

SEROPREVALENCE OF FASCIOLOSIS IN BUFFALOES AND HUMANS IN SOME AREAS OF PUNJAB, PAKISTAN

A.W. Qureshi and A.Tanveer

Department of Zoology, University of the Punjab, Lahore-54590

ABSTRACT: Prevalence of fasciolosis was assessed in some areas of the Punjab, Province by using indirect haemagglutination (IHA) test and overall it was noted 18.33% in buffaloes and 4.67% in humans. In buffaloes, area wise prevalence was recorded highest in Kamonki (32.0%) followed by Muridke (26.0%), Shahdra (20.0%), Kasur (14.0%), Gujranwala (10.0%) and lowest in Sheikhpura (8.0%). Similar results were noted in case of humans, prevalence was highest in Kamonki (8.0%) followed by Muridke and Shahdra (6.0%), Kasur (4.0%) and lowest in Gujranwala and Sheikhpura (2.0%). Statistically area wise significant ($P < 0.05$) difference was observed in buffaloes while non-significant in humans, when analyzed by Chi-square test. Gender wise male buffaloes showed higher prevalence while in humans females were found to be more susceptible than males. In age wise data adult buffaloes were found with higher prevalence. In humans all infected subjects were below the age of 30 years. Age and gender wise no significant ($P > 0.05$) difference was observed in buffaloes as well as in humans.

Keywords: Fasciolosis, buffaloes, IHA test, prevalence.

INTRODUCTION

Fasciolosis is a zoonotic disease and can infect a wide variety of mammalian hosts, particularly sheep, goat, buffaloes, cattle and man. Fasciolosis is unique in being capable of giving rise to human endemic areas from below sea level (on the shores of the Caspian Sea) up to very high altitude (as in Bolivia, Peru, Ecuador and Venezuela) (Mas-Coma *et al.*, 2003).

Kandell and parfitt (1965) was the first who reported that fascioliasis caused by *Fasciola gigantica* and *F. hepatica*, is one of the major problems wherever livestock farm are maintained in Pakistan.

Buffaloes are economically very important as they provide major part of meat and milk production in our country. Pathology in buffaloes and cattle due to fasciolosis was described by Sabri *et al.* (1981) and Shaikh *et al.* (2004), respectively. From the southern parts of Pakistan 8.5% and 14.8% incidence of fasciolosis in buffaloes have been reported by Bilqees and Alam (1988) and Shaikh *et al.* (2004), respectively. Maqbool *et al.* (2002) reported 14.77% and Qureshi *et al.* (2005) 15.36% from Punjab. *F. gigantica* and *F. hepatica* was reported 11.47% and 13.52% in buffaloes by Kakar and Kakarsulemankhel (2008) from Quetta (Baluchistan) and by Khan *et al.* (2009) 22.4% and 3.06%, in Punjab, respectively.

As far as the human fasciolosis is concerned there is one preliminary report available from rural areas of Lahore by Qureshi *et al.* (2005b) highlighting the presence of fasciolosis in Pakistan.

Keeping in view the gravity of the disease it was decided to assess the seroprevalence of fasciolosis in buffaloes and especially in humans by using IHA test, as serological methods are more sensitive for diagnosis than coprological methods (Mas-Coma *et al.*, 2005).

MATERIALS AND METHODS

Blood sampling: A total of 300 blood samples each from humans and buffaloes were randomly collected for serological examination from six randomly selected areas of punjab i.e., kamonki, muridke, shahdra, kasur, gujranwala and sheikhpura, from april 2003-march 2005. From each area 50 samples were collected.

Separation of serum: Under aseptic measures 5ml of blood was drawn by vein puncture with the help of disposable syringes and transferred to a screw capped sterile clean duly labeled test tubes slowly to avoid haemolysis (Benjamin, 1981).

The blood samples were left for about an hour to clot. The clotted blood was separated with a fine loop and the samples were centrifuged at 3500 rpm for at least 5 minutes. The supernatant clear sterile

fluid (serum) was aspirated with a pasture pipette and put in screw capped vial and stored at -20°C until processed for analysis.

Serological examination: All the serum samples were analyzed for specific IgG antifasciola antibodies by using commercial IHA test kit (Distomosis Fumouze kits). Titer equal or above 1:320 were considered positive for fasciolosis.

Statistical Analysis: Data was analyzed by Chi-square (χ^2) using computer software SPSS (version 10.0).

RESULTS AND DISCUSSION

In buffaloes: Out of 300 serum samples 55 (18.33%) were found positive for fasciolosis when tested by IHA test.

Area wise: Area wise prevalence (%) was noted highest in Kamonki (32.0%) followed by Muridke, Shahdra, Kasur, Gujranwala and lowest in Sheikhpura. Statistical analysis by Chi-square (χ^2) test showed significant difference in prevalence of all areas ($P < 0.05$). It was also noted that Kamonki, Muridke and Shahdra showed significantly higher ($P < 0.05$) prevalence than Sheikhpura while remaining areas had non-significant difference when compared with it (Table 1).

Age wise: When the data was analyzed on the basis of age groups it was noted that buffaloes showed higher prevalence in adults (>2 years) as compared to young ones (<2 years). However, the difference was statistically non-significant ($P > 0.05$), (Table 1).

Gender wise: In gender wise data males showed slightly higher prevalence than females with statistically non-significant difference ($P > 0.05$), (Table 1).

In Humans

Fourteen human blood samples (4.67%) out of 300 were found positive for antibodies against fasciolosis in different areas of Punjab from April 2003- May 2005, by IHA test.

Area wise: Area wise prevalence was highest in Kamonki followed by Muridke and Shahdra, Kasur and lowest in Gujranwala and Sheikhpura. Statistical analysis by Chi-square (χ^2) test showed non-significant difference in all areas ($P > 0.05$), (Table 2).

Age wise: Data regarding different age groups showed that highest prevalence was in 11-20 years

followed by <10 years, 21-30 years and lowest in >30 years. Statistically no significant difference was noted between all age groups ($P > 0.05$), (Table 2).

Gender wise: In sex wise data females showed higher prevalence than males but when data was analyzed statistically, non-significant difference was found between them ($P > 0.05$) (Table 2).

An overall prevalence of fasciolosis in buffaloes was found 18.33% in some areas of Punjab from April 2003 to March 2005 which is higher than reported by Maqbool *et al.* (2002) and Qureshi *et al.* (2005a) i.e., 14.77% and 15.36% while lower than reported (25.46%) by Khan *et al.* (2009). The difference may be due to difference in study areas as well as diagnostic methods as all other findings are based on coprological diagnostic method.

Studies in different areas showed a varied degree of prevalence. The highest prevalence was found in Kamonki followed by Muridke, Shahdra, Kasur, Gujranwala and lowest in Sheikhpura. Statistical analysis showed significantly ($P < 0.05$) higher prevalence in Shahdra, Kamonki and Muridke. The difference in prevalence may be due to presence of swampy and rice grown areas, which are influenced by local climatic conditions, presence of water bodies and availability of suitable snail host. It is reported that irrigation canals have important role in distribution of helminthes eggs (Maqbool *et al.* 2003; Narcis *et al.* 2004; Diaz *et al.* 2007).

Gender wise prevalence showed that male buffaloes were more susceptible than females for fasciolosis but difference was not significant ($P > 0.05$). Aal *et al.* (1999), Maqbool *et al.* (2002), Qureshi *et al.* (2005a) and Khan *et al.* (2009) also reported non-significant difference between in buffaloes on gender basis. The lower infection in females may be related to their better care for milk production and breeding. These results are in contradiction with Phiri *et al.* (2005) who reported significantly higher infection in females and suggested that such difference in susceptibility on gender basis may exist. This may be attributed to difference in animal breed and geographical conditions.

The prevalence of fasciolosis in respect to the physiological status of buffaloes revealed non-significantly higher prevalence in adult buffaloes than young ones. Khan *et al.* (2009) also reported no significant difference in age wise data while Maqbool *et al.* (2002) and Qureshi *et al.* (2005a) found significantly higher ($P < 0.05$) infection in adult buffaloes in Punjab. The higher prevalence in

adult buffaloes may be due long time exposure of adult animals to infective larvae as compared to young ones.

In case of humans, 4.67% were found positive for fasciolosis when test by iha test. As far as the role of fasciolosis in man is concerned there is one preliminary report available from rural areas of Lahore by Qureshi *et al.* (2005b) who reported $0.30 \pm 0.18\%$ prevalence. No published data is available from the study areas of Punjab for comparison. Ortiz *et al.* (2000) reported 15% human fasciolosis in Peru, Curtale *et al.* (2003) reported 71% in Egypt, Caprino *et al.* (2007) reported 10 cases per year in Italy and Rokni (2008) reported >7000 to >10000 cases in Iran. The

difference in prevalence is due to different geographical geoclimatic conditions.

Over all area wise prevalence (%) of human fasciolosis in present study was highest in Kamonki followed by Muridke and Shahdra, Kasur and lowest in Gujranwala and Sheikhpura. There was non-significant difference between their prevalence statistically. These all were agricultural and rural areas and with poor standard sanitation conditions. Many workers reported that rural areas are more prone to this disease (Esteban *et al.*, 1997; Ortiz *et al.*, 2000). Females were found more susceptible than males but difference is non-significant. Aal *et al.* (1999) and Curtale *et al.* (2003) Qureshi *et al.* (2005b) also reported

Table 1: Prevalence of Fasciolosis, by IHA test, in Buffaloes

Factors		No. of positive/ Total samples	Prevalence (%)
Areas	Sheikhpura	4/ 50	8.0
	Gujranwala	5/ 50	10.0
	Kasur	7/ 50	14.0
	Shahdra	10/ 50	20.0*
	Kamonki	16/ 50	32.0*
	Muridke	13/ 50	26.0*
Age (years)	Young (<2 years)	15/ 100	15.0
	Adult (>2years)	40/ 200	20.0
Gender	Male	27/ 130	20.77
	Female	33/ 170	19.41
Total		55/ 300	18.33

* indicating significant difference (P>0.05).

Table 2: Prevalence of Human Fasciolosis by IHA test

Factors		No. of positive/ Total samples	Prevalence (%)
Areas	Sheikhupura	1/ 50	2.0
	Gujranwala	1/ 50	2.0
	Kasur	2/ 50	4.0
	Shahdra	3/ 50	6.0
	Kamonki	4/ 50	8.0
	Muridke	3/ 50	6.0
Age (years)	0-10	5/90	5.55
	11-20	7/110	6.36
	21-30	2/65	3.08
	>30	0/35	0
Gender	Male	8/ 182	4.4
	Female	6/ 118	5.08
Total		14/ 300	4.67

P=non-significant

non-significant difference between infection in females and males in humans, which is explained by the similarity of diet in both genders (Esteban *et al.*, 1999, 2002; Marcos *et al.*, 2005).

It was observed that all infected humans were below 30 years of age while no positive subject was found in persons above 30 years. This may be related to higher immunity in these subjects. Curtale *et al.* (2003) and Marcos *et al.* (2005) reported under 19 years of age were more susceptible while according to Aal *et al.* (1999) and Moghaddam *et al.* (2004) all age groups were

equally susceptible for fasciolosis. The difference may be related to living habits and hygienic conditions of people in a particular area.

The results provided basic data on the seroprevalence of fasciolosis in buffaloes and especially for humans in some areas of Punjab which may be helpful for further epidemiological studies of fasciolosis in buffaloes and especially for humans as there is lack of knowledge on the epidemiological aspects of human fasciolosis.

REFERENCES

- Aal, A. A.A., AM. Abou-Eisha and MN. El-Sheary. Prevalence of Fascioliasis among man and animals in Ismailia Province. *Assiut. Vet. Med. J.*, 41: 141-152 (1999).
- Benjamin, M. M. Outline of Veterinary Clinical Pathology. 2nd Ed. Iowa State University press Ames Iowa, USA (1981).
- Bilqees, F. M. and M.A. Alam. Fascioliasis in livestock in Karachi. *Proc. Parasit.*, 5: 15-36 (1988).
- Caprino, P., F. Ferranti, G. Passa and A. Quintiliani. A rare case of obstructive jaundice and cholecystitis in hepatic fascioliasis in Italy. *Chir. Ital.*, 59: 891-894 (2007).
- Curtale, F., YAE. Hassanein, A. El Wakeel, S. Mas-Coma and A. Montresor. Distribution of human fascioliasis by age and gender among rural population in the Nile Delta, Egypt. *J. Trop. Pediatr.*, 49: 264-268 (2003).
- Diaz, P., J. Pedreira, M. Aries, I. Fransico, G. Fernandez, P. Morrondo and A. Paz-Silva. Risk period of infection by parasites in cattle from oceanic climate areas. *Parasitol. Res.*, 101: 339-342 (2007).
- Esteban, J.G., A. Flores, R. Angles and S. Mas-Coma, 1999. High endemicity of human fascioliasis between Lake Titicaca and La Paz valley, Bolivia. *Trans. Roy. Soc. Trop. Med. Hyg.*, 93: 151-156 (1999).
- Esteban, J.G., A. Flores, R. Angles, W. Strauss, C. Aguirre and S. Mas-Coma. A population-based coprological study of human fascioliasis in a hyperendemic area of the Bolivian Altiplano. *Trop. Med. Int. health*, 2: 695-699 (1997).
- Esteban, J.G., C. Gonzalez, MD. Bargues, R. Angles, C. Sanchez, C. Naquira and S. Mas-Coma.. High fascioliasis infection in children linked to a man-made irrigation zone in Peru. *Trop. Med. Int. Health.*, 7: 339-348 (2002).
- Kakar, MN. and JK. Kakarsulemankhel. Prevalence of endo and ecto parasites in ciws and buffaloes of Quetta. *Pakistan Vet. J.*, 28: 34-36 (2008).
- Kendall S. B. and JW. Parfitt. The life history of some vectors of *Fasciola gigantica* under laboratory conditions. *Ann. Trop Med. Parasit.*, 59: 10-16 (1965).
- Khan, M. K., MS. Sajid, MN. Khan, Z. Iqbal and MU. Iqbal. Bovine fasciolosis: prevalence, effects of treatment on productivity and cost benefit analysis in five districts of Punjab, Pakistan. *Res vet sci.* (2009, Epub ahead of print).
- Maqbool, A., CS. Hayat, A. Tanveer. M. Salahuddin and A. Arfan. Prevalence and ecology of *Lymnea* snails in Punjab, Iran. *J. Vet. Res.*, 4: 1382 (2003).
- Maqbool, A., CS. Hayat, HA. Hashmi and A. Tanveer. Epidemiology of Fascioliasis in buffaloes under different managemental conditions. *Veterinarski Arhiv.* 72: 221-228 (2002).
- Marcos, L., V. Maco, A. Terashima, F. Samalvides, JR. Espinoza, E. Gotuzzo. Fascioliasis in relatives of patients with *Fasciola hepatica* infection in Peru. *Rev Inst Med Trop Sao Paulo.* 47: 219-22 (2005).
- Mas-Coma, S., MD. Bargues, MA. Valero and MV. Fuentes. Adaptation capacities of *Fasciola hepatica* and their relationships with human fascioliasis: from below sea level up to the very high altitude. In: Combes, C., Taxonomy, Ecology and Evolution of Metazoan Parasites, pp. 81-123. Jourdan, J. (Eds.), vol. 2. Perpignan University Press, Perpignan (2003).
- Mas-Coma, S., MD. Bargues and MA. Valerio. Fasciolosis and other plant boren trematodes zoonoses. *Int.J.Parasitol.*, 35:1253-1278 (2005).
- Moghaddam, A.S., J. Massoud, M. Mahmoodi, AH. Mahvi, MV. Periago, P. Artigas, MV. Fuentes, MD. Bargues and S. Mas-Coma. Human and animal fascioliasis in Mazandaran province, northern Iran. *Parasitol. Res.*, 94: 61-69 (2004).
- Narcis, B., B. Simon, MT. Edridah, K. Francis and WO. Ambrose. Epidemiology and geography of *Schistosoma mansonai* in Uganda: implication for planning control. *Tropical Medicine and Internatinal Health*, 9:372 (2004).
- Ortiz, P., M. Cabrera, J. Jave, J. Claxton and D. Williams. Human fascioliasis: prevalence and treatment in a rural area of Peru. *Infect. Dis. Rev.*, 2: 42-46 (2000).
- Phiri A. M., IK. Phiri, CS. Sikasunge and J. Monard. Prevalence of fasciolosis in Zambian cattle observed at selected abattoirs with emphasis on age, sex and origin. *J. Vet. Med.*, 52: 414-416 (2005).

Qureshi, A. W., A. Tanveer, A. Maqbool and S. Naiz. Epidemiological study of fasciolosis in buffaloes at different sites of Punjab Province. Punjab Univ. J. Zool., 20(1): 21-28 (2005a).

Qureshi, A.W., A. Tanveer, SW. Qureshi, A. Maqbool. TJ Gill and SA. Ali. Epidemiology of human fasciolosis in rural areas of Lahore. Punjab Univ. J. Zool., 20: 171-178 (2005b).

Rokni, M.B. The present status of human helminthic diseases in Iran. Ann. Trop. Med. Parasitol., 102: 283-295 (2008).

Sabri, M., MZ. Khan and HA. Samad. Coparative pathology of natural *fasciola* species in buffaloes and cattle. Vet. J., 2: 27-28 (1981).

Shaikh AA, FM. Balqees and MM. Khan. Bile duct hyperplasia and associated abnormalities in the Buffaloes infected with *Fasciola gigantica*. Pak. J. Zool., 36: 231-237 (2004).