

Prevalence of Fasciolosis in Buffaloes of Bahawalpur, Punjab, Pakistan

Abul Hasanat*, Nuzhat Sial, Muhammad Shafiq Chaudhary, Muazzam Ali, Sumaira Kausar
Department of Life Sciences, The Islamia University of Bahawalpur, Pakistan.

*Correspondence: ahzoologist95@gmail.com

Abstract

Fasciolosis is a trematode borne parasitic disease that infects liver of large ruminants widely prevalent throughout the world. During the present study fecal samples from buffaloes were collected on random basis from the all tehsils of Bahawalpur district from February 2012 to October 2012. Of total 1800 fecal samples, 284 (15.8%) were found to be positive. Highest prevalence was recorded in Yazman (21.7%) followed by Bahawalpur (16.7%), Khairpur (15.6%), Hasilpur (14.4%) and the lowest was recorded in Ahmedpur (10.6%). Statically chi-square (χ^2) showed non significant ($p>0.05$) difference between all areas. Monthly overall highest prevalence was recorded in September (31%), while the lowest was found in the month of May (3.5%). Statistically a significant ($p<0.05$) difference was recorded in all months. Overall highest seasonal wise prevalence was found in autumn (28.3%) followed by winter (21%), summer (12%) and lowest in spring (8.3%). In age wise prevalence the adult buffaloes were highly (19.9%) infected than young ones (5.3%). Statistically a significant difference ($p<0.05$) was found between all seasons and age groups. Gender wise the prevalence was slightly higher but statistically non significant ($p>0.05$) in females (15.9%) than males (15.1%). Bahawalpur (Pakistan) has a significant prevalence (%) of fasciolosis that may cause economic loss.

Keys word: Fasciolosis, buffaloes, Bahawalpur, prevalence.

1. Introduction

Livestock and their products are the major source of animal's proteins. But parasitism is the main barrier which limits livestock productions. Parasitic diseases not only cause mortality of animals, and also have direct effects in term of reduced production of milk, meat, wool, hide production; infertility and loss of stamina of working animals and especially zoonotic impact on human health are considerably greater (Baker & Muller, 1988). Helminthiasis, pose a serious health threat and a limitation to the productivity of ruminants due to the associated morbidity, mortality, cost of treatment and control measures (Nwosu *et al.*, 2007). The gastro- intestinal tract (GIT) of animals harbor a large variety of parasites majorly helminthes, that causes clinical and sub clinical parasitism. These parasites severely affect the health status of animals and thus cause great economic losses to the livestock industry. In Pakistan parasitic infestation is quite prevalent and cost about 26.5 million rupees per annum to the livestock industry (Anwar *et al.*, 1995; Irfan, 1984). The prevalence of gastrointestinal helminthiasis is associated to the agro-climatic conditions like quality and quantity of pasture, humidity, temperature, rainfall and grazing behavior of the host (Pal and Qayyum, 1993; Sardar *et al.*, 2006). Fasciolosis is a trematode borne parasitic disease that infects liver of large ruminants widely prevalent throughout the world. It is caused by *Fasciola* spp. i.e., *Fasciola gigantica*, and *Fasciola hepatica* (Phiri *et al.*, 2006). In Pakistan fasciolosis is one of the major factor that limits livestock development (Kendall, 1954).

Bahawalpur is the region with semi arid condition. But still it have different type canals and which fever the prevalence of fresh water snails and hence snail borne diseases. So it is necessary to check the epidemiology of fasciolosis in economically important animals like buffaloes.

2. Materials and Methods

During the present study fecal samples were collected on random basis from the five tehsils (Fig. 1) of Bahawalpur district i.e. Bahawalpur, Ahmadpur, Yazman, Khairpur, and Hasilpur from February 2013 to October 2013.

2.1 Collection of fecal samples

From each tehsil a total 50 fecal samples per animal including buffaloes, and cows were sampled on random basis. For diagnostic test 1g solid excreta with less water/2g excreta with more water/4g diarrhetic excreta was collected. 1 table spoon refers to 1 g of excreta. During sampling only fresh stool were collected or these were directly collected from the rectum of the animals. The samples were collected in plastic vials with a lid, containing 5-10% formalin as preservative and to prevent hatching of the eggs. The vials were properly labeled by species, place, age and date of collection and were brought in Regional Diagnostic lab of Livestock diseases Bahawalpur for diagnosis.

2.2 Parasitological diagnostic tests

Each sample was examined by following different types of parasitological diagnostic techniques.

A simple microscopic examination was done by taking the sample and observed under low power microscope (10 X 0.25) for *fasciola* eggs detection. For this purpose a small amount of feces was mixed with normal saline solution (0.9%) in a petri dish and a drop of it was taken on 3 X 1 glass slide in form of a thin smear as large as 1 and 1/2 X 1 and was fully covered with a coverslip and examined under microscope (Thienpont *et al.*, 1979). The positive slide (s) were further proceed by Formol-ether Sedimentation (concentration) test.

In this test 1g of feces was emulsified in 7 ml of in 10% of formol-saline solution. The emulsion was the left for 10 minutes for fixation. It is then filtered from a fine strainer and filtrate was taken in centrifuge tube. Three ml ether was then added to it and the mixture was shaken vigorously and was centrifuged at 2000 rpm for 2 minutes. The debris was loosened by a stick and the supernatant was discarded leaving few drops of sediment. Two drops of sediments was taken on glass slide, covered with coverslip and studied under microscope for the presence of *Fasciola* eggs (Foreyt, 1997; Vohra and Agarwal, 2006).

Eggs were identified based on morphology described by Soulsby (1982) and Yamaguti (1975).

The results were analysed by using Chisquare (χ^2) test on computer statistical software SPSS version 18.

3. Results

An overall prevalence (%) of fasciolosis was found to be 15.8% in District Bahawalpur from February 2013 to October 2013 (Tab.3.1).

The overall highest month wise prevalence was found in the September (31±0.03%), followed by October (25.5±0.031%), February (21±0.029%), August (20.5±0.029%), July (14.5±0.025%), March (10±0.021%), June (9.5±0.021%), April (6.5±0.017%) and the lowest prevalence was found in May (3.5±0.013%) (Tab.3.1). Statistically at 95% confidential interval the prevalence was found to be highly significant (p<0.05) in all months. Only April showed less significant difference.

Area wise overall prevalence in five areas of district Bahawalpur showed that infection was highest at Yazman (21.7±0.022%) followed by Bahawalpur (16.7±0.020%), Khairpur (15.6±0.019%), Hasilpur (14.4±0.019%) and was lowest at Ahmedpur (10.6±0.16%) (Tab.3.1). Statistical analysis showed non-significant (p>0.05) difference in all areas.

Data revealed that the highest prevalence in all the areas of Bahawalpur was reported during autumn (28.3±0.023%) followed by winter (21±0.029%), summer (12±0.021%) and lowest in spring (8.3±0.026%) (Tab.3.1). Statistically prevalence was significantly higher in autumn (P<0.05) and summer and was less significant in winter as compared to spring.

Overall sex wise prevalence showed that female (15.9±0.024%) were more susceptible than males (15.1±0.017%) from fasciolosis (Tab.3.1). However, statistical difference was found to be non significant (P>0.05) between the prevalence of male and female.

It was observed that overall prevalence in adult buffaloes was significantly (P<0.05) higher (19.9±0.022%) than young ones (5.3±0.10%) (Tab.3.1).

To find out the infection rate associated with grazing habitat of buffaloes it was observed that the highest prevalence was in Riverine areas (16.7±0.020%) followed by Plain areas (12.9±0.16%) and lowest in Dry areas (6±0.014%) (Tab.3.1). While statistical analysis showed that the prevalence was highly significant (p<0.05) in all grazing habitat groups of all areas.

In month wise data, in all areas prevalence was highest in September i.e., 40%, 32.5%, 30%, 27.5% and 25% in Yazman, Bahawalpur, Khairpur, Hasilpur and Ahmedpur respectively while lowest prevalence was noted in May in at Yazman (7.5%), Bahawalpur(5%), Khairpur(2.5%), Hasilpur (2.5%) and Ahmedpur (0%) (Tab.3.2). Statistically at 99% confidential interval prevalence was highly significant (P<0.01) in the months of September, February and October in all areas while Yazman, Khairpur and Hasilpur also showed highly significant difference (P<0.01) in August. In all other months it was non significant (P>0.01).

Area and season wise data showed that highest prevalence (P<0.01) in all areas was noted in autumn followed by winter, summer and lowest in spring season (Tab.3.2). Except autumn in all other seasons prevalence was less significant.

Gender wise prevalence, in all areas it was observed a higher prevalence in females of Yazman, Bahawalpur, Khairpur, Hasilpur and Ahmedpur i.e 24.5%, 17.9%, 16.4%, 14.9% and 9.9% repectively than males i.e 12.8% (Tab.3.2) in all areas, while statistical difference was highly significant (P<0.01).in both males and females.

In all area, it was observed that prevalence was higher in adults (Yazman 27.2%, Bahawalpur 20.6%, Khairpur 19.8%, Hasilpur 18.6% and Ahmedpur 3.6%) than young ones (7.8%, 6.8%, 4.9%, 3.9% and 2.9% respectively) (Tab.3.2). While statistically both showed non significant ($P>0.01$) difference in all areas except Bahawalpur with highly significant ($P<0.01$) difference.

Area and grazing habitat wise data showed that prevalence was highly significant ($P<0.01$) in grazing habitat of all areas except the plain habitats of Khairpur, Hasilpur and Ahmedpur that showed non significant ($P>0.01$) difference in prevalence (Tab.3.2).

4. Discussion

In the present study overall prevalence of fasciolosis in buffaloes was found to be 15.8 % of which 11, 3.61 and 1.2% prevalence was found for *F. gigantica*, *F. fasciola* and mixed infection respectively. Khan *et al.* (2009) also recorded a highest prevalence of fasciolosis in buffaloes and cattles with highest prevalence rate of *F. gigantica* and lower prevalence of *F. hepatica* from Layyah, Punjab, which are in favor of results. Maqbool *et al.* (2002) in their studies reported overall 25.59, 26.16, 13.7 and 10.5 per cent, prevalence respectively in slaughtered buffaloes, buffaloes at livestock farms, veterinary hospitals and in household buffaloes in the Punjab. These results are in favour of our results as in the present study the prevalence was recorded from different environmental conditions. Our results also agree with the work of Qureshi *et al.* (2012) reported over all 14.69% prevalence in buffaloes of the Punjab by fecal analysis. Khan *et al.* (1991) have reported overall prevalence of fasciolosis in Rawalpindi division (Potohar region) to be 37.53 percent and 31.74 percent in buffalo and cattle, respectively. The difference in prevalence from our results may due the dry condition of Bahawalpur area as compare to Rawalpindi. Bhutto *et al.*, (2012) reported a total 42.06% of overall prevalence in buffaloes in Sindh. They reported all positive cases for *F. gigantica* in buffaloes. The highest prevalence in this case is due the study was carried in different agro-climatic conditions. In our studies highest prevalence was also found in the riverine based areas i.e 16% as compare to other semi dry and dry areas.

In season wise prevalence Maqbool *et al.* (2002) and Khan *et al.* (2009) reported overall highest (24.0%) seasonal prevalence in all types of buffaloes was recorded during autumn, followed by spring (20.0%), winter (13.0%), while the lowest (9.0%) was recorded during summer. In our studies highest prevalence was in autumn i.e 28.2% and while the lowest was recorded in spring i.e 8.2%. The difference in our lowest prevalence may due to the difference in environmental conditions as in Bahawalpur the summer season duration is much more as compare other areas. Our results get favour from the findings of Qureshi *et al.* (2012). They also recorded highest prevalence in autumn while lowest in spring. Khan *et al.* (2009) recorded a highest prevalence in winter (39.08%) and lowest infection in summer (12.92%) from Layyah. There is difference in season wise prevalence as compare to our work. This difference may due to difference in environmental conditions. Masud and Majid, (1984) reported highest prevalence during winter season in buffaloes of Multan. These also favor our results as we found highest prevalence in cold and wet season.

In month wise prevalence our study shows highest prevalence in September (31%) and lowest prevalence in May (3.5%). All areas also showed the same pattern of prevalence in month wise. Similar findings were recorded by Qureshi *et al.* (2012) and also by Maqbool *et al.* (2002) and Khan *et al.* (2009) in buffaloes.

In gender wise statistically no significant difference, but a slightly higher prevalence was recorded in females buffaloes (male 15.2%, female 16%) in our studies. In age wise prevalence animals above 2 years (20%) found to be highly susceptible then below 2 (5.3%). These results could get favor from the findings of Qureshi *et al.* (2012) and also by Maqbool *et al.* (2002). They recorded similar results in different areas of Punjab. The results also could favor from the work of Bhutto *et al.* (2012) and Khan *et al.* (2009).

In area wise highest prevalence in buffaloes was found in Yazman (21.7%) and lowest was recorded in Ahmadpur (10.6%), the results could favor the findings of Qureshi (2009). They recorded a different but statistically non significant difference prevalence in buffaloes in different area of Punjab. Iqbal *et al.* (2007) and Khan *et al.* (2009) also recorded the same results for fasciolosis from different areas of Pakistan.

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Tab.3.1: Over all Prevalence of fasciolosis in buffaloes of Bahawalpur from feb-2013 to oct-2013.

Factors		total no. of observed samples	total no. of positive samples	Prevalence (%)±S.E
Month (s)	February	200	42	21±0.029
	March	200	20	10±0.021
	April	200	13	6±0.017
	May	200	7	3.5±0.013
	June	200	19	9.5±0.021
	July	200	29	14.5±0.025
	August	200	41	20.5±0.029
	September	200	62	31±0.033
	October	200	51	25.5±0.031
Season	Winter	200	42	21±0.029
	Spring	400	33	8.25±0.026
	Summer	800	96	12±0.021
	Autumn	400	113	28.25±0.023
Gender	Male	430	65	15.11±0.017
	Female	1370	219	15.98±0.024
Age	0-2 years	513	27	5.26±0.10
	> 2 years	1287	257	19.96±0.022
Area (s)		360	78	21.66±0.022
	Yazman	360	60	16.66±0.020
	Bahawalpur	360	56	15.55±0.019
	Khiarpur	360	52	14.44±0.019
	Haslipur	360	38	10.55±0.16
Grazing habitat	riverine area	360	60	16.66±0.020
	Plain area	450	58	12.88±0.16
	Dry area	450	27	6±0.014
Total		1800	284	15.8%

Tab. 3.2: Areas wise prevalence (%) of fasciolosis in buffaloes

Factors		Yazman		Bahawalpur		Khairpur		Hasilpur		Ahmadpur	
		Inf./total	Prevl. (%)	Inf./total	Prevl. (%)	Inf./total	Prevl. (%)	Inf./total	Prevl. (%)	Inf./total	Prevl. (%)
Month (s)	February	10/40	25	9/40	22.5	9/40	22.5	8/40	20	6/40	15
	March	5/40	12.5	5/40	12.5	4/40	10	4/40	10	2/40	5
	April	4/40	10	3/40	7.5	3/40	7.5	2/40	5	1/40	2.5
	May	3/40	7.5	2/40	5	1/40	2.5	1/40	2.5	0/40	0
	June	5/40	12.5	4/40	10	4/40	10	4/40	10	2/40	5
	July	8/40	20	6/40	15	6/40	15	5/40	12.5	4/40	10
	August	14/40	35	7/40	17.5	7/40	17.5	8/40	20	5/40	12.5
	September	16/40	40	13/40	32.5	12/40	30	11/40	27.5	10/40	25
	October	13/40	32.5	11/40	27.5	10/40	25	9/40	22.5	8/40	20
	Season	Winter	10/40	25	9/40	22.5	9/40	22.5	8/40	20	6/40
Spring		9/80	11.25	8/80	10	7/80	8.75	6/80	7.5	3/80	3.75
Summer		30/160	18.75	19/160	11.87	18/160	11.25	18/160	11.25	11/160	6.87
Autumn		29/80	36.25	24/80	30	22/80	27.5	20/80	25	18/80	22.5
Gender	Male	11/86	12.79	11/86	12.79	11/86	12.79	11/86	12.79	11/86	12.79
	Female	67/274	24.45	49/274	17.88	45/274	16.42	41/274	14.96	27/274	9.85
Age	0-2 years	8/103	7.766	7/103	6.796	5/103	4.854	4/102	3.92	3/102	2.94
	> 2 years	70/257	27.23	53/257	20.62	51/257	19.84	48/258	18.60	35/258	13.56
Grazing habitat	riverine area	52/180	28.88	44/180	24.44	40/180	22.22	38/180.	21.11	25/180	13.88
	Plain area	20/90	22.22	12/90.	13.33	10/90	11.11	9/90.	10	7/90	7.77
	Dry area	6/90.	6.66	4/90.	4.44	6/90	6.66	5/90.	5.55	6/90	6.66
Total		78/360	21.66	60/360	16.66	56/360	15.55	52/360	14.44	38/360	10.55

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