



Research Article

Coprological Examination of Small and Large Ruminants in Central Zone of Khyber Pakhtunkhwa

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Abstract | Parasitic infections especially gastrointestinal parasites are a major constraint for blooming dairy industry of Pakistan, because it limit, the productive performance of animals. Aim of the project was to find out the prevalence of internal parasites in small and large ruminants in central zone of Khyber Pakhtunkhwa. For this purpose, a total of 1700 fecal samples were received from central districts and processed for coprological examination. Out of 1700 samples, 947 samples (55.7%) were positive for intestinal parasites. Specie wise prevalence of GI parasites was recorded as 51.5% in cows, 58.3% in buffalo, 73.9 % in sheep and 68.5% in goats. *Trichostrongylus* (32.8%) was recorded as highly prevalent in cattle followed by *amoeba* (10.2%) and *Fasciola* (6.1%), while in buffaloes *fasciola* was recorded higher followed by *amoeba* (19%) and *Trichostrongylus* (5.35%). *Haemonchus contortus* was the most prevalent intestinal parasite in the study area followed by *Trichostrongylus* in small ruminants, whereas mixed infection in goats was recorded as 21%. Different predisposing factors studied in the current study were season, location, age and sex. Prevalence was recorded higher in hot and humid months of the year because it favors the growth and development of gastrointestinal parasites. Similarly, young and male animals were found more susceptible to gastrointestinal parasites in the current study. Frequent screening of animals and deworming should be practiced for complete eradication of gastrointestinal parasites.

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Keywords | Gastrointestinal parasites, Ruminants, *Trichostrongylus*, *Fasciola*, *Hemonchus contortus*

Introduction

Livestock play a significant role in alleviating the poverty of poor farmers in Pakistan by improving their economic status (Gadahi *et al.*, 2009). Most of the rural people depend on cattle, buffalo, sheep and goats for their livelihood. Cattle (*Bos indicus*) is considered as important dairy animal of Pakistan and having about 35% share in total milk production in the country (Bhutto *et al.*, 1993). Similarly, more than 96% buffalo (*Bubalus bubalis*) population are in Asia, mainly in Indian sub-continent (FAO, 2011).

Goats (*Capra hircus*), is considered as poor man's cow, is among the earliest domesticated animals. It is widely distributed throughout the world but mostly present in tropical and subtropical areas (Di-Cerbo *et al.*, 2010). Goats can be adapted easily in new environment and needs minimal investment, comparative to other species (Dini *et al.*, 2016).

Parasitic infestation especially intestinal parasites are a major constraint for blooming dairy industry of Pakistan. Lack of awareness of the farmers community and the climatic condition of the country provides

ideal environment for the parasitic infection of animals in the country (Raza *et al.*, 2007). Gastrointestinal parasites affect the production of animals either directly or indirectly (Chikweto *et al.*, 2018). Intestinal parasites cause clinical and subclinical infection which affect the productive capacity of ruminants due to retarded growth, cost of treatment and it predisposes animals to secondary bacterial and viral infection (Khan *et al.*, 2015). The host immunity is affected by the helminthes infestations and it predispose the host to other infections (Serrano and Millán, 2014; Supali *et al.*, 2010). In presence of parasitic infections, the outcome of some opportunistic pathogens may be exacerbated (Avramenko *et al.*, 2015). Intestinal parasitic infestation has adverse effect on milk production and reproductive performance of large ruminants (Lashari and Tasawar, 2011), while in small ruminants it affect the carcass and wool quality and even death of kids and lamb (Raza *et al.*, 2007; Aya *et al.*, 2013).

Prevalence of intestinal parasites in ruminants is affected by various risk factors such as season, grazing habits, malnutrition and age of animals (Radostits *et al.*, 1994; Adedipe *et al.*, 2014). Development of parasites is mainly affected by hot weather due to which infestation of parasites (haemoparasites and intestinal parasites) is more common in hot and humid months of the year (Shah *et al.*, 2017). The objective of the present study is to determine the prevalent GI parasites in study area and to determine the predisposing factors.

Materials and Methods

Sampling area

This study was conducted in central zone of Khyber Pakhtunkhwa i.e. Peshawar, Charsadda, Nowshera and Khyber Agency. The average temperature of central zone in winter season ranges from 4°C-18°C while in summer season temperature ranges from 25°C-42°C. The climatic conditions of study area, especially in summer season, are very favorable for the hatching and development of helminthes ova.

Sample collection

A total of 1700 fecal samples were collected/received from central zone of Khyber Pakhtunkhwa and processed at Center of Parasitology and Poultry, Veterinary Research Institute, Peshawar. Fecal samples were collected from different district of Khyber

Pakhtunkhwa i.e. Peshawar (n=1304), Charsadda (n=180), Nowshera (101) and Khyber district (n=116) from various animal species i.e. cow (n=1130), buffalo (n=336), Sheep (n=146) and goats (n=89).

Coprological examination

Coprological examination was conducted through floatation technique by adopting the standard procedure of Zajac and Conboy (2012). Briefly, fecal samples (5g) were dissolved in saturated solution of zinc sulphate ($ZnSO_4$) and strained through fine sieve. The filtrate obtained was poured in 10ml test tube and on the upper surface of the solution, cover slip was applied and was remained still for about 20-25 min, so that the helminthes eggs stick to the cover slip. The cover slip was removed gently and placed on microscopic slide for observation of helminthes ova.

Parasite eggs were observed and identified with the help of keys mentioned by Thienpont *et al.* (1986); Zajac and Conboy (2012).

Statistical analysis

Data thus collected was arranged in MS Office Excel and statistically analyzed by Chi square (χ^2) for prevalence at a probability level ≤ 0.05 using SPSS version 16.0.

Results and Discussion

Prevalence of intestinal parasites

Out of total 1700 fecal samples, 947 samples (55.7%) were positive for intestinal parasites in which *Trichostrongylus* was recorded as 24%, *Fasciola* 10.4%, *Amoeba* 10.7%, *Hemonchus* 7.88%, *Eimeria* 1%, *Monezia* 0.29% and mixed infection 1.29% (Table 1). Overall prevalence in the present study is in congruent with the findings of Adejinmi and Harrison (1997) and Rafiullah *et al.* (2011).

Species wise prevalence

Specie wise prevalence was recorded as 51.5% in cows, 58.3% in buffalo, 73.9 % in sheep and 68.5% in goats. Gupta *et al.* (2012) also stated increased prevalence of GI parasites in buffaloes as compare to cows, whereas, overall prevalence in large ruminants recorded in the present study was almost similar to results of Mir *et al.* (2013), who reported overall prevalence of 51.21% in cattle and buffaloes. Kashyap *et al.* (1997) reported lower overall prevalence of GI parasites while Marskole *et al.* (2016) recorded higher

overall prevalence in large ruminants. This variation in results might be due to difference in sample size, period of study and geo-climatic conditions. Overall prevalence of GI parasites in goats was similar to findings of [Gebeyehu et al. \(2013\)](#), who reported overall prevalence of 69.3% in goats. Similarly, 68.75% overall prevalence of GI parasites was recorded in small ruminants by [Singh et al. \(2013\)](#) which is almost similar to overall prevalence of GI parasites in the present study (71.2%).

Table 1: Prevalence of gastrointestinal parasites in large and small ruminants.

Parasites	Number of positive cases (n)	Prevalence (%)
Trichostrongylus	409	24
Fasciola	177	10.4
Amoeba	183	10.7
Hemonchus	134	7.88
Eimeria	17	1
Monezia	5	0.29
Mixed	22	1.29
Total	947	55.7

In cows, *Trichostrongylus* was recorded as 32.8%, *Fasciola* 6.1%, *Amoeba* 10.2%, *Haemonchus* 0.7%, *Eimeria* 1.23%, *Monezia* 0.26%, *Toxocara* 0.26%, mixed infection as 0.26% and was significant statistically ($P < 0.05$). [Rafiullah et al. \(2011\)](#) reported the same results as 30.07% and *Moneizia* as 0.65%. Prevalence of fasciolosis in the present study is almost similar to results of [Bilquees and Alam \(1988\)](#) who recorded the occurrence of fascioliasis as 6.95% in cows from Karachi, Pakistan. Similarly, [Sabri et al. \(1981\)](#) observed prevalence of fascioliasis as 8% in cattle.

In buffalo, *Trichostrongylus* was examined as 5.35%, *Fasciola* 32.2%, *Amoeba* 19%, *Haemonchus* 0.29%, *Eimeria* 0.59%, *Monezia* 0.59%, mixed infection

as 0.59% and was significant statistically ($P < 0.05$). Fasciolosis in the present study was slightly lower from [Islam et al. \(1992\)](#) who stated 46.6% Fasciolosis from buffaloes in Bangladesh. Similarly, [Biswas \(2012\)](#) reported the prevalence of *Monezia* as 0.60% in buffaloes.

In small ruminants i.e. sheep and goats, result was completely different from large ruminants. In sheep, *Trichostrongylus* was 10.2% and *Haemonchus* 60.2%, while in goats, *Trichostrongylus* was observed as 5.9%, *Amoeba* 1.1%, *Haemonchus* 41.6% and mixed infection of *Strongyloides* and *Haemonchus* as 21.4% and was significant statistically ($P < 0.05$) ([Table 2](#)). Haemonchosis was recorded as most prevalent gastrointestinal infection in small ruminants in the present study which is in congruent with the study conducted by [Singh et al. \(2013\)](#). Environment of the study area is hot and humid which is ideal for the hatching and development of helminthes ova. [Pathak and Pal \(2008\)](#) reported the prevalence of *Trichostrongylus* as 5.6% in goats which is similar to results of present study.

Predisposing factors for intestinal parasites

Season wise prevalence of gastrointestinal parasites were 35, 70.4, 60.3 and 57.9% in winter, spring, summer and autumn, respectively and this difference was highly significant ($P < 0.01$).

[Pathak and Pal \(2008\)](#) and [Gebeyehu et al. \(2013\)](#) also reported same results that prevalence was more in hot rainy season while lower in dry cold season. Higher prevalence in hot and humid months of the year might be due to increased humidity and temperature which favors the development of larvae. These findings are in congruent with the results of [Dhoot et al. \(2002\)](#), [Bhattacharya and Ahmed \(2005\)](#) and [Rafiullah et al. \(2011\)](#).

Table 2: Specie wise prevalence of gastrointestinal parasites.

Parasite	Cow (n=1130)	P value	Buff (n=336)	P value	Sheep (n=146)	P value	Goat (n=89)	P value
Trichostrongylus	371	0.00	18	0.00	15	0.00	5	0.01
Fasciola	69		108		-		-	
Amoeba	116		64		-		1	
Hemonchus	8		1		88		35	
Eimeria	14		2		-		-	
Monezia	3		2		-		-	
Mixed	3		2		-		18	
Toxocara	3		-		-		-	

Prevalence of gastrointestinal parasites was recorded as 56.1% in Peshawar, 57.2% in Charsadda, 43.5% in Nowshera and 59.4% in Khyber agency and this difference was recorded as highly significant. Prevalence was recorded as 55.2% in adults and 61.9% in young and this difference was statistically significant ($P < 0.05$). Similar result was also recorded by [Gwaze et al. \(2009\)](#) that prevalence is higher in young goats as compare to adults. This statement is also supported by the findings of [Regassa et al. \(2006\)](#) that young animals are more susceptible to parasitic infections. Sample size was lower in young which might be the reason for higher prevalence of GI parasites in young comparatively.

Sex wise prevalence was 55.1% for female and 65.6% for male and was found highly significant ($P < 0.01$) ([Table 3](#)). [Marskole et al. \(2016\)](#) also reported the same results that intestinal parasites were more in males as compare to female. Higher prevalence in male might be due to the neglected attitude of owners to male as compare to females. This statement is supported by the findings of [Fikru et al. \(2006\)](#), [Bilal et al. \(2009\)](#), and [Awraris et al. \(2012\)](#) from different parts of the world.

Table 3: Prevalence of gastrointestinal parasites with respect to season, location, species, age and sex.

Variables	Category	N	Prevalence (%)	P value
Season	Winter	394	35	0.00
	Spring	301	70.4	
	Summer	616	60.3	
	Autumn	390	57.9	
Location	Peshawar	1304	56.1	0.00
	Charsadda	180	57.2	
	Nowshera	101	43.5	
	Khyber Agency	116	59.4	
Species	Cow	1130	51.5	0.00
	Buffalo	336	58.3	
	Sheep	146	73.9	
	Goat	89	68.5	
Age	Adult	1588	55.2	0.029
	Young	113	61.9	
Sex	Female	1602	55.1	0.00
	Male	99	65.6	

Conclusions and Recommendations

It can be concluded from results of the study that

Trichostrongylus is most prevalent in cattle while in fasciolosis was recorded higher in Buffaloes. In sheep and goats *Haemonchus contortus* is the most prevalent GI parasite. Season play important role in growth and development of parasites and higher prevalence was recorded in hot humid months of the year.

Novelty Statement

Ruminants are susceptible to variety of helminthes but fasciolosis is very common in large rumi-nants, especially buffaloes, while *Haemonchosis* is prevalent in small ruminants.

Author's Contribution

Said Sajjad Ali Shah: Sample collection and processing, analysis of data and wrote the manuscript.

Muhammad Ilyas Khan and Faisal Ahmad: Helped in drafting of the manuscript.

Aziz Ullah: Sample collection.

Hayat Ullah: Compilation of data.

Conflict of interest

The authors have declared no conflict of interest.

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