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Research Article

Study on Prevalence of Gastro Intestinal Helminths of Goat in District Abbottabad

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Abstract

The study was aimed to detect the prevalence of gastrointestinal tract (GIT) parasites in goats. The study was conducted in different tehsils of District Abbottabad viz; Abbottabad, Havelian, Sherwan and Nathiagali. A total of 200 faecal samples (50 samples from each tehsils) were collected randomly from goats of different age groups (< 1 year, 1 - 2 years and > 2 years) and of either sex. Out of 200 faecal samples examined for the presence of helminth parasites, 58 (29.0%) were positive for the eggs of different GIT helminths. The species identified in this study were: *Trichostrongylus axei (12.5%)*, *Haemonchus contortus (7.00%), Trichuris ovis (5.5%),* and *Nematodirus spp (4.00%).* The highest prevalence of GIT parasite in goats was recorded in Havelian (46%) followed by Abbottabad (32%), Sherwan (24%) and Nathiagali (14%). The result of GIT parasite was statistically significant in different Tehsils. The effect of sex on prevalence of GIT helminths was high (31%) in female as compared to male (25.33%). Among tehsils highest prevalence (46.00%) was recorded in Havelian, while it was lowest (14.00%) in Nathiagali. Regarding the age, highest prevalence was 36.67% in 1 - 2 years of age group followed by 25.00% and 21.43% in above two years and less than one year respectively. Statistically no significance was observed comparing the results of sex and age.

It was concluded that GIT parasites are prevalent (29%) in examined goats and has affected age, sex and animal management regimes. Therefore, it is recommended that proper management practices, regular fecal examination and training of farmers about methods of prevention to boost their economy.

Keywords: *Gastrointestinal Parasites; Goat; Age; Sex; Prevalence*

Introduction

Rearing of goats is a traditional profession of most of the nomadic tribes [1]. The world's goat population in 2004 was estimated to be over 743 million of which most of them were found in developing countries [2,3]. Goat population in Pakistan is about 64.9 million in which 9.59 million are in Khyber Pakhtunkhwa [4]. It increases the economic status of rural poor. Goats are representing an important

source of animal protein in third world countries, such as Pakistan, Due to their small size, goats are easily and conveniently slaughtered for home consumption. Goat's milk is closer in composition to human milk than milk from the cow and therefore an excellent baby food. Goats form a major investment and contribute a big percentage of homes income and alleviate poverty [5].

Parasitic diseases have got unique importance as they cause high morbidity and huge economic losses (ranging from 20 to 25%) in the form of low wool, meat and milk production, retarded growth, morbidity and mortalities [1]. Due to extreme climate, unhygienic environment, improper management and close contact with infected animals, different parasites affect the goats. GIT parasitic infection is the important limiting factor affecting on small ruminant productivity, as the parasitism has a highly adverse effects on the small ruminant [6].

GIT parasites are found in all species of animals including goat and sheep. Young and underfed animals of both sexes and lactating animals are most susceptible for these parasites. GIT helminth parasites are a universal problem for both small and large-scale farmers. Different diseases and conditions share the clinical signs associated with GIT parasitism [4].

Quantitative and qualitative fecal examination is performed to confirm the infection and its severity by these helminths [7].

Aim of the Study

The current study was conducted to detect the prevalence of helminth parasites in goats and their correlation with sex and age of the animals in District Abbottabad, Khyber Pakhtunkhwa.

Materials and Methods

Study area

The cross sectional study was conducted to record the prevalence and control of gastrointestinal helminths in goats in Four Tehsils (Abbottabad, Havelian, Sherwan and Nathiagali) of Abbottabad district, Khyber Pakhtunkhwa (Figure 1).

Figure 1: *Map of the study area (District Abbottabad).*

Sample collection

A total of 200 fresh fecal samples were collected randomly from different surrounding areas of District Abbottabad. Samples were preserved in sterile containers and brought to the Parasitology Laboratory of Veterinary Research and Disease Investigation Center, Abbottabad for microscopic examination. Fecal samples were examined according to techniques as described by Zajac and Conboy 2006. The samples were examined for helminth identification and worm burden/load both qualitatively and quantitatively [4].

Qualitative examination

Direct fecal smear method

Small amount of feces was placed on a glass slide and a drop of water was added and mixed thoroughly. The glass slide was covered with a cover slip. The cover slip was moved around until it laid flat and was able to read through the smear. The slide was examined using the 10X and 40X objectives [8].

Floatation method

A 2.0g sample of fresh feces was added to 10 ml of the flotation solution (Saturated Sodium chloride) and mixed thoroughly, the suspension was poured into a test tube and more flotation solution was added to fill the tube to the top. A cover glass was placed on the top of the surface of the liquid and the tube and cover slip was left standing for 10 - 15 minutes. The cover slip was removed vertically and placed on a slide and then examined under microscope for the identification of helminths egg [9].

Sedimentation method

A sample of 3g of feces was mixed with 30ml of water and was strained through 80-mesh sieve. After that filtrate was centrifuged in a conical tube for 3 minutes at 1200 rotation per minute (rpm). Supernatant was discarded and process was repeated three times. 1 drop of 1% methylene blue was added to the suspension and then examined it microscopically [9].

Quantitative technique

McMaster technique (egg count)

Weigh 4 gram of feces and place it into a beaker after that add 56 ml of flotation fluid (Saturated Sodium chloride). Stir the contents of the beaker thoroughly with a fork, tongue depressor or spatula. Filter the faecal suspension through a tea strainer or double layer of cheesecloth or dental napkin into the second beaker. Stir the filtrate in the 2nd beaker with a Pasteur pipette. Stir fluid and fill first compartment of the McMaster counting chamber with the pipette and then fill the second compartment of McMaster. Allow the counting chamber to stand for 5 minutes. Examine the sample of the filtrate under the compound microscope. Count all eggs within the engraved area of both chambers of McMaster, ignoring those outside the squares and multiply into 50 to determined egg per gram (EPG) [10].

Data analysis

Data analysis was conducted for mean prevalence at 95% confidence interval. Chi-square test was used to analyze the significant difference among the proportions, whereas p-value < 0.05 was regarded as significant. The analytical software package Graph Pad Prism was used for the statistical analysis.

Results

The results revealed that the overall prevalence of gastrointestinal helminths was recorded as 29% in the goats in Abbottabad (Table 1). The highest percentage was recorded from Havelian, i.e. 46 and the lowest 14 percent from Nathiagali (Table 1).

S. No	Tehsil	No. of Samples examined	No. of goats infected	Percentage %
1	Abbottabad	50	16	32
2	Havelian	50	23	46
3	Sherwan	50	12	24
4	Nathiagali	50	7	14
Total		200	58	29

Table 1: *Tehsil wise prevalence percentage of gastrointestinal Helminths in goat.*

S. No	Specie of Parasite	No. of goats examined	No. of goats infected	Percentage %
1	*Trichostrongylus axei*	200	25	12.5
2	*Haemonchus contortus*	200	14	7.00
3	*Trichuris ovis*	200	11	5.5
4	*Nematodirus spp.*	200	8	4

Table 2: *Prevalence of different gastrointestinal nematode species in goats.*

Species identified

The helminth species identified in this study were: *Trichostrongylus axei*, *Haemonchus contortus, Trichuris ovis* and *Nematodirus* with frequency percentage of 12.5%, 7.00%, 5.5% and 4.00% respectively.

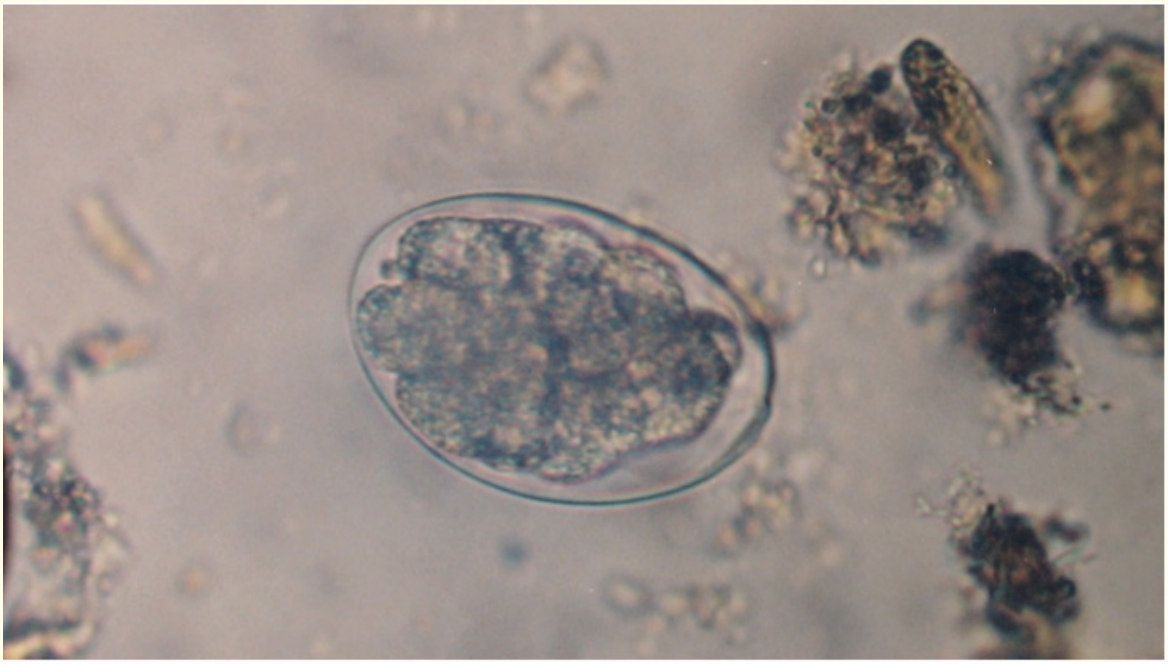

Figure 2: *Haemonchus contortus 400x.*

Figure 3: *Trichostrongylus axei 400x.*

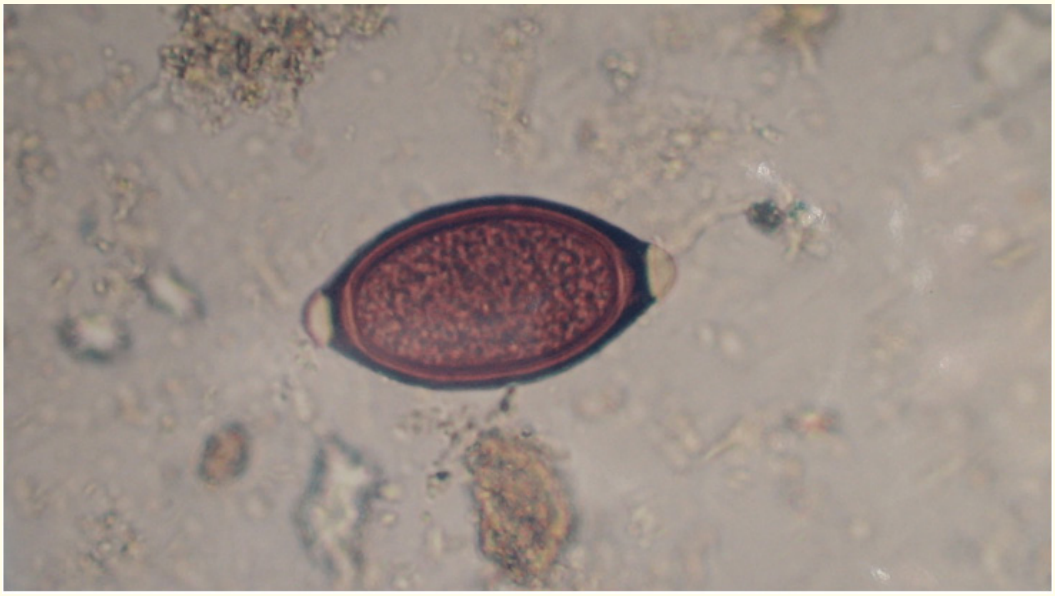

Figure 4: *Trichuris ovis 400x.*

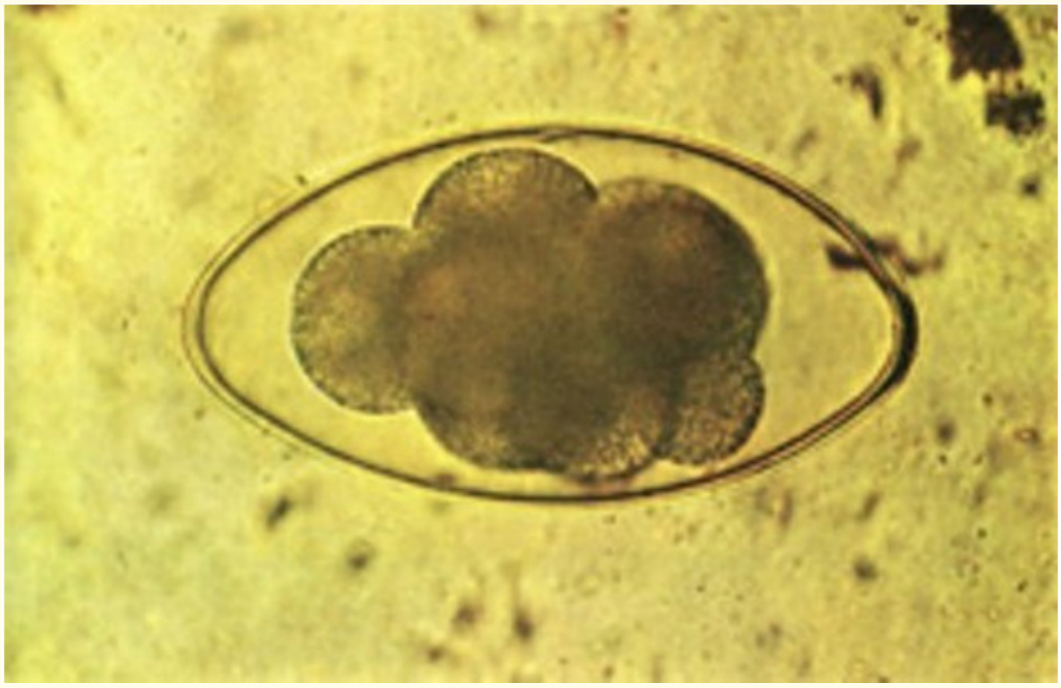

Figure 5: *Nematodirus spp 400x.*

S. No	Type of Infection	Specie of Parasite	No. Positive	Percentage* %
1	Pure (27.59%)	*Trichostrongylus axei*	7	12.06
		Haemonchus contortus	4	6.89
		Trichuris ovis	3	5.17
		Nematodirus spp.	2	3.44
2	Mixed (72.41%)	*T. axei + H. contortus + T. ovis*	16	27.58
		H. contortus + T. axei	13	22.41
		T. ovis + T. axei	8	13.79
		Nematodirus spp. + H. contortus	5	8.62

Table 3: *Prevalence of different gastrointestinal helminth species in goats.*

Rate of infection

The frequency of mixed type of infection was higher (72.41%) than single infection; 27.59%. The helminths found were *Trichostrongylus axei (*12.06%*), Haemonchus contortus (*6.89%*), Trichuris ovis (*5.17%*)* and *Nematodirus spp. (*3.44%*)* percentage respectively. Out of 42 goats infected with mixed infection of gastrointestinal helminths had *Trichostrongylus axei + Haemonchus contortus + Trichuris (13) Haemonchus + Trichostrongylus, Trichuris + Trichostrongylus and Nematodirus spp. + Haemonchus* respectively had 27.58%, 22.41%, 13.79% and 8.62% respectively.

Effect of sex on endo-parasites prevalence

The sex wise prevalence is elaborated in table below.

Effect of sex on occurrence of helminths in goats is presented in table 4. According to the results, the prevalence was high in female goats in Abbottabad (33.33%), Havelian (52.00%), Sherwan (28.13%) and Nathiagali (17.14%) in all four tehsils of Abbottabad as compared to male goats respectively. Infection in male was recorded as 29.41%, 32.00%, 22.22% and 13.33% in Abbottabad, Havelian, Sherwan and Nathiagali respectively. There are no significant effect in relation to sex in our study at P > 0.05 (Table 4).

S. No	Tehsil	Gender of animals	Animals examined	No. of goat Observed	No. of Expected	Chi. Square	P Value
1	Abbottabad	Male	17	5	5.45	0.04	0.8124
		Female	33	11	10.55	0.02	
		Total	50	16	16	0.05635	
2	Havelian	Male	25	8	10.5	0.60	0.275
		Female	25	13	10.5	0.60	
		Total	50	21	21	1.190476	
3	Sherwan	Male	18	4	4.68	0.10	0.6944
		Female	32	9	8.32	0.06	
		Total	50	13	13	0.15438	
4	Nathiagali	Male	15	2	2.4	0.07	0.757
		Female	35	6	5.6	0.03	
		Total	50	8	8	0.095238	

Table 4: *Effect of Sex on prevalence of gastrointestinal parasite infection in goat.*

Effect of age on endo-parasites prevalence

Out of 200 goats examined for gastrointestinal helminths 58 were found infected. The age of goats ranged between less than one to above two years. The goats were divided into three age groups i.e. less than one year, 1 - 2 years of age, above 2 years. Table 5 depicts the prevalence of gastrointestinal helminths in different age groups of goats. The prevalence was highest i.e. 36.67% in 1 - 2 years of age group followed by 25.00% and 21.43% in above two years and less than one year respectively. The Chi square test for differences of age groups proportion was non–significant P > 0.05 (Table 5).

S No	Age	Animal examined	Observed	Expected	Chi Sq.
1	1 - 12 months	70	15	20.3	1.384
2	1 - 2 years	90	33	26.1	1.824
3	Above 2 years	40	10	11.6	0.221
Total		200	58	58.00	3.429

Table 5: *Effect of Age on prevalence of gastrointestinal parasite infection in goat.*

Fecal egg counts (FECs)

The examination of eggs of helminths through quantitative technique using modified McMaster method for estimating the intensity of gastro intestinal helminths egg per gram (EPG) are presented in table 6.

Helminth species	Light infection		Moderate infection		Heavy infection	
	Range	Mean	Range	Mean	Range	Mean
*Trichostrongylus axe*i	100-500	280	500-2000	1140	2000+	2300
Haemonchus contortus	100-2000	390	2000-7000	2700	7000+	8100
Trichuris ovis	100-800	550	800-1600	1110	1600+	--
Nematodirus spp.	50-100	--	100-600	147	600+	--
T. axei + H. contortus + T. Ovis	50-800	440	800-1200	850	1200+	1560
H. contortus + T. Axei	50-800	370	800-1200	830	1200+	1300
T. ovis + T. Axei	50-800	604	800-1200	1155	1200+	1700
Nematodirus spp. + H. Contortus	50-800	558	800-1200	957	1200+	1350

Table 6: *Infection rate (EPG) of gastro-intestinal helminths in goats.*

Discussion

The present study was conducted to know the prevalence of helminth parasites in goats at district Abbottabad, Khyber Pakhtunkhwa, Pakistan. The overall prevalence of gastrointestinal parasite infection was recorded as 29.00% in goat.

The infection percentage in goats was recorded 29%. These findings are in disagreement with Gadahi., *et al*. [11] who reported 63.50% helminths prevalence in goats in Islamabad. The results of Asif., *et al*. [12] indicated that the overall prevalence of helminths parasite in goats as 63.70% in Rawalpindi. The contrast finding may be due to climatic variation and different geographical location of study area.

Gender wise Infection rate in goats was observed low in males (25.33%) and high in female (31.20%) but statistically it was non-significant ($P > 0.05$). Our studies are in agreement with Fazlullah [13] who recorded prevalence of goat GIT parasite infection in male low (24.45%) and high in female (34.67%). Dagnachew., *et al*. [14] also reported a higher prevalence of helminths infection in female animals rather than males.

The age-wise prevalence of GIT parasite infection in goat aging 1 - 2 years was high and in goats above 2 years was low. Infection rate in goats was noted as 21.43, 36.67and 25% in age of 1 - 12 months, 1 - 2 years and above 2 years respectively. The results showed a non-significant difference among the age of the animals, it is in contrast to report by Tefera., *et al*. [15] and Hassan., *et al*. [16] who reported that a not significant difference among the sex and season of the breeds but a significant difference among the age of the animals. These results are also supported by Okorafor., *et al*. [17] who observed more infection in age group of less than 2 years. The results of this study are in agreement with Sohail., *et al*. [4] who has also reported more infection rate in young goats than older animals. Fazlullah [13] also determined the same results that the age-wise prevalence of GIT parasite infection in goat aging 1 - 2 years was high (41.82%) and above 2 year in goat was low (20%).

Nematodes were more prevalent in the study area than other genera which agreed with Tefera., *et al*. [15] who reported the dominance of nematodes in their work. Present study showed pure number of helminth present in gastrointestinal tract in goat. *Trichostrongylus axei* (43.75%) helminths were found more common followed by *Haemonchus contortus, Trichuris ovis* and *Nematodirus* with frequency

percentage of 25.00%, 18.75% and 12.50% respectively. This study is disagreed with Fazlullah (2016) who found more percentage of *Haemonchus contortus* (35.14%) with *Trichuris ovis* (24.32%) and *Nematodirus* (18.92%).

In the present study, goats reared in different locations were infected with GIT parasites, though no statistically significant association ($P > 0.05$) was observed between prevalence and locations. Previous studies indicate that different climatic conditions in different locations are important factors for development, multiplication and survival of nematode parasites [18] and these could be converted to differences in the risk of acquiring the parasites between animals managed under different locations.

Conclusion

In current study it was concluded that occurrence of GIT parasites is affected by age, sex of animals, managemental regimes and climatic conditions.

Recommendation

It is recommended that proper management, regular fecal examination and training of farmers to boost the economy of the farmers.

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