservation of Sahiwal Cattle (RCCSC) Jehangirabad District Khanewal, Punjab, Pakistan. *Pakistan Journal of Zoology*, 42(6): 735-739.
- Vanimisetti, H. B. (2003). Genetics of resistance to *Haemonchus contortus* infection in sheep. M. S. thesis, Virginia Polytechnic and State University., Virginia.