Acta Parasitologica Globalis 11 (1): 21-24 2020
ISSN 2079-2018

DOI: 10.5829/idosi.apg.2020.21.24

A Cross Sectional Study on the Prevalence and Possible Risk Factors of Bovine Fasciolosis in and Around Dimtu Town Southwest Ethiopia

[1]Nezif Mohammed and [2]Sirajudin Kedir

[1]Jimma Zone, Tiro Afeta District Livestock and Fisheries Office, Dimtu, Ethiopia
[2]Jimma University, School of Veterinary Medicine, College of Agriculture and Veterinary Medicine, P.O. Box: 307, Jimma, Ethiopia

Abstract: A cross-sectional study was conducted from September 2018 to December 2019 in and around Dimtu town, southwestern Ethiopia, to determine the prevalence of bovine Fasciolosis and its associated risk factors. Simple random sampling methods were used to select the study animals and sedimentation technique was applied for recovery of *Fasciola* eggs from fresh fecal samples. Out of 384 fecal samples examined, 101 were positive and overall prevalence of Fasciolosis was 26.3% in the study area. The prevalence of bovine Fasciolosis was similar in Gibe grazing site 25(25.8%) as compared to Lanjibo grazing site 52 (25.1%), Harsu grazing site 17(37%) and Waro grazing site 7(20.5%). However, there was no statistically significant difference on the prevalence of bovine Fasciolosis based on grazing site. Similarly, not statistically significant difference observed between body condition ($p>0.05$). However, statistical significant differences were appreciated among the age and sex of animal categories ($p<0.05$). Adult 95 (34%), Young 3(3.4%) and old 3(15.8%) prevalence. The prevalence relation in was 13 (15.7%) in male group 88 (29.2%) in female animal. Therefore, Fasciolosis should be taken in to consideration as one of the major limiting factor to livestock productivity in and around Dimtu town. Hence, control measures against Fasciolosis must be designed to target either the parasite or the snail intermediate host or by regular deworming or drainage the area.

Key words: Bovine · Body Condition · Prevalence · Fasciolosis

INTRODUCTION

Fascioliasis is among the important parasitic diseases in tropical and subtropical countries which limit productivity of ruminants particularly in cattle. Fascioliasis is zoonotic trematodes of great public health importance affecting ruminant animals and man. The class Trematodes falls into two main subclasses, the Monogenea, which have a direct life cycle and the Digenea, which require an intermediate host. The former are found mainly as external parasite of fish. While the latter are Sound exclusively in vertebrates and are of considerable veterinary importance [1]. The adult digenetic trematodes, commonly called 'flukes', occur primarily in the bile ducts, alimentary tract and vascular system. Most flukes are flattened dorsoventrallv. Have a blind alimentary tract. Suckers 2, for attachment and are hermaphrodite. The egg pass out of the final host usually in faeces and the larval stage develop in a molluscan intermediate host. For a few species, a second intermediate host is involved, but the mollusc is essential for all members of the group [2].

Fascioliasis is among the important parasitic diseases in tropical and subtropical countries which limit productivity of ruminants in particular cattle. The development of Fasciolosis involves the presence of an intermediate host (Lymnaea species.), suitable habitats for mollusks and environmental factors such as high humidity, adequate temperature and rainfall. Furthermore, when infecting the definitive host, mature flukes lay eggs that spread in the environment and cause pasture recontamination [3]. Fasciola is commonly recognized as liver flukes and they are responsible for wide spread of morbidity and mortality in cattle characterized by weight

Corresponding Author: Nezif Mohammed Abafita, Jimma Zone, Tiro Afeta District Livestock and Fisheries Office, Dimtu, Ethiopia.

loss, anemia and hypoproteinemia, reduced production of meat, milk and wool and expenditures for anthelmintic. The total global economic loss attributed to Fasciolosis has been estimated earlier to be more than US$3 billion per year [4]. Fasciolosis is one of the economically important diseases of domestic livestock particularly in cattle and sheep and occasionally human beings [5]. Recently [6] highlighted the significance of Fasciolosis as an emerging helminthes zoonotic and reported that currently there are 2.4 to 17 million human cases globally and 91.1 million people are living at risk of infection. The two species most commonly implicated as the etiological agents of Fasciolosis are *Fasciola hepatica* and *Fasciola gigantica* [5]. Fascioliasis is a zoonotic disease of public health importance.

Man becomes infected when metacercariae of the fluke is ingested along with water Cress Salad and vegetables grown along banks of water reservoirs inhabited by potential snail hosts [3]. Therefore, the objective of this study was to estimate the prevalence of bovine Fasciolosis and to identify host and ecology related risk factors for Fasciolosis in and around Dimtu town.

MATERIALS AND METHODS

Study Area: Tiro Afeta is found in the eastern central part of Jimma Zone, at 64 Km from Jimma town in Oromia Regional state at 316 km south west of Addis Ababa at longitude of 35°52'-37°37'E and latitude of 7°36'-8°56'N. It has an area of 1001.9 km2 and four urban centers, i.e., Akko, Raga-Siba, Gebbera and Dimtu town (district's capital) and 25 Kebeles. It has common boundaries with Botor Tole, Sekoru, Limu Kossa, Kersa, Omo Nada districts and Southern Ethiopian people's Regional State. Attitudinally, the district lies between 1640 and 2800 meters above sea level. The district is classified into woinadega (85%) and dega (15%) agro climatic zones. The average minimum and maximum annual temperatures were 7°C and 30°C, respectively.

Sample Size Determination and Sampling Method: The sample size will be determined by using the formula given by Michael Thrusfield [7] , with 95% confidence level, 5% desired absolute precision and this study is not conducted before in this area so there is no expected prevalence. According to Michael Thrusfield [7] , The number of samples this particular study was calculated as follows:

$$n = \frac{(1.96)^2 = p\exp(1 - p\exp)}{d^2}$$

where:
n = required sample size
Pexp = expected prevalence
d = desired absolute precision

Therefore, the number of cattle, examined in this study will be calculated to be 384. Simple random sampling method will be applied to select study animals. During sampling of the animals, their breeds, age groups, sex, body condition score and management system will be recorded.

Sample Collection: Fecal sample will be collected per rectum of individual animals using gloved fingers and put into sampling bottles containing 10% formalin and label each sample. During every sampling of study animals' information on sex, breed, approximate age of individual animals, body condition scores, study Keble and altitude, grazing type or grazing situation, vegetation cover (ecology) and water source for animals will be recorded on data recording sheet. Then after collection, samples are transported to laboratory for analysis. Sedimentation technique will be employed to assess the presence of Fasciolosis eggs through repeating dilution of the fecal suspension and sedimentation of the eggs, which are heavier than most of the fecal particles [8].

Data Analysis: The collected data was entered and stored into Microsoft Excel spreadsheet 2007. The data were thoroughly screened for errors and properly coded before subjecting to statistical analysis. The data were imported from the Microsoft Excel and analyzed using Statistical Package for Social Sciences (SPSS) software version 20. Descriptive statistics was used to determine the prevalence of Fasciolosis and Chi-square (χ^2) test was used to assess the association of the potential risk factors like age, sex, body condition and Peasant association (PA) for the occurrence of the Fasciolosis. A 5% significance level was used to determine whether there are significant differences or not.

RESULTS AND DISCUSSION

Among 384 cattle examined using coproscopical examination in the field survey 26.3 % (n = 101) were found to be positive for bovine Fasciolosis.

Table 1: Prevalence of bovine Fasciolosis based on risk factors

Risk factor	Number of examined	Number of positive (%)	χ^2 (p-value)
Age			
Young	86	3(3.4%)	32.8(0.001)
Adult	279	95(34%)	
Old	19	3(15.8%)	
Total	384	101(26.3%)	
Body condition			
Poor	26	7 (26.9%)	1.008(0.6)
Medium	258	64 (24.8%)	
Good	100	30 (30%)	
Total	384	101 (26.3%)	
Sex			
Male	83	13 (15.7%)	6.184(0.016)
Female	301	8829.2%)	
Total	384	101 (16.3%)	
Grazing site			
Harsu	46	17(37%)	3.4(0.331)
Waro	34	7 (20.5%)	
Lanjibo	207	52 (25.1%)	
Gibe	97	25 (25.8%)	
Total	384	101 (26.3%)	

The prevalence of bovine Fasciolosis at Harsu grazing site 17(37%), at Waro grazing site7(20.7%), at Lanjibo grazing site 52 (25.1%) and gibe grazing site 25(25.8%). There are no statistically significant differences on the prevalence of bovine Fasciolosis based on grazing site and three body condition scoring ($p>0.05$). However, There are statistically significant differences appreciated among the sex and age categories ($p<0.05$). Male cattle 13 (15.7%) and female 88 (29.2%) and young cattle 3 (3.4%), adult 95 (34%) and old cattle's were 3(15.8%) had prevalence respectively.

The present study revealed an overall prevalence of 26.3% in the study peasant associations and Agro-ecological zone. Higher prevalence of bovine Fasciolosis was obtained when it is compared with prevalence of the disease reported by Mohammed Yusuf *et al*. [9] (24.4%) in 2016 Haramaya municipal abattoir and 20.8% in Bedelle District by Yosef Mamo *et al.* [10]. The variation from this study may be due to availability of Gilgelgibe dam and the soil type in our study is clay which is favorable to form marshy area that sustain snail vector. The results indicated that both ages and both sexes were at about difference risk to acquire the infection that adult cattle's are more exposure to the Fasciolosis than both young and old cattle due to long distance movement of adult cattle. Due to no restriction on movement for grazing adults are more exposed to the risk factors. In case of sex, female cattle are more prevalent than male this is because of the female cattle are move everywhere for grazing, for drinking water and during estrus period due to seeking for the male while males are reared in selected area for their grazing after plough so the male are limited for the movement for searching food. Additionally male animals are used for fattening purpose so they reared intensively without any contact with other animal. According to age category the adult cattle group are more risky than both young and old age groups of animal in the study area because of adult animals are move long distance due to searching feed and mating then contact with snail but young old age animal group are restricted to movement due to their age that they cannot seek for grazing and mating. The cattle were seen grazing in the area that necessitates more contact times with the larval stage of the parasite and the snail intermediate vector. This creates ideal condition for the multiplication of Fasciolosis and increases the epidemiology of the disease.

CONCLUSION AND RECOMMENDATIONS

The prevalence of bovine Fasciolosis recorded in this study based on coprological examination revealed the presence of Fasciolosis in the cattle population in and around Dimtu town. The disease was detected in both sexes and age groups of the study animals. In addition, the occurrence of the diseases is closely linked to the presence of biotypes suitable for the development and multiplication of intermediate hosts. Therefore, this study revealed that bovine Fasciolosis was one of the major parasitic diseases contributing to loss in productivity and production of cattle in the study area. Depend up on this conclusion the following recommendations are forwarded.

- Fasciolosis should be considered as one of the major limiting factor to livestock productivity in and around Dimtu town.
- Implementation of appropriate control measures for the intermediate host should be encouraged.
- Strategic use of anti-helminthes should be practiced to reduce pasture contamination with fluke eggs.
- Detailed studies involving additional risk factors should be conducted on this similar study.

ACKNOWLEDGEMENTS

We great fully acknowledge Tiro Afeta livestock and fishery office and Jimma University for all the material supports we received. We also thank the farmers of in and around Jimma town who were willing to be part of the study and provided us complete information.

REFERENCES

1. Abunna, F., L. Asfaw, B. Megersa and A. Regassa, 2010. Bovine fasciolosis: coprological, abattoir survey and its economic impact due to liver condemnation at Soddo municipal abattoir, Southern Ethiopia. Tropical Animal Health and Production, 42(2): 289-292.
2. Khan, M.K., M.S. Sajid, M.N. Khan, Z. Iqbal and M.U. Iqbal, 2009. Bovine fasciolosis: prevalence, effects of treatment on productivity and cost benefit analysis in five districts of Punjab, Pakistan. Research in Veterinary Science, 87(1): 70-75.
3. Ekenma Kalu, 2015. A review on Bovine Fascioliasis: Journal of Agriculture and Veterinary Science, 8: 23-26
4. Md. Rezaul Karim, Mohammad Showkat Mahmud and Md. Giasuddin, 2015. Epidemiological Study of Bovine Fasciolosis: Prevalence and Risk Factor Assessment at Shahjadpur Upazila of Bangladesh.
5. Pal, M., 2007. Zoonosis. (2nd edition.), Satyam Publishers, Jaipur, India.
6. Pal, M., M. Abdurrahman and M. Zewdu, 2014. Growing significance of fasciolosis as an emerging zoonosis. Ethiopian Int. J. Multidisc. Res., 1: 10-13.
7. Michael Thrusfield, 2005. Veterinary Clinical Studies Royal (Dick) School of Veterinary Studies University of Edinburgh.
8. Hansen, J. and B. Perry, 1994. Vet. Res. Comm, The Epidemiology, Diagnosis and Control of Helminthes Parasites of Ruminants. A hand book. International Laboratory for Research on Animal Disease.
9. Mohammed Yusuf, Nuraddis Ibrahim, Wubit Tafese and Yosef Deneke, 2016. Prevalence of Bovine Fasciolosis in Municipal Abattoir of Haramaya, Ethiopia.
10. Yosef Mamo, Yosef Deneke and Nuraddis Ibrahim, 2014. Prevalence of Bovine Fasciolosis in and Around Bedelle District, Ethiopia.