Short Paper

Epidemiology of Paramphistomiasis in buffaloes under different managemental conditions at four districts of Punjab province,Pakistan

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Summary

Epidemiological studies were undertaken at slaughter-houses, livestock farms, veterinary hospitals and on household buffaloes under climatic conditions of four different districts of Punjab province. Infection rate was 22.29, 28.33, 17.08 and 12.75%, respectively in slaughter-house buffaloes, livestock farm buffaloes, veterinary hospital buffaloes and household buffaloes. Overall the season wise the highest prevalence (28.33%) was recorded in buffaloes at livestock farms followed by slaughtered (22.29%) and veterinary hospital buffaloes (17.08%). While the lowest (12.75%) prevalence was recorded in household buffaloes during spring. It was also observed that the higher infection rate was recorded in younger buffaloes (below two years of age) than older (above two years of age) where as sex wise the prevalence indicated that male buffaloes were more commonly affected than females. Snails belonging to genera *Bulinus, Lymnaea* and *Planorbis* were also observed which are responsible for the transmission ofparamphistomiasis.

Key words: Epidemiology, Paramphistomiasis, Buffaloes, Punjab, Pakistan

Introduction

Paramphistomiasis is a widespread parasitic disease of ruminants and causes heavy losses. In Pakistan the incidence of both *Paramphistomum cervi* and *P. microbothrium* has been recorded. These parasites wander in the duodenal mucosa resulting in severe erosions. In heavy infection, they cause enteritis characterized by oedema, haemorrhages and ulceration whereas adult flukes in the forestomach are well tolerated. The immature fluke causes high degree of morbidity as well as mortality (Panda, 1985). In heavy duodenal infection, there are also rectal haemorrhages followed by a period of prolonged straining (Urquhart *et al*., 2000). Paramphistomiasis thus causes anaemia, diarrhoea, dehydration, loss in weight, low milk and meat yield and even death.

The incidence of the disease is increasing every year in Pakistan. Since fresh water snails are obligatory intermediate hosts therefore, they must be controlled. In Pakistan fresh water snails are of considerable medical and veterinary importance and found throughout the year (Tanveer and Khan, 1989). The climatic conditions of Pakistan are favorable for the development and growth of fresh water snails. Keeping in view the importance of this disease, the present study was designed to record the prevalence of paramphistomiasis in buffaloes at four different districts of Punjab province.

Materials and Methods

Prevalence of paramphistomiasis in slaughtered animals

To record the prevalence of paramphistomiasis in buffaloes, a survey of four slaughter-houses in Lahore, Sheikhopura,

Gujranwala and Kasur was carried out at monthly intervals from November (2002) to October (2003). Post-mortem examination of slaughter animals was carried out and duodenum, rumen and reticulum were checked for the presence of young and adult flukes. Faecal samples of these animals were collected before slaughtering and were examined for the presence of eggs of paramphistome flukes.

Paramphistomiasis in live animals

For this purpose survey of animals at livestock farms, veterinary hospitals and household animals in the districts of Lahore, Sheikhopura, Kasur and Gujranwala was carried out. During the study the month and season wise prevalence was recorded. For this purpose, the year was apportioned into 4 seasons, spring (March-April), summer (May-August), autumn (September-October) and winter (November-February). The prevalence in relation to age and size was also noted.

Parasitological techniques

Fluke recovered from each of infected animals during the survey was counted and morphologically identified as Foreyt (2001). Faecal samples were examined by direct smear, floatation and sedimentation techniques for the presence of fluke eggs (Urquhart *et al*., 2000). The counting of eggs was performed by the Mc Master egg counting technique (Foreyt, 2001). Paramphistomes eggs were identified on the basis of morphology (Soulsby, 1982; Foreyt, 2001).

Meteorological data

Information on maximum and minimum temperature, humidity, rainfall and pan evaporation was collected daily from the meteorological records of Lahore. The monthly averages for each weather factor were collected.

Results

During the one year period of this study from November (2002) to October (2003), a total of 2400 buffaloes at slaughter-houses and 7200 live buffaloes (2400 at farms, 2400 at veterinary hospitals, and 2400 household buffaloes) were examined for param-phistomiasis. Of these, 535 (22.29%) cases of slaughtered buffaloes, 680 (28.33%) at farms, 306 (12.75%) of households and 410 (17.08%) at veterinary hospitals, were infected with param-phistomiasis. The overall infection rate was (20.11%) (Table 1). It was evident from Table 1 that the highest prevalence of paramphistomiasis in slaughtered buffaloes (43%) and buffaloes at livestock farms (52%) was recorded during the month of August followed by September, whereas the lowest prevalence (11.5%) and (16%) was recorded during December and February, respectively. The highest prevalence at veterinary hospital and household buffaloes (28%) and (20.5%) was noted during the month of September and August, respectively and the lowest prevalence (10%) and (8.5%) was recorded during the month of February at veterinary hospital and household buffaloes, respectively (Table 1).

Among the slaughtered, livestock farm, veterinary hospital and household buffaloes the highest prevalence was recorded during autumn, 40.05, 43.5, 24.75 and 19%, respectively and the lowest in slaughtered buffaloes (14%) and buffaloes at livestock farms (17%) was recorded during spring, whereas in buffaloes at veterinary hospital and household the lowest prevalence was recorded during winter, (12.25%) and (9.87%), respectively (Table 2).

The occurrence of paramphistomiasis was more frequently recorded in younger buffaloes (29.57%) than adult (13.89%) (Table 3). Analysis of the disease pattern in male and female buffaloes revealed that no significant difference was observed. The prevalence was slightly higher in male buffaloes than females (Table 3). The highest prevalence was recorded at livestock farms (28.33%) followed by slaughtered (22.29%) and veterinary hospitals (17.08%), while the lowest (12.75%) was recorded in household buffaloes (Table 1).

It was also noticed that the highest prevalence was recorded at Gujranwala followed by Sheikhopura and Lahore, respectively, while the lowest was at Kasur.

Prevalence in relation to meteorological

factors indicated that there was a positive correlation of disease to minimum temperature, humidity and rainfall. Statistical analysis revealed a significant correlation between disease and rainfall. Snails belonging to genera *Bulinus, Lymnaea* and *Planorbis* were also observed which are responsible for the transmission of paramphistomiasis.

Discussion

The occurrence of paramphistomiasis in an area is influenced by a multifactorial system, which composes hosts, parasitic agents, transmission process and environmental effects. In natural foci of paramphistomiasis, the parasites and their intermediate and final hosts form an association of a potential epidemiological danger and it is important that the existence and localization of such an association should be recognized beforehand so that, they can be brought under control.

In the present study, epidemiological data on paramphistomiasis was collected from slaughtered and clinically ill buffaloes (at livestock farms, veterinary hospitals and households) of four districts of the Punjab province, Pakistan. When the data on seasonal incidence of paramphistomiasis were analysed, it was observed that higher incidence of paramphistomiasis occurred in the months of August, September and October in slaughtered buffaloes and clinically ill animals. Rolfe *et al*., (1991), Abrous *et al*., (1999) and Georgi *et al*., (1999) reported that the two most important factors influencing the incidence of paramphistomiasis are the temperature and moisture affect the hatching of fluke ova, and viability of encysting cercariae and the population of snails. They also emphasized that during autumn season, the temperature and moisture are favorable for the rapid propagation of the parasitic life cycle.

In the present study, the majority of the slaughtered animals were harbouring mature flukes in their rumen and reticulum while in clinically ill animals the incidence of infection was based on identification of eggs in the faeces. Therefore, the recorded incidence of the infection was mainly due to mature parasites.

To complete the life cycle (from egg to egg) paramphistome requires 17 to 18 weeks in summer and more than 20 weeks in winter in Pakistan to provide intermediate and final hosts, which are at liberty to pick up the parasite in its infective stage at proper time.

It was also noted that rainy season in Pakistan started in July and August, when the environmental temperature and humidity changes, so as to favour the emergence of cercariae from snail, due to this, metacercariae may show their existence in July, after the ingestion which produces the paramphistomiasis in animals. Metacercariae survived in herbage for up to 12 weeks depending on the environmental conditions. This assumption appears to be the reason for the high incidence of paramphistomiasis during August-September (summer and autumn). When young animals become infected (Gupta and Singh, 1990; Chaudhri *et al*., 1993; Dutta *et al*., 1995; Georgi *et al*., 1999), it was observed that higher incidence of paramphistomiasis occurred during autumn followed by summer and the lowest occurred during spring. These findings are closely related to those of Misra *et al*., (1997) and Georgi *et al*., (1999). An increased incidence of paramphistomiasis in buffaloes was noted in younger animals (below two years of age) (29.57%) than adults (above two years) (13.89%). The recorded findings corroborate the opinion of Chaudhri *et al*., (1993), Ludng *et al*., (1997) and Georgi *et al*., (1999). Though the explicit cause of the high incidence of the disease in younger animals can not be explained fully, it seems to be related to faulty management, poor nutrition and lowered resistance due to environmental factors and increased incidence of disease. In the present study it was found that infection was slightly lower in females than males, the reason seems to be related to social practice of keeping female under better management and feeding conditions in comparison to male which are generally let loose to graze freely in pastures; Chaudhri *et al*., (1993) and Ludng *et al*., (1997) found the same results.

Infection was highest at Gujranwala

followed by Lahore and Sheikhopura, respectively, while the lowest was at Kasur. This may be due to the fact that high level of infection was thought to be associated with the extension of the canal system providing additional areas of swamp and marsh where the buffaloes were exposed to infective larvae and metacercariae of helminths as was also noted by Chaudhri *et al*., (1993) and Misra *et al*., (1997).

In the present study the highest prevalence was recorded at livestock farms as was also noted by Cheruiyot and Wamae (1998) and Casset (1989). Snails belonging to genera *Bulinus*, *Lymnaea* and *Planorbis* were recorded in the present study. Similar genera were also recorded by Rimbaud and Diana (1991) and Abrous *et al*., (1998). The incidence of infected snails was highest during rainy season as was also recorded by Rolfe *et al*., (1991), Abrous *et al*., (2000) and Kunitskii (2000).

Control of paramphistomiasis may be achieved by removal of buffaloes from pasture or regular treatment during these periods. Strategic treatment during the dry season may reduce contamination of snail habitat and infectivity of the pasture in the following wet season.

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Table 1: Monthwise prevalence of paramphistomiasis in buffaloes

Month	Slaughter-house		Livestock farms		Vet. hospitals		Household		Overall %age	
	No. affected/ No. examined	%age of infection	No. affected/ No. examined	%age of infection	No. affected/ No. examined	%age of infection	No. affected/ No. examined	%age of infection		
Nov. 2002	35/200	17.5	60/200	30	29/200	14.5	22/200	11	146/800	18.25%
Dec. 2002	23/200	11.5	33/200	16.5	24/200	12	19/200	9.5	99/800	12.37%
Jan. 2003	36/200	18	54/200	27	25/200	12.5	21/200	10.5	136/800	17%
Feb. 2003	30/200	15	32/200	16	20/200	10	17/200	8.5	99/800	12.37%
Mar. 2003	26/200	13	33/200	16.5	27/200	13.5	22/200	11	108/800	13.5%
Apr. 2003	30/200	15	35/200	17.5	32/200	16	19/200	9.5	116/800	14.5%
May 2003	28/200	14	39/200	19.5	29/200	14.5	22/200	11	118/800	14.75%
Jun. 2003	25/200	12.5	35/200	17.5	34/200	17	20/200	10	114/800	14.25%
Jul. 2003	54/200	27	81/200	40.5	38/200	19	27/200	13.5	200/800	25%
Aug. 2003	86/200	43	104/200	52	53/200	26.5	41/200	20.5	284/800	35.5%
Sep. 2003	85/200	42.5	91/200	45.5	56/200	28	40/200	20	272/800	34%
Oct. 2003	77/200	38.5	83/200	41.5	43/200	21.5	36/200	18	239/800	29.87%
Overall	535/2400	22.29	680/2400	28.33	410/2400	17.08	306/2400	12.75	1931/9600	20.11%

Table 2: Seasonwise prevalence of paramphistomiasis in buffaloes

Season	Slaughter-house		Livestock farms		Vet. hospitals		Household		Overall %age	
	No. affected/ No. examined	%age of infection	No. affected/ No. examined	%age of infection	No. affected/ No. examined	%age of infection	No. affected/ No. examined	%age of infection		
Winter	124/800	15.5	179/800	22.38	98/800	12.25	79/800	9.87	476/3200	14.88%
Spring	56/400	14	68/400	17	59/400	14.75	41/400	10.25	214/1600	13.88%
Summer	193/800	24.12	259/800	32.37	154/800	19.25	110/800	13.75	716/3200	22.37%
Autumn	162/400	40.05	174/400	43.5	99/400	24.75	76/400	19.0	511/1600	31.94%

Table 3: Age and sex wise prevalence of paramphistomiasis in buffaloes

Parameter		Slaughter-house		Livestock farms		Vet. hospitals		Household		Overall %age	
		No. affected/ No. examined	%age of infection	No. affected/ No. examined	%age of infection	No. affected/ No. examined	%age of infection	No. affected/ No. examined	%age of infection		
Age	Below 2 yrs	305/915	33.33%	386/1120	34.46%	208/880	23.63%	228/896	25.44%	1127/3811	29.57
	Above 2 yrs	230/1485	15.49%	294/1280	22.97%	202/1520	13.29%	78/1504	5.19%	804/5789	13.89
Sex	Male	357/1590	22.45%	464/1610	28.81%	210/1554	13.51%	164/874	18.76%	1195/5628	21.23
	Female	178/810	21.97%	216/790	27.34%	200/846	23.64%	142/1526	9.30%	736/3972	18.52