

Epidemiology of Haemonchosis in sheep and Goats under different managemental conditions

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Abstract

Epidemiological studies were undertaken at slaughterhouses, livestock farms and veterinary hospitals under the different climatic conditions existing in Punjab province. Infection rate of haemonchosis was 35.44, 38.04 and 36.83 per cent, respectively in slaughtered sheep and goats, sheep and goats at livestock farms and at veterinary hospitals. Overall the highest (43.69%) seasonal prevalence in all types of sheep and Goats was recorded during summer; followed by autumn (38.46%), spring (37.12%), while the lowest (28.79%) was recorded during winter. It was noticed that animals of either sex are equally affected. A higher infection rate was recorded in animals below 9 months than above 9 months of age and did not show any significant difference.

Keywords: *Haemonchosis*, Epidemiology, Sheep, Goat, Management.

Introduction

Haemonchosis caused by *Haemonchus contortus* is a predominant, highly pathogenic and economically important disease of sheep and goats (Mortensen *et al.*, 2003). These parasites are common blood feeders that cause anaemia and reduced productivity and can lead to death in heavily infected animals (Githigia *et al.*, 2001). It has been estimated that each worm sucks about 0.05 ml of blood per day by ingestion or seepage from lesions (Urquhart *et al.* 2000). *Haemonchosis* is primarily a disease of tropical and sub tropical regions. However high humidity, at least in microclimate of the faeces and the herbage is also essential for larval development and their survival. It is a serious health problem, which causes lower production due to high morbidity, mortality and cost of treatment and control measures. The frequency and severity of the disease largely depends on the rainfall in any particular area. Surveys in countries around the world have shown that amongst domestic animals, sheep and Goats suffer more frequently from *haemonchosis* (Maqsood *et al.*, 1996); Nwosu *et al.*, (2007); Tariq *et al.*, (2008).

In developed countries, the data on epidemiology of various parasites are published in an efficient manner as an aid to combat infections more effectively. In contrast, in developing countries little published information exists and data on the epidemiological aspect of parasitic infections, particularly on

haemonchosis is rare. Keeping in view the importance of the disease the present study is designed to record the prevalence of *haemonchosis* in sheep and Goats in Punjab (Pakistan) in relation to meteorological factors, host, age and physiological status and is an attempt to bridge the gap in knowledge of these aspects.

Materials and Methods

Survey of haemonchosis in slaughterhouses. To record the prevalence of *haemonchosis* visiting the abattoirs at weekly intervals each month during the study period i.e., September 2006 to August 2007 carried out a survey of 4 slaughterhouses in Lahore, Gujranwala, Sheikhupura and Kasur. Post-mortem examinations of slaughtered animals were carried out and abomasa were checked for the presence of the parasites. The date of collection, the number of total and infected animals was recorded, the age sex, area of such animals was also maintained.

Haemonchosis in live animals. Epidemiological studies were performed at various Abattoirs, livestock farms and veterinary hospitals in the districts of Lahore, Gujranwala, Sheikhupura and Kasur. During the studies the seasonal prevalence was recorded. For this purpose the year was divided into 4 seasons as follows: winter (November-February), spring (March-April), summer (May-August), and autumn (September-October). The prevalence of *haemonchosis* in relation to temperature, humidity, age and sex was also maintained.

Table- 1: Month wise prevalence of haemonchosis in sheep and goats.

Month	Slaughter house		Livestock Farms		Veterinary Hospitals		Over all %	
	No. Affected/ No. Examined	% of Infection	No. Affected/ No. Examined	% of Infection	No. Affected/ No. Examined	% of Infection	No. Iffected/ No. Examined	% of Infection
September,2006	140/400	35	171/400	42.75	151/400	37.75	462/1200	38.5
October, 2006	142/400	35.5	171/400	42.75	148/400	37	461/1200	38.42
November,2006	109/400	27.25	131/400	32.75	99/400	24.75	339/1200	28.25
December,2006	110/400	27.5	134/400	33.5	100/400	25	344/1200	28.67
January, 2007	97/400	24.25	128/400	32	117/400	29.25	342/1200	28.5
February,2007	103/400	25.75	142/400	35.5	114/400	28.5	359/1200	29.92
March, 2007	161/400	40.25	152/400	38	142/400	35.5	455/1200	37.92
April, 2007	143/400	35.75	146/400	36.5	147/400	36.75	436/1200	36.33
May, 2007	170/400	42.5	155/400	38.75	166/400	41.5	491/1200	40.92
June, 2007	171/400	42.75	153/400	38.25	201/400	50.25	525/1200	43.75
July, 2007	173/400	43.25	179/400	44.75	202/400	50.5	554/1200	46.17
August, 2007	182/400	45.5	164/400	41	181/400	45.25	527/1200	43.92
Overall	1701/4800	35.44	1768/4800	36.83	1826/4800	38.04	5295/14400	25.58

Parasitological techniques: Haemonchus recovered from each of the infected abomasum during the survey in slaughterhouses were counted and morphologically identified (Zajac *et al.*, 2006). Faecal samples were examined by direct smear, flotation and sedimentation techniques for the presence of Haemonchus eggs (Martin *et al.*, (1990). The counting of eggs was performed by McMaster egg counting technique (Anon., 1977). Haemonchus eggs were identified on the basis of morphology (Valderrabano *et al.*, 2001). Monthly visit was paid on each farm and veterinary hospitals and samples were collected and brought to Diagnostic Laboratory, Department of Parasitology, University of Veterinary and animal Sciences, Lahore-Pakistan.

Meteorological data: Day-to-day informations on maximum and minimum temperature, humidity, rainfall and pan-evaporation were collected from the meteorological records of Lahore. The monthly averages for each weather factor were calculated.

Results

Epidemiology of haemonchosis: During the study year (September 2006 to August 2007) 4800 sheep and goats were examined at slaughterhouses, 4800 at livestock farms and 4800 at veterinary hospitals each of which 1701 (35.44%) were slaughtered, 1768 (36.83%) at livestock farms, and 1826 (38.04%) at Veterinary Hospitals were infected with *Haemonchus contortus*. Overall infection rate was 5295 (25.58%) (Table 1). It was evident from (Table 1) that the highest prevalence of *haemonchosis* was recorded in slaughterhouse sheep and goats during the month of July (43.25%), followed by June (42.75%) and whereas the lowest prevalence (24.25%) was recorded during January. The highest prevalence of *haemonchosis* was

recorded in Livestock Farms during the month of July (44.75%), followed by September, October (42.75%) and whereas the lowest prevalence 32.0% was recorded during January (Table 1). Similarly the highest prevalence of *haemonchosis* was recorded in Veterinary Hospitals during the month of July (50.5%), followed by June (50.25%) and whereas the lowest prevalence (24.75%) was recorded during November (Table 1).

Among the slaughtered sheep and goats the highest overall prevalence was recorded during summer (43.5%) followed by spring (38.0%) then autumn (35.25%), whereas the lowest prevalence (26.19%) was recorded during winter. At livestock farms, the highest (42.75%) overall prevalence was recorded during autumn, followed by summer (40.69%) then spring (37.25%) whereas the lowest prevalence was recorded during winter (33.31%). At veterinary hospitals a peak of Haemonchus infection was recorded during summer with an infection rate of 43.69%, followed by 38.46% during autumn then (37.12%) spring, while the lowest (28.79%) prevalence was recorded during winter. Hence, the overall highest incidence of the year in sheep and goats was recorded during summer (43.69%), followed by autumn (38.46%) then spring (37.12%), while the lowest (28.79%) prevalence was recorded during winter (Table 2).

It was also noted that the highest prevalence was recorded at Gujranwala followed by Sheikhpura then Kasur and the lowest at Lahore.

The occurrence of *haemonchosis* was more frequently recorded in younger (below 9 months) sheep and goats (39.91%) than in older (above 9 months) animals (33.23%) (Table 3). Analysis of the disease pattern in male and female sheep and goats revealed no significant difference (Table 3).

Table- 2: Season wise prevalence of haemonchosis in sheep and goats.

Season	Slaughter house		Livestock Farms		Veterinary Hospitals		Over all %	
	No. Affected/ No. Examined	% of Infection	No. Affected/ No. Examined	% of Infection	No. Affected/ No. Examined	% of Infection	No. Iffected/ No. Examined	% of Infection
Autumn	282/800	35.25	342/800	42.75	299/800	37.37	923/2400	38.46
Winter	419/1600	26.19	533/1600	33.31	430/1600	26.87	1382/4800	28.79
Spring	304/800	38	298/800	37.25	289/800	36.12	891/2400	37.12
Summer	696/1600	43.5	651/1600	40.69	750/1600	46.87	2097/4800	43.69

Prevalence in relation to meteorological factors:

The meteorological data of Lahore, Gujranwala, Sheikhpura and Kasur districts for the period September 2006 to August 2007 were recorded. A positive correlation of disease prevalence to minimum temperature, morning and evening humidity and rainfall has been recorded. Statistical analysis revealed a significant correlation ($P < 0.01$) between disease prevalence and humidity, rainfall and high temperature.

Discussion

The occurrence of *haemonchosis* in an area is influenced by a multifactorial system, which comprises hosts, parasite and environmental effects. *Haemonchus* are common blood feeders that cause anaemia and reduced productivity and can lead to death in heavily infected animals. It has been estimated that each worm sucks about 0.05 ml of blood per day by ingestion or seepage from lesions (Urquhart *et al.* 2000). *Haemonchosis* is primarily a disease of tropical and sub tropical regions. However high humidity, at least in microclimate of the faeces and the herbage is also essential for larval development and their survival. It is a serious health problem, which causes lower production due to high morbidity, mortality and cost of treatment and control measures.

In the present study, epidemiological data on *haemonchosis* were collected from sheep and goats in slaughterhouses, at livestock farms and at the veterinary hospitals of Lahore, Gujranwala, Sheikhpura and Kasur districts of Punjab province. When the data on seasonal prevalence in all the four groups of sheep and goats were analyzed it was observed that the highest prevalence of *haemonchosis*

occurred during summer, followed by autumn and spring, while it was the lowest during winter. These findings are consistent with those of Agyei, (1991); Maingi *et al.*, (1993) Waruiru *et al.*, (2001); Vlasoff *et al.*, (2001); Nginyi *et al.*, (2001); Shahadat *et al.*, (2003); Khajuria and Kapoor, (2003); Lateef *et al.*, (2005); Keyyu *et al.*, (2005). Maryah (2005), Nwosu *et al.*, (2007). They reported that the high biotic potential of *H. contortus* results in rapidly assuming dominance at times when environmental conditions on pasture are favourable for the development and survival of the free-living stages. They reported that high prevalence and seasonal abundance of eggs and adult stages of *Haemochus* parasites of sheep and goats during hot humid season. Lindqvist *et al.*, 2001 attributed several factors i.e., warmer and wetter grazing seasons, the greater time animals spend on pasture, ineffective deworming practices or the development of anthelmintic resistance in this parasite. Nwosu *et al.*, (2007) reported the prevalence and seasonal abundance of the egg and adult stages of *Haemonchus* parasites of sheep and goats and revealed that 43.1% and 55.8% of the samples, respectively, were positive for *haemonchosis*. The prevalence showed a definite seasonal sequence that corresponded with the rainfall pattern in the study area during the period. In both sheep and goats, counts of *Haemonchus* egg increased with the rains and peak levels were attained during rainy season. Adult worm burdens were generally low and showed seasonal variation that corresponded with the rainfall pattern in the study area during the period. *Haemonchus* species attained peak counts together in both goats (June) and sheep (August). From the results it was indicated that

Table- 3: Age and Sex wise prevalence of haemonchosis in sheep and goats.

Season	Slaughter house		Livestock Farms		Veterinary Hospitals		Over all %	
	No. Affected/ No. Examined	% of Infection	No. Affected/ No. Examined	% of Infection	No. Affected/ No. Examined	% of Infection	No. Iffected/ No. Examined	% of Infection
Age								
< 9 Months	1067/2706	39.43	977/2466	39.62	1000/2455	40.73	3044/7627	39.91
> 9 months	634/2094	30.28	849/2334	36.37	768/2345	32.75	2251/6773	33.23
Sex								
Male	761/2112	36.03	797/2151	37.05	798/2207	36.16	23566470	36.41
Female	940/2668	34.97	1029/2649	38.84	970/2593	37.41	2939/7930	37.06

environmental conditions during summer were quite favorable for the development and completion of *Haemonchus contortus* life cycle that corresponded with the rainfall pattern in the study area. The seasonal variations in *Haemonchus* faecal egg counts were consistent between the different age and sex classes of sheep during the period of study,

The present study revealed that prevalence was higher in animals below 9 months of age than above 9 months. These results are closely related to the findings of Assoku, (1981); Gibbs, (1986); Asanji & Williams, (1987); Pal & Qayyum, (1992); Maqsood *et al.*, (1996); Vlasoff *et al.*, (2001); Magona and Musisi, (2002); Vanimisetti *et al.*, (2004); Lateef *et al.*, (2005). The effect of age on faecal egg counts was highly significant ($P < 0.01$). Maqsood *et al.*, (1996) reported that the prevalence of *haemonchosis* was higher in both sheep and goats less than two years of age (67.1%; 47.8%) compared with those of above two years (40.4%; 33.3%). Worm burden was higher in sheep as compared with goats. It was recognized that sheep below 9 months of age are more susceptible to parasite infection than above 9 months of age, Gamble and Zajac, (1992); Watson *et al.*, (1994); Colditz *et al.*, (1996). This may be due to the fact that with the advancement of age, vigor of the animal become better and they develop resistance against the parasitic diseases (Silverman & Patterson, 1960). The results of the present study are in line with the above-mentioned workers.

In the present study it was noted that there was no significant difference of animals of either sex, prevalence in male was 36.71% and in females 37%. However, most of the researchers have observed higher rate of *haemonchus* infection in female hosts compared with males Asanji & Williams, (1987); Pal & Qayyum, (1992); Maqsood *et al.*, (1996); Komoin *et al.*, (1999); Valcarcel & Romero, (1999) Gauly *et al.*, (2006). Maqsood *et al.*, (1996) reported that the rate of infection was higher (74.6%) in females than male (59.1%) sheep; whereas there was no difference in the prevalence between male and female goats.

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