Annals of Biological Studies
RIBS MEDICAL RESEARCH INSTITUTE OF BIOLOGICAL STUDIESCENTER

Article

Geospatial and Demographic study of Fasciola hepatica infection in Buffalo of Punjab, Pakistan

Adeel Ali[1] and Sofifian Bin Umer[2,*]

[1] University of Sargodha, Pakistan.
* Correspondence: sofifian.umer159753456@gmail.com

Received: June 11, 2023; Revised: July 21, 2023; Accepted: July 25, 2023; Published: July 27, 2023.

Abstract: A total of 4800 fecal samples from four distinct districts in Punjab Province (Pakistan) were analyzed under a microscope in order to ascertain the prevalence of fasciolosis in buffaloes. After two years, the evaluation of fecal samples revealed an overall prevalence of 17.46%. Gujranwala (18.25%) had the highest infection rate, followed by Lahore (18.08%), Kasur (17.67%), and Sheikhupura (15.83%). There is no discernible difference (P>0.05) between the infections in any of the locations. Compared to juvenile buffaloes (8.82%), infection was considerably (P<0.01) greater in mature buffaloes (>2 years). Although it was discovered that males were more vulnerable (15.43%) than females (14.64%), there was no statistically significant difference in the infections in the two sexes.

Keywords: Fasciolosis; Prevalence; Buffaloes; Punjab; Pakistan

1. Introduction

The rot of the liver, known as fasciolisis, is a worldwide disease mostly caused by Fasciola spp., particularly F. hepatica and Fasciola gigantica. The typical hosts are domestic herbivorous animals including sheep, cattle, and goats, where the disease typically affects the bile duct [1,2]. It is a major factor in the cattle industry's financial and health losses in many different nations. Livestock is affected in two ways by it: directly, it causes actual liver condemnation at slaughter; indirectly, it affects feed efficiency, weight gain, milk production, and reproductive performance [3].

First and foremost, reports indicated that fascioliosis was one of the main issues in Punjab, Pakistan, a region known for cattle husbandry. After a considerable amount of time, research was conducted on animals admitted to Punjabi veterinary clinics and slaughterhouses in order to determine the disease's frequency. There have also been reports from Sindh [4] and other Pakistani provinces, suggesting that fasciolosis is endemic there. Since they produce more than half of all the milk and meat produced in our nation, buffaloes are extremely important economically.In order to determine the prevalence of this parasite disease in relation to location, age, and gender, the current study examined fascioliosis in buffaloes in a few Punjabi cattle-raising districts. The information thus gathered will aid in the formulation of a plan for Pakistani buffalo fasciolosis prevention and control.

2. MATERIALS AND METHOD

2.1. Study area

Study was conducted in 4 agro-ecological Districts of Punjab Province i.e., Lahore, Gujranwala, Kasur and Sheikhupura (Fig 1).

2.2. Sample collection

4800 faecal samples were taken from the aforementioned locations between June 2003 and June 2005 in order to document the prevalence of fasciolosis in buffaloes (Study year 1=June 2003-June 2004 and Study year 2= July 2004 to June 2005). These samples were taken from each buffalo's rectum and placed in sterile plastic jars. After adding 10% formalin, all samples were labeled with the necessary information on age, gender, and location and kept at 4 °C.

2.3. Coprological analysis

Each solid faecal material was combined with one milliliter of regular saline and a tiny amount (about one gram) of each was thoroughly mixed. A smear of this combination was made on a glass slide, covered with a cover slip, and examined under a microscope at 10 and 40X to check for the presence of Fasciola eggs. Liquid-consistency feces samples were analyzed without being combined with saline solution. Eggs were distinguished based on the morphology reported in [5].

3. Statistical analysis

Data was analyzed statistically by using Student's t-test and ANOVA through computer software (Microsoft SPSS 10.0).

4. RESULTS

An overall prevalence of fasciolosis was found 17.46% in selected district of Punjab in two study years.

Figure 1. Map Showing: A) Punjab province (Green) of Pakistan, (B) study Districts (gray) of Punjab: (a) Gujranwala, (b) Sheikhupura, (c) Lahore and (d) Kasur

4.1. Area wise (%) distribution

Research conducted in several districts revealed varying levels of infection. Gujranwala had the highest mean infection rate (18.25%), followed by Kasur (17.67%), Lahore (18.08%), and Sheikhupura (15.83%). The same general pattern of infection was observed in both study years (Fig 2). When compared to one another, the ANOVA test revealed that the differences in infection rates across all locations were not statistically significant (P=0.055).

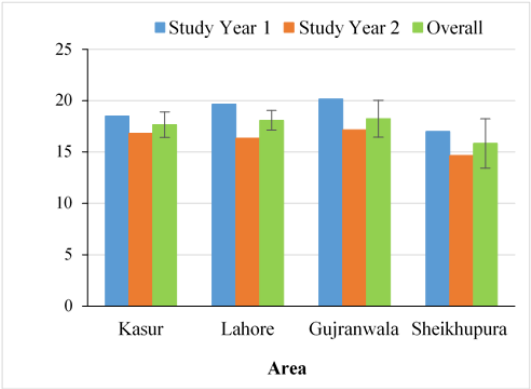

Figure 2. District wise distribution of Fasciolosis in buffaloes of North-East Punjab

4.2. Age wise (%) distribution

It was observed in overall infection that adult animals have significantly (P 0.01) higher infection (15.9%) than young ones (8.82%) as shown in Fig 3.

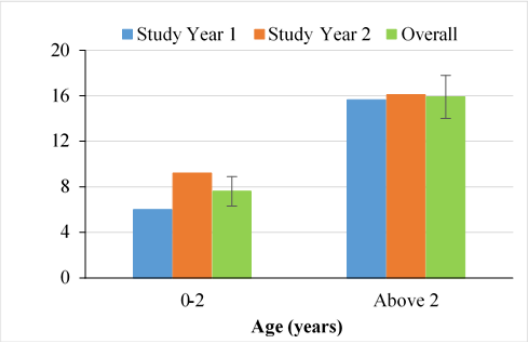

Figure 3. Age wise distribution of Fasciolosis in buffaloes of North-East Punjab

4.3. Gender wise (%) distribution

In terms of overall gender prevalence, men (15.43%) were shown to be more susceptible to fasciolosis than women (13.56%). Males were 1.125 times more at risk than females, according to the odds ratio. The infection rates of both sexes did not differ statistically significantly (P 0.05) (Fig 4).

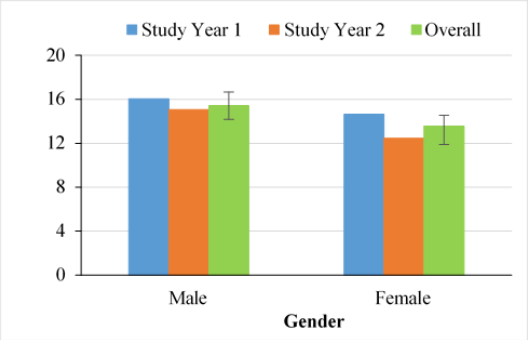

Figure 4. Gender wise distribution of Fasciolosis in buffaloes of North-East Punjab

5. DISCUSSION

According to the current study, the overall fasciolosis infection rate in buffaloes during a two-year period in the Punjab province was 17.46%; Gujranwala had the highest infection rate, while Sheikhupura had the lowest. These outcomes roughly correspond to report [6,7]. This discrepancy could be the result of various research regions with disparate climates and livestock management practices in particular [8]. The degree of infection in a region was believed to be correlated with the canal system's expansion, which added more regions of marsh and swamp where buffaloes were exposed to helminthes' infectious larvae. These regions guarantee the continuation of the parasite life cycle and offer habitat for the intermediate host [6,9].

Despite the fact that males had greater infection rates than females, the difference is not very noticeable. Females may have fewer infections because they receive greater care during breeding and milk production. Significantly greater infection rates were found in female buffaloes and small ruminants, respectively, in [8]. Conversely, [2] found no variations in the frequency of bovine fasciolosis associated to sex (P>0.05). The settings under which animals are managed affect the variation in infection. Generally, younger female buffaloes and those that were breastfeeding or pregnant received greater care than older females and male animals.

When comparing the incidence of fasciolosis to the physiological status of buffaloes, it was shown that adult buffaloes had a considerably greater infection rate (P<0.001) than juvenile buffaloes. Adult buffaloes had greater infection rates, according to [5,9]. It suggested that adult animals are more vulnerable to fasciolosis. This might be because adult animals have been exposed to infectious larvae for a longer period of time than juvenile ones. A further explanation would be that young animals receive greater care than older animals do. Non-significant differences in infection between age groups were also identified. It showed that animals of all ages are nearly equally vulnerable [10,11].

This survey found that Punjab's (Pakistan) buffaloes had a noticeably greater prevalence of fasciolosis, which can result in severe financial loss. A source of environmental contamination, particularly in freshwater environments, can also

be attributed to infected animals carrying Fasciola eggs. The study made the distribution of fasciolosis by geography, age, and gender quite evident.

Author Contributions: All authors contributed equally to the writing of this paper. All authors read and approved the final manuscript.

Conflicts of Interest: "The authors declare no conflict of interest."

References

[1] Aal, A. A. A., Abou-Eisha, A. M., & El-Sheary, M. N. (1999). Prevalence of Fascioliasis among man and animals in Ismailia Province. Assiut. *Vet. Med. J., 41* (2), 141-152.

[2] Ahmad, M., Khan, M. N., Sajid, M. S., Muhammad, G., Qudoos, A., & Rizwan, H. M. (2017). Prevalence, economic analysis and chemotherapeutic control of small ruminant fasciolosis in the Sargodha district of Punjab, Pakistan. *Vet. Italiana, 53* (1), 47-53.

[3] Chaudri, S. S., Gupta, R. P., Kumar, J., Singh, A., & Sangwan, K. (1993). Epidemiology and control of Fasciola gigantica infection of cattle and buffaloes in Eastern Haryana, India. *Indian J. Anin. Sci., 63* (6), 600-605.

[4] Keyyu, J. D., Monard, J., Kyvsgaard, N. C., & Kassuku, A. A. (2005). Epidemiology of Fasciola gigantica and amphistomes in cattle in traditional, small-scale dairy and large-scale dairy farms in the southern highlands of Tanzania. *Trop. Anim. Health Prod., 37* (4), 303-314.

[5] Khan, M. K., Sajid, M. S., Khan, M. N., Iqbal, Z., & Iqbal, M. U. (2009). Bovine fasciolosis: prevalence, effects of treatment on productivity and cost benefit analysis in five districts of Punjab, Pakistan. *Res. Vet. Sci., 87* (1), 70-75.

[6] Molina, E. C., Gonzaga, E. A., & Lumbao, L. A. (2005). Prevalence of infection with Fasciola gigantica and its relationship to carcase and liver weights, and fluke and egg counts in slaughter cattle and buffaloes in southern Mindanao, Philippines. *Trop. Anim. Health Prod., 37* (3), 215-221.

[7] Mulcahy, G., & Dalton, J. P. (2001). Cathepsin L proteinases as vaccines against infection with Fasciola hepatica (liver fluke) in ruminants. *Res. Vet. Sci., 70* , 83-86.

[8] Opio, L. G., Abdelfattah, E. M., Terry, J., Odongo, S., & Okello, E. (2021). Prevalence of Fascioliasis and Associated Economic Losses in Cattle Slaughtered at Lira Municipality Abattoir in Northern Uganda. *Anim., 11* (3), 681.

[9] Piri, K., Saidijam, M., Maghsood, A., Matini, M., & Fallah, M. (2018). Prevalence of Animal Fasciolosis and Specification of Fasciola spp. Isolated from Sheep, Goats and Cattle by Molecular Method: Hamadan Province, West of Iran. *Iran J Parasitol., 13* (4), 524-531.

[10] Khan, N. U., Sultan, S., Ullah, I., Ali, H., Sarwar, M. S., Ali, A., Usman, T., Khan, A. U., Hussain, M., Mehboob Ali, Rabbani, F., & Rahman, A. (2020). Epidemiological study of bovine fasciolosis using coprological technique in district Mardan, Khyber Pakhtunkhwa, Pakistan. *Pure Appl. Biol., 9 (*1), 455-463.

[11] Kakar, M. N., Masood, M. I., Janbaz, K. H., Qadir, M. I., Masood, I., & Kakarsulemankhe, J. K. (2011). Prevalence of fascioliasis in cows and buffaloes in Quetta, Pakistan. *Pharma. Online, 2* (2), 974-978., 76 , 9-17.