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The Prevalence of Gastrointestinal Nematodes in Livestock and their Health Hazards: A Review

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ABSTRACT

Livestock plays an important role in the national economy and has a significant share in the gross domestic product of Pakistan. Parasitic diseases and worm infestations negatively affect their health, production, and reproductive performance. In addition, parasitic infestation in livestock reduces gross production values and renders huge economic losses globally. Among the parasites, the most important are nematodes. They are distributed worldwide and affect all kinds of livestock. This review aimed to elaborate on the main gastrointestinal nematodes, their mode of action, impacts on livestock and their control (physical, chemical or biological) strategies. Common examples of nematode worms infesting the livestock are *Ascaris, Hemonchus, Strongyloids, Trichostrongyliods, Ostertagia, Trichuris, Dictyocaulus, Trichnellia, Enterobius, Cooperia, Gunagylonema, Chabertia*, and *Oesphagostomum*. The gastrointestinal nematodes are detrimental to the animals' health. Nematodes primarily affect animals' feed consumption and efficiency, and severe ailments result in the death of the affected animals. The production and health losses primarily depend on the age of the animals, the degree of severity of worm infestation, epidemiology pattern of the parasites, management strategies of the flocks, and ecoclimatic conditions which are favorable for the worm's infestation. To minimize these issues, farmers should be educated on the importance of intensive livestock management and environmental sanitation, as well as strategic deworming of cattle using efficient broad-spectrum anthelmintics, biological control of the parasites, and breaking their life cycle and intermediate hosts.

Keywords: *Ascaris*, *Enterobius*, *Hemonchus*, Nematode, Parasitism, Roundworms, *Strongylus*

INTRODUCTION

Gastrointestinal (GIT) nematode infestation is the most important problem and constraint to the livestock industry in Pakistan. It negatively affects the health of small and large ruminants population and negatively influences the national economy regarding production losses at the major. The livestock share in the agriculture sector is more than 60%. Livestock plays an important role in the national economy (Government of Pakistan, Agriculture Economic Survey, 2021).

The sheep and goats possess tremendous approaches to producing meat, milk, and wool. Livestock is prone to GIT nematode infestation, and it can lead to a significant death rate. These GIT nematodes significantly affect sheep and goats' production and reproduction performance (Asmare et al., 2016).

The GIT nematodes are detrimental to the animals' health. These parasites primarily affect livestock feed consumption and the efficiency of the animals. In addition, severe ailments result in the death of the affected animals. The potential negative impact primarily depends on the animals' age, severity of worm infestation, the epidemiology pattern of the parasites, management strategies of the flock, and ecoclimatic conditions in the worm infestation (Urquhart et al., 1996).

Gastrointestinal nematodes mostly infest small ruminants. Their epidemiological patterns rely on the factors related to the parasite-host (such as inadequate host nutrition, poor hygiene, and sanitation; Tesfaye et al., 2021). Among these GIT parasites, the most common parasites infesting the livestock are *Hemonchus contortus, Ascaris, Strongyloids, Trichostrongyliods, Ostertagia, Trichuris, Dictyocaulus, Trichnellia, Enterobius, Cooperia, Gunagylonema, Chabertia, Oesphagostomum* (Mekonen, 2021).

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Therefore, strategies for the treatment and prevention of these GIT nematodes in livestock, with anthelmintic drugs, control of parasite infestations, biological control of the parasites, and breaking their life cycle and intermediate hosts should be practiced to minimize the impact of these parasites on the health status, production and performance of the animals, and safeguard the national food interest and economy (Sadr et al., 2022; Lotfalizaded et al., 2022).

Morphology of the parasites

The body of the nematodes is elongated and cylindrical, tapering at both ends and extremities. They are non-segmented creatures; however, their bodies are covered with a thick waxy cuticle layer for protection. This cuticle layer is also continuously related with the buccal cavity and digestive tract of the parasites (Jacobs et al., 1999).

General life cycle of nematodes

The nematodes are oviparous and lay a huge number of eggs per day. For example, Ascaris female lays 200,000 eggs per day and has 27 million eggs in her body at one time. The nematodes have direct and indirect life cycles, but these worms usually show a direct life cycle in livestock without involving the intermediate host. Sexes are separate and sexual dimorphism is also present in nematodes. The eggs are shed in the host feces and hatch into the first larval stage (L1), which feeds on bacteria and soil. As these worms show metamorphosis, they show ecdysis and molt into the L2 under suitable eco-environmental conditions, and subsequently, L3 larval stage is hatched. This L3 comes out of the feces, attaches itself to leaf blades of the grasses, and is transmitted to the grazing animals via the oral route. This nematode transmission can be termed oro-fecal route transmission (Mekonnen, 2021).

Overall prevalence of gastrointestinal nematodes in livestock

A study was conducted in Odisha, an eastern Indian state on the Bay of Bengal, to determine the GIT nematodes in a different breed of sheep (Kumar et al., 2021). For this purpose, about 701 fecal samples were collected from different sheep of different breeds. After fecal examination and coproculture, it was concluded that the prevalence of GIT nematodes was 61.20%. Another study was conducted in Wayu, Toka, and Diga districts, Oromia regional state, Ethiopia, to determine the prevalence of GIT nematode in sheep. The sample analysis revealed the prevalence of nematode infestation in the study was 44% (Chali and Hunde, 2021). In Sillod Tehsil, from Aurangabad district in Maharashtra, , India, the prevalence of GIT and protozoan in sheep and goats was determined. For this purpose, about 940 fecal samples were collected randomly from sheep and goats. Floatation, sedimentation, and direct smear method techniques were used for the analysis. The findings revealed a high prevalence of nematodes in sheep and goats at 72% and 61%, respectively (Shaikh and Naphade, 2021).

Another study was performed in Rajendran agar, Hyderabad, Pakistan, to determine the nematode infestation. Nematode infestation results in stunted growth, weight loss, reproduction and production loss. For this purpose, about 368 fecal samples were collected directly from the rectum of the goat. Gross, direct fecal smear, sedimentation, and flotation techniques were implied to examine and identify nematode infestation. The analysis of the samples revealed a 38% prevalence of nematodes (Shashank et al., 2019).

A total of 120 fecal samples were collected from cattle in Azare abattoir, Katagum Local Government Area, Bauchi State, North-Eastern Nigeria, to determine the GIT nematode in domestic animals. The analysis of the samples indicated the prevalence of 56% of nematodes (Umar et al., 2021). A study in Vom, Central Nigeria, determined the prevalence of GIT parasites. For this purpose, 1508 fecal samples were collected from various domestic animals, such as goats, dogs, horses, rabbits, sheep, and cattle. Formal ether concentration techniques were implied to examine worms. The analysis of the samples revealed the highest prevalence of nematodes in those species (Abraham et al., 2020).

In another study the prevalence of GIT nematodes in wild ruminants was investigated in Massachusetts, Rhode Island, Vermont, New York, Maryland, Kentucky, North Carolina, South Carolina, Arkansas, Louisiana, Iowa, Kansas, Nebraska, New Mexico, Wyoming, and Alaska of the USA. For this purpose, 548 fecal samples were collected from different wild ruminants on a large scale randomly to examine the worms. All samples were cultured and isolated DNA using PCR. The analysis of the samples revealed that Ostertagai (90%) and Trichostronylus (69%) were predominant (Barone et al., 2020).

A study was conducted in central and south-eastern regions of Ukraine to examine the parasitic infestation in sheep. For this purpose, about 710 fecal samples were collected from the rectum of sheep. After examination, it was found that 79.58% of sheep were infected, which was a great impact on the national economy (Melnychuk et al., 2020). The occurrence of GIT nematodes in goats in Karachi, Pakistan, from 42 samples was 30%, and the occurance of *Oesophagostomum rafiae* was recorded in goats for the first time (Lala et al., 2019).

In the Coastal Savannah zone of Ghana, 338 fecal samples from cattle and 502 fecal samples from small ruminants (sheep and goats) were collected. A formal ether sedimentation technique was implied to examine the worm. The analysis of the samples revealed that the prevalence of GIT helminths was 90.8% (Squire et al., 2019). A study was conducted in Oromiya Regional State of Ethiopia to determine the prevalence as well as associated risk factors of GIT

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nematodes from 384 fecal samples from sheep and goats showed 71.88% for prevalence of nematodes (with flotation and McMaster techniques), while the prevalence of sheep was 75.8%, and the goat was 61.2% (Dugassa et al., 2018).

In Ranchi, Jharkhand, India, 1506 fecal samples of sheep were collected. Modified Sheather's Sugar floatation technique and Formal ether acetic acid technique were used to examine the worms. The analysis of the samples revealed that the highest prevalence of nematodes was 39.04% (Jena et al., 2018). A study was conducted in Tandlianwala, Faisalabad, Pakistan, to determine the prevalence of GIT helminth in cattle and also the therapeutic efficacy of albendazole. For this purpose, 384 fecal samples were collected from cattle. Sedimentation, Floatation, and McMaster techniques were implied to examine the worms. The analysis of the samples revealed that the prevalence of GIT parasites was 38.02% (Sadiq et al., 2018).

A study was conducted in India on estimating the seasonal ratio of GIT helminths in goats in central Madhya Pradesh. A total of 1478 fecal samples were collected from the goats. After examinations, it was concluded that out of 1478 samples, 1194(80.78%) were positive for GIT tract helminths in which the prevalence of nematodes, trematodes and cestodes were 77.47%, 7.37%, and 14.75%, respectively. The prevalence of GIT helminths and nematode infection was highest in adults (81.04% and 96.39%) compared to kids (77.68% and 89.66%; Saiyam et al., 2018). In Suhag, Egypt, 442 fecal samples were randomly collected from small and large ruminants (171, 128, and 143 from cattle, buffaloes, and sheep, respectively). Fecal microscopy revealed a 30% prevalence of nematodes in cattle, 22.6% in buffaloes, and 31.4% in sheep of nematodes (Al-Aboody et al., 2017).

About 106 fecal samples from the rectum of sheep in the Sherpur district, Bangladesh, were collected. Direct smear and Stoll dilution egg counting techniques were implied to examine worms. The analysis of the samples revealed the highest prevalence of helminth in domestic sheep, especially nematodes (Poddar et al., 2017).

A cross-sectional study was conducted in the district of Dera Ismail Khan, Pakistan, to determine the parasitic infestation in large ruminants. For this purpose, 1920 fecal samples (960 samples from dairy calves and 960 samples from buffalo calves) were collected and examined. After fecal examination, the GIT parasitic infestation was found highest in buffalo calves (67%) as well as in cow calves (47%). The parasitic infestation was highest in summer (75.78% in buffalo calves and 70.3% in dairy calves) as compared to winter (32.91% in buffalo calves and 30.41% in cow calves (Farooq et al., 2012).

A study was conducted in Bogor, Demak, East Java, and Lombok, Indonesia, to determine GIT parasitic infestation in buffaloes. For this purpose, about 89 fecal samples were collected from buffaloes. McMaster's technique was implied to examine worms. The analysis of the samples revealed that the overall infestation of the nematode was the highest (Karim et al., 2016). In Haramaya University farms, Eastern Hararghe, Oromiya region, 383 fecal samples were randomly collected from the small ruminants (sheep 216 and goat 167). Direct and indirect techniques were used to examine and identify the worms. The analysis of the samples revealed that the highest prevalence of nematodes was 88.8% while 89.2% in sheep and 88.4% in goats (Mideksa, et al., 2016).

In Kohat, Khyber Pakhtunkhwa, Pakistan, 500 fresh slaughtered gut content of small ruminants (200 sheep and 300 goats) were collected. Direct microscopy, floatation, and sedimentation techniques were implied to examine and identify the worms. The analysis of the sample revealed a 23% prevalence of nematodes out of a 45.6% overall prevalence. The prevalence of GIT parasites in goats was 49.0% and was higher than in sheep (40.5%) (Rashid et al., 2016). A study was conducted on nomadic cattle herds in Eruwa, Oyo State, Southwestern Niger, to determine GIT parasites. For this purpose, 177 fecal samples were collected from the rectum of cattle. The analysis of the samples revealed that 62.7% was the prevalence of GIT parasites, especially *Ascaris* (Stephen et al., 2016).

A study was conducted in Meskan district, Gurage Zone, Southern Ethiopia, to determine the prevalence of GIT helminth of sheep. For this purpose, 350 sheep fecal samples were collected. The analysis of the samples revealed that the prevalence of nematodes was 60.57% *Strongyles* accounted for the majority of retrieved nematode eggs (27.1%), followed by *Strongyloides* (10.9%), *Trichuris* species (3.7%) and *Ascaris* spp. (0.6%) (Nana et al., 2016).

In Peshawar, Pakistan, fecal samples from 800 sheep were collected to determine the worm infestations. The analysis of the samples revealed a 60% parasitic infestation in sheep (Jan et al., 2015).

A study was conducted in Minna, a northcentral city in Nigeria, to determine the GIT nematodes. For this purpose, about 426 fecal samples were collected from the rectum of domestic animals (sheep, cattle, and goats). Floatation techniques were implied to examine worms. The analysis of the samples revealed a 66.19% prevalence of GIT parasites in domestic animals (Agbajelola et al., 2015).

In Udaipur, India, fecal samples were collected from 1013 buffaloes and 1012 dairy cows. After examination, the results revealed that nematode prevalence was highest in cows (79.24%) and was 28.13% in buffaloes (Swarnakar et al., 2015).

In Abeokuta, in Ogun State, southwestern Nigeria170 fecal samples from 30 goats, 40 sheep, and 100 cattle were collected. The analysis of the samples revealed that the prevalence of nematodes was 58.8% in cattle, 23.5%, and 17.6% in sheep and goats, respectively (Sylvia et al., 2015). A study was conducted in the Gechi district, Southwestern Ethiopia, to determine the occurrence of GIT helminth in domestic animals. The analysis of the samples revealed that the

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overall prevalence was 82.2%, while the prevalence of GIT parasites in sheep was 84.3% and in goats was 78.7% (Emiru et al., 2013).

A study was conducted in Jatoi district of Muzaffargarh, Pakistan, to determine the prevalence of GIT helminth in domestic animals. For this purpose, a total of 500 fecal samples were collected from the rectum of cattle. Direct, indirect, and copro-culture techniques were implied to examine the worms. The sample analysis revealed a 51% overall prevalence of helminth and a 21% prevalence of nematodes were recorded (Raza et al., 2013a).

Prevalence of haemonchus and other species in livestock

A study was conducted in Nyagatare District, Rwanda, to determine the prevalence of *Haemonchus contortus*. For this purpose, 949 fecal samples were randomly collected from sheep and goats. Parasitological techniques such as Fecal egg counts (FEC) using the Modified Wisconsin Sugar Floatation method and the Fluorescent-labeled peanut-lectin agglutination test were implied to examine the worms. The analysis of the samples revealed that the overall prevalence of *Haemonchus contortus* in sheep and goats was the same at 75.7% (Mushonga et al., 2018). Another similar study was conducted in Uttar Pradesh, India, to determine the occurrence of *Haemonchus contortus* in goats. For this purpose, about 635 goat fecal samples were collected. The analysis of the fecal samples revealed that 60.0% prevalence of *Haemonchus contortus* in goats (Rashid et al., 2018). Another study at Kamrup, India, analyzed 510 fecal samples of goats and revealed a 16.40% prevalence of *Haemonchus contortus* in goats (Dutta et al., 2017).

A study was conducted in Jabalpur, Madhya Pradesh, India, to investigate the occurrence of GIT parasites in domestic animals. For this purpose, 1675 goat fecal samples were collected from the goat population and were examined microscopically. The highest prevalence of *Strongyles* (61.43%), *Coccidia* (25.97%), *Amphistomes* (9.73%), *Monieziaexpansa* (8.66%), *Trichuris* spp. (2.03%), *Strongyloides* spp. (1.79%) and *Fasciola gigantica* (0.66%) were recorded. The prevalence of GIT parasites was highest in adults (73.83%), compared to young goats (69.1%, Lata et al., 2017).

In the Mulwa region, Madhya Pradesh, India, 200 fecal samples of goats were collected to determine the prevalence of *Strongylus* infestation. The analysis of the sample revealed that the 65% prevalence of *Strongyle* seven genera of parasites were recognized. *Haemonchus* spp. (32.33%) was the predominant GIT nematode, followed by *Oesophagostomum* spp. (22.51%), *Trichostrongylus* spp. (18.67%), *Cooperia* spp. (15.03%), *Nematodirus* spp. (12.65%), *Ostertagia* spp. (3.34%) and *Bunostomum* spp. (3.12%; Rajpoot et al., 2017).

A study was conducted in Tandojam, Sindh, Pakistan, to determine the prevalence of endoparasites in domestic animals. For this purpose, about 120 fecal samples were collected directly from the rectum of domestic animals (buffalo, cow, goat, and sheep), 30 samples for each animal, and 80 blood samples were also collected from buffalo, cow, goat, and sheep (20 samples for each animal). McMaster, floatation, sedimentation, and thin blood smear techniques were implied to determine the prevalence of endoparasites. The analysis of the samples revealed that the *Hamenochus contortus* 30% and liver fluke 40% were predominant in the fecal sample (Khaskheli et al., 2016).

An investigation of the prevalence of GIT parasites in goats from the western region of Santa Catarina, Brazil, comprised 24 farms in seventeen distinct towns. Animals (n=217) with various production goals (milk and meat) and ages were randomly selected. The feces were collected, placed in plastic bottles, and transferred in 10°C portable coolers to the laboratory. Centrifugal flotation with a saturating sugar solution was employed to assess the existence of eggs, cysts, and oocysts of GIT parasites,. In 88.9% of the examined animals, nematode eggs belonging to the Strongylida order were discovered. After cultivation and larvae identification, *Haemonchus* spp. *Trichostrongylus* spp. *Teladorsagia* spp. *Cooperia* spp. and *Oesophagostomum* spp. were identified. Moreover, eggs of the genera *Thysanosoma*, *Trichuris*, *Moniezia*, and *Neoascaris* were observed. In addition, the presence of *Eimeria* spp. and *Cryptosporidium* spp. oocysts and *Giardia* spp. and *Entamoeba* spp. cysts were confirmed. In all investigated farms, animals had a single or mixed infection, with helminths of the *Haemonchus* and *Trichostrongylus* genera and the protozoan Eimeria, being the most prevalent (Radavelli et al., 2014).

A study was conducted in Chittagong, Bangladesh, to determine the helminth infestation in goats and its relation to host, age, sex, breed, and season. For this purpose, 1600 fecal samples were collected from goats. The analysis of the samples revealed that the nematode infestation was highest than other helminths. The prevalence of different helminths in goats was *Fasciola* spp (2.62%), *Paramphistomum* spp. (2.00%), *Moniezia* spp. (2.31%), *Bunostomum* spp. (4.62%), *Strongyloides* spp. (6.93%), *Oesophagostomum* spp. (4.31%), *Haemonchus* spp. (5.87%). The age prevalence of helminths in goats was 11.41%, 28.59%, and 71.88% at ages 0-12 months, 13-24 months, and above 24 months, respectively. According to sex, the prevalence of helminths in goats was 34.50% in females and 22.87% in males (Rahman et al., 2014).

In the district of Multan, Punjab, Pakistan426 GIT tracts of large domestic ruminants (buffalo and cattle) were collected from slaughtered houses. Direct and indirect techniques were implied to examine the *Toxocara vitulorum.* The analysis of the sample revealed the 54.63% prevalence of *Toxocara vitulorum* (Raza et al., 2013b).

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A study was conducted in Southern Botswana, to determine parasitic infestation in domestic animals. For this purpose, a total of 465 fecal samples were collected from different domestic animals (131 dairy calves, 94 beef calves, 143 goat kids, and 97 lambs) to investigate the prevalence of helminth. McMaster and evaluation of enzyme immune-assay (EIA) techniques were implied to examine the worms. The results of parasitological techniques showed helminthic and *Eimeria* infections. The prevalence of helminthic and *Eimeria* species in dairy calves was 2.75 and 2.9%, while, in beef calves, the prevalence was 3.25 and 2.9%. The prevalence of helminthic and *Eimeria* infections in goat kids was 3.4 and 2.8%, while in lambs was 4.45% and 3.2% (Sharma and Busang, 2013).

In Sargodha, Pakistan about 390 GIT tracts were collected from different slaughtered houses. Direct and indirect techniques were implied to examine and identify the worms. The sample analysis revealed the 40.51% helminth prevalence (Ahmad et al., 2012).

A study was conducted in Jenin, Palestine, to determine the incidence and diversity of GIT nematodes from the intensive and extensive rearing farm system. For this purpose, about 810 fecal samples were collected from ruminants composed of both 525 extensive and 285 intensive farm systems. Of 13 genera, 11 were nematodes, 1 cestode (Moniezia), and 1 protozoan (*Eimeria*) were recovered from the GIT parasites (GIPs). Less GIP diversity was observed in intensive rearing systems. The prevalence of GIPs was significantly greater ($p < 0.01$) in animals raised using an extensive method (26.5 versus 7.9%). Several localities had significantly different GIP prevalence values ($p < 0.01$). The prevalence of infection was highest in Tarem, with a proportion of (21.1%), and lowest in Betqad, with a proportion of (5.3%). *Eimeria* spp. was the most prevalent parasite in the region. Afterward, *Dictyocaulus* spp (49.1% prevalence) and *Haemonchus* spp (23.1% prevalence) come. Animals maintained under an intensive grazing system had a lower prevalence of GIP with low diversity (*Eimeria* spp, *Dictyocaulus* spp, *Trichostrongylus* spp, *Neoscaris* spp, and *Ascaris* spp) than those maintained under an extensive grazing system (*Eimeria* spp, *Dictyocaulus* spp, *Haemonchus* spp, *Moniezia* spp. (Badran et al., 2012).

A study was conducted in the District Ganderbal, Kashmir, to determine the prevalence of GIT helminth. For this purpose, the GIT tract was collected from 284 sheep and 318 goats. The analysis of the samples revealed the 82% prevalence of *Haemonchus contortus* while the prevalence of helminth in sheep was 64.08% and in goats was 83.64% (Kuchai et al., 2012).

In Addis Ababa Municipal, Abattoir, Ethiopia, 535 slaughtered cattle were examined for worm infestation. Out of the total selected animals, 19 (3.6%) were affected by *Taenia saginata,* while 24 (4.5%) were affected by *Cysticercosis bovis* (Ibrahim and Zerihun, 2012).

A study was conducted in Iceland, to determine the prevalence of GIT helminth in sheep and rams. For this purpose, random fecal samples were collected from sheep and rams. Direct and indirect techniques were implied to examine worms. The analysis of the samples revealed that the highest prevalence of four types of helminth eggs was remarkable, such as *Moniezia expansa*, *Trichuris ovis, Nematodirus filicollis (N. filicollis)* and *N. apathiger* (Skirnisson et al., 2018).

A study identified the patent *strongylid* nematode infections using McMaster worm egg counts, and PCR assays of Internal transcribed spacer (ITS-2 nuclear ribosomal DNA) to screen genomic DNA extracted directly from lamb fecal samples. Lambs from four farms in southern Western Australia were sampled rectally on two separate occasions, with McMaster WECs and PCRs conducted on 858 samples. Negative controls (n = 96), worm egg count (WEC) <50 eggs per gram, and positive controls (n = 96) containing approximately equal proportions of *Teladorsagia circumcincta, Trichostrongylus colubriformis, Haemonchus contortus*, *Oesophagostomum* spp., and *Chabertia ovina*) were generated. All control samples were amplified following positive controls. The two diagnostic tests identified high levels of agreement (Kappa values ≥ 0.93). PCRs detected an additional 2.0% of samples as strongylid-positive, but there was no significant difference in the number of strongylid-positive samples identified using PCR or McMaster WEC (Sweeny et al., 2011).

A study was conducted in Peshawar, Pakistan, for which 4490 fecal samples were collected from cattle of different breeds, including males and females to investigate GIT parasites. The Direct smear method was used for the detection of parasite ova. The prevalence of parasites was higher in females 2411 (83.10%) than in males 490 (16.90%). Out of 2901 GIT parasites, 2209 (76.15%) were helminths, and 395 (13.62%) were protozoan parasites. In males, *Trichostrongylus colubriformis* had the highest prevalence (13.83%), while in females, *Trichostrongylus colubriformis* (16.24%) had the highest prevalence (Rafiullah et al., 2011).

A study was conducted at Government Research Centre for Conservation of Sahiwal Cattle (RCCSC) Jehangirabad, District Khanewal, Pakistan. For this purpose, about 333 fecal samples were collected directly from the rectum of sheep to determine the *Haemonchus contortus* prevalence. Direct microscopy and McMaster techniques were implied to determine *Haemonchus contortus* prevalence. The sample analysis revealed that the highest prevalence of *Haemonchus contortus* at 77.7% (Tasawar et al., 2010).

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In Hyderabad, Sindh, Pakistan, 1200 fecal samples were collected from sheep. McMaster, pastures larval count, and necropsy worm count techniques were implied to examine and identify the nematodes in sheep. The analysis of the sample revealed that the 24.6% prevalence of *Haemonchus contortus* recorded was symbolic (Al-Shaibani et al., 2008).

A study was conducted in Mymensingh district, Bangladesh, the determination the prevalence of GIT parasites in goats. For this purpose, 150 viscera from different slaughtered houses were collected. After examination, it was concluded that helminths were responsible for Bengal goat diseases. A total of 5 species were identified, such as *Oesophagostomum columbianum* (92%), *Trichuris ovis* (56.66%), *Schistosoma indicum* (38%), *Moniezia expansa* (10.66%) and *Moniezia benedeni* (2.66%) and these infections were highest in winter (100%) than that in summer (89.33%; Mohanta et al., 2007).

CONCLUSION

The overall high prevalence of gastrointestinal parasites in this review in some regions implies this issue is a very serious problem that reduces the productivity of livestock around the globe. The frequency of GIT parasites in cattle should be reduced by teaching farmers the value of intensive cattle management, environmental sanitation, strategic deworming of livestock using effective broad-spectrum anthelmintics, biological control of the parasites and breaking their life cycle, and intermediate hosts

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Authors' contribution

Arsalan Khan, Muhammad Jamil and Saeed Ullah wrote the manuscript, Faiqah Ramzan, Hina Khan and Naimat Ullah reviewed the manuscript, Mubarik Ali, Atta Ur Rehman collected the materials and Norina Jabeen and Rahila Amber formatted and revision of the manuscript.

Competing interests

The authors declare the competing interests as none.

Ethical consideration

Ethical considerations have been made by the authors.

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