

Prevalence of Fasciolosis (Liver Flukes) Infection in Cattle Slaughtered at Dambi Dollo Town Municipal Abattoir, Kellem Wollega Zone, Ethiopia

Tesfaye Itefa^{1*}, Yoseph Alemu¹, Ebisa Regasa¹, Amanuel Alemu¹ and Milkiyas Kena²

¹Kellem Wollega Zone Agriculture Office, Expert of Livestock Health, Ethiopia

²Gawo Kebe District Agriculture Office, Livestock Health Experts, Ethiopia

Abstract

The study was carried out from January to December 2021 with the main objectives of to determine the prevalence of fasciolosis infections in cattle, slaughtered at Dambi Dollo Municipal Abattoir. The slaughtered animals were daily inspected for liver fasciolosis throughout the year of 2021. Macroscopic fasciolosis was detected from a total of 4424 basing on animals species, sex, season, and *Fasciola* species. In addition to this, fecal samples from 100 female cattle were collected for microscopic examination. The total prevalence rate of *Fasciola* species infection occurs in the study area were about 1364/4424 (30.83%) from the total cattle slaughtered carcasses. On sex based case, prevalence of fascioliasis was 8/24 (33.33%) and 1356/4400 (30.82%) for females and males cattle carcasses, respectively. The study revealed that the significance of season in finding that highest fasciolosis infection was recorded during winter and autumn. It constitutes a major cause of economic losses at study area and threat public health.

Keywords: *Fasciola gigantica* • *Fasciola hepatica* • Liver fluke • Slaughterhouse • Snails

Introduction

Slaughterhouses provide an excellent meat inspection place, where many zoonotic diseases observed but meat poor handling in or out the abattoir can leading to both economic losses and a lot of public health hazardous [1,2]. Fasciolosis considered the top of all the domestic ruminants' parasitic zoonotic worldwide infection that is endemic in a tropical area and Kellem Wollega, Dambi Dollo [3-5].

Genus *Fasciola* "liver fluke" is belonging to trematode helminths which containing two main species; *Fasciola gigantica* and *Fasciola hepatica* is very common observed in the liver of cattle and other ruminants [6-8]. Fasciolosis reduces animal productivity, weight gain, and the production of meat and milk. In addition, it causes moderate icterus, metabolic disorders, and secondary infections due to decrease immunity by chronic fasciolosis and liver condemnation during postmortem inspection in slaughterhouses while the acute fasciolosis may lead to mortalities [9-11]. Human fasciolosis infection occurs accidentally after ingestion of eggs/larvae while ruminant ingestion of forage containing metacercarial cyst [12].

Ingested parasite lives in hepatic parenchyma or in bile duct, which causing liver hemorrhagic black tunnels [13]. Diagnosis is depending on the history of snail habitats or fasciolosis on the farm, symptoms, postmortem examinations, feces, and blood examination for *Fasciola* eggs [14].

There is no enough information on the ruminants' fasciolosis in the study area, Dambi Dollo town. Therefore, this study was designed with the aims

of determining the prevalence of fasciolosis infections in cattle slaughtered in Dambi Dollo town slaughterhouse.

Materials and Methods

The study area

A cross-sectional study was conducted in Dambi Dollo Municipal abattoir to detect the prevalence of the fasciolosis (liver flukes) from the slaughtered cattle. Dambi Dollo town is the capital city of Kellem Wollega Zone Administration. It is a part of the Oromia region, which is located to the west of the Addis Ababa/Finfinne between 8°32'N latitude and 34°48'E longitude with an elevation between 1701 and 1827 meters above sea level. Dambi Dollo town is located 652 km to the west of Addis Ababa/Finfinne. Dambi Dollo Municipal abattoir slaughtered about 4424 cattle animals during 2021. According to the Ethiopian legislations of meat inspection, slaughtering of female cattle never been allowed before all teeth are changed (over 5 years) while they approved for slaughtering after about 2 years.

Samples collection

A total of 4424 (4400 bulls and 24 cows) local breed cattle slaughtered at Dambi Dollo Municipal abattoir were inspected for the presence of liver fluke/fasciolosis allover 2021 which was efficiently inspected by naked eye and palpation for the presence of gross lesion and the worms, then further examinations done at Laboratory level. All data samples collected were transported in an icebox to the laboratory of Type B Veterinary Clinic of the town for further examinations within 24 hrs.

Samples preparation for postmortem inspection

Liver and gall bladder postmortem inspection by making multiple cuts and sub cuts about 1 cm thick to check the presence of fasciolosis, which made gritty sounds and bile duct thickness, palpation pressure, exerted brownish fluid, and immature *Fasciola*. Identification of the species based on the morphological features of the agent and classify into *F. gigantica* and *F. hepatica* [15,16].

To calculate the total sample size, the following assumptions were made: 5% desired level of precision, 95% level of confidence, and 50% expected the

*Address for Correspondence: Tesfaye Itefa, Department of Veterinary Medicine, Kellem Wollega Zone Agriculture Office, Expert of Livestock Health, Ethiopia, E-mail: tesfish153@gmail.com

Copyright: © 2022 Itefa T, et al. This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

Received: 16 April 2022; Manuscript No. ahbs-22-61028, Editor assigned: 18 April 2022, PreQC No. P-61028; Reviewed: 02 May 2022, QC No. Q-61028, Revised: 07 May 2022; Manuscript No. R-61028; Published: 14 May 2022, DOI: 10.37421/ahbs.2022.6.161

prevalence of cattle fasciolosis in Dambi Dollo Municipal abattoir, the sample size was determined by using the formula given below [17].

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

Where,

n = required sample size,

P_{exp} = Expected prevalence,

d=desired absolute precision. But in current stud, all slaughtered animal samples were taken for good precision.

Statistical analysis

The obtained results were encoded and recorded in an excel database analyzed by descriptive statistics survey were performed using Graph Pad Instant version 3 for determination of means and the analysis of variance between the different data. The treatment, in this study, was determined using standard error and analysis of variance ($p < 0.05$). The incidence of fasciolosis was 8/24 (33.33%) and 1356/4400 (30.82%) for females and males cattle carcasses, respectively.

Seasonal liver fasciolosis condemnation rates in examined cattle and buffaloes samples

As illustrated in Table 1, results revealed that cattle's fasciolosis is higher during spring and summer. The highest fasciolosis infection found in winter followed by autumn, spring, and summer. There was a significant difference in between different seasons while there was not any significance between males and females cattle. The highest fasciolosis infection found in winter followed by autumn, spring, and summer. There was a significant difference in between different seasons. The cattle fasciolosis prevalence rate was (35.04%, 22.73%, 18.48%, and 23.75%) during winter, spring, summer, and autumn, respectively.

Macroscopic liver fasciolosis in examined cattle samples

Grossly regarding fasciolosis infection during slaughterhouse postmortem inspection (Table 1) showing the external smooth liver surface declared several white or creamy tunnels ranged from few millimeters to nearly 3 cm, represented the postmortem liver fibrosis appear from external liver surface. Fasciolosis tunnels which observed from intact liver surfaces oozing grassy blackish hemorrhagic exudates. Creamy leaf-like *Fasciola* spp. about 1.5-2.0 cm in length and about 1.0 cm in width were observed by naked eye from the liver of the slaughtered cattle (Table 2).

Results

Prevalence of liver fasciolosis in examined cattle samples

The results obtained in Table 2 indicated that the overall prevalence rate of *Fasciola* infection occurs in the study area were 1364/4424 (30.83%) from the total slaughtered cattle carcass.

The sex based prevalence of fasciolosis was 8/24 (33.33%) and 1356/4400 (30.82%) for females and males cattle carcasses, respectively (Table 1).

Discussion

Fasciola spp. is a parasite threatening domestic ruminants and public health. Transmission of this trematode infection is depending on the presence of intermediate "lymnaea snail" host and final host. This snail host commonly presents in high density during rainfall period annually and/or in highly moist pastures soil [13,18]. The overall prevalence rate of fasciolosis in the examined cattle slaughtered in Dambi Dollo town municipal abattoir was about 1364/4424 (30.83%) which nearly agreed with Morsy TA, et al. [19], who previously found 25.5% in Egypt. On the other hand, higher incidences of fasciolosis have

Table 1. Seasonal liver fasciolosis condemnation rates in examined cattle slaughtered at the municipal abattoir of Dambi Dollo town was significantly different ($p > 0.05$).

Season	Winter	Spring	Summer	Autumn
Rate of infection	35.04	22.73	18.48	23.75

Table 2. Prevalence of liver fasciolosis in examined cattle and buffaloes slaughtered at the Dambi Dollo municipal abattoir.

Examined Animals	Examined	Positive	Prevalence%	Overall Prevalence%
Cattle	-	-	-	-
Females	24	8	33.33	-
Males	4400	1356	30.82	-
Total	4424	1364	-	30.83

been recorded by Pfukenyi DM and Mukaratiwa S [20], who reported 37.1% in Zimbabwe and Abraham JT and Jude IB [13] recorded 44.8% in Nigeria. However, there were some remarkable lower results reported by Mellau LSB, et al. [21], who found 16.3% in Tanzania, Haridy FM, et al. [22] noted 21.8% in Gambia Governorate, Afrakhosravi EB [23] reported 11.09% in Iran, and Mungube EO, et al. [24] recorded 26% in Kenya. Human fasciolosis was been occurred after the consumption of encysted cercaria and not by eating of animal livers infected by adult *Fasciola* spp.

The ingestion of watercress vegetables grown along contaminated water by snails and domestic ruminant fecal matters with adult parasite [25]. Our reported seasonal liver fasciolosis condemnation rates revealed that is lower during winter and autumn than in spring and summer.

Accordingly, the study found that (35.04%, 23.75%, 22.73%, and 18.48%) during winter, autumn, spring, and summer, respectively. This finding might be attributed to raining season and presence of fresh green grazing pasturing. This finding was supported by the previous findings reported by Adedokun OA, et al. [26] who reported in winter (52.3%) and in dry season (21%) in Nigerian cattle, while, fasciolosis was highest in winter (around the raining periods) and/or dampness area due to spreading of the snails host [13,23,27,28].

Fasciolosis occurs mainly not only in children living in rural settings but also in people living in urban areas by metacercarial of the fluke is ingested along with watercress salad and vegetables grown along banks of water reservoirs inhabited by potential snail hosts. About 2.4 million people infected world wide and 180 million are at risk of the infection fasciolosis commonly asymptomatic children infection with mild anemia. Humans' fasciolosis is mainly correlated with highly eggs excreted areas and not related with highly animals' fasciolosis and sometimes infection transmitted by human stool contamination [29].

In this study, the routine macroscopic postmortem fasciolosis inspection revealed that infected liver have numerous injuries with congestion, enlargement with very hard fibrosis. Postmortem visually examination of intact liver also showing the presence of different sizes (1.5-2.7 cm) of *Fasciola* spp. impeded on the hepatic tissue with characteristic white or creamy color. Hepatic postmortem incision is showing thick wall fibrosis by fasciolosis tunnels which oozing grassy blackish exudates and debris. The trials to opening this tunnel exerted leaf-like liver flukes that diminished infected liver and carcass value and resulted in rejection of liver by consumers.

Similar lesions were observed by authors in Bangladesh [18] and in Nigeria [2,13]. According to Ethiopian veterinary authorities, detection of fasciolosis in liver should be removed total liver condemnation or partial affected lobes after performing boiling tests and rapid phase according to parasitic infestation density and extension. The rest carcass was been released for human consumption [25]. Controlling fasciolosis mainly by anthelmintics, this only acts against at mature stages. Triclabendazole is the only drug, which affects against both immature and mature stages fascioliasis. Anthelmintic administered during December/January and from April/May for controlling chronic fasciolosis, a third dose should be given in August. However, molluscicides were been recommended for snail control [20,30].

Conclusion and Recommendation

The present study revealed a moderate fasciolosis infestation in cattle in the municipal abattoir of Dambi Dollo town, and the study is recommended that it is important to enhance snail and fasciolosis control at farm levels to diminish the economic losses due to infection. Thorough meat inspection should also be taken on abattoir by experts.

References

1. Oladele-Bukola, M.O., and Ismael A. Odetokun. "Prevalence of bovine fasciolosis at the Ibadan municipal abattoir, Nigeria." *African J Food Agric Nutr Dev* 4 (2014): 9055-9070.
2. Kalu, E., U. Akpabio, and D. I. Gloria. "A case of chronic fascioliasis in a cattle slaughtered at Ubakala Abattoir." *J Vet Adv* 6 (2015): 1017-1022.
3. Haridy, Fouad M., Tosson A. Morsy, Nabil I. Gawish and Thanaa N. Antonios, et al. "The potential reservoir role of donkeys and horses in zoonotic fascioliasis in Gharbia Governorate, Egypt." *J Egypt Soc Parasitol* 2 (2002): 561-70.
4. Dietrich, C.F., A. Kabaalioglu, E. Brunetti and J. Richter. "Fascioliasis". *Z Gastroenterol* 53 (2015): 285-290.
5. Amer, Said, Ahmed Elkhatam, Shereif Zidan and Yaoyu Feng, et al. "Identity of *Fasciola* spp. in sheep in Egypt." *Parasites & vectors* 1 (2016): 1-8.
6. Farag, Hoda F. "Human fascioliasis in some countries of the Eastern Mediterranean Region." *EMHJ-Eastern Mediterranean Health J* 4 (1998): 156-160.
7. Walker, S.M., Asanteli Eliangikundi Makundi, F. V. Namuba and Ayub Ahmad Kassuku, et al. "The distribution of hepatica and *gigantica* within southern Tanzania—constraints associated with the intermediate host." *Parasitol* 4 (2008): 495-503.
8. Bazh, E.K., Noha. A. Beder, M. Ayoub, and Kadry Sadek. "Infection among cattle and buffaloes at Behera Governorate, Egypt." *Zagazig Vet J* 40 (2012): 125-136.
9. Mason, C.S. "Fasciolosis associated with metabolic disease in a dairy herd and its effects on health and productivity." *Cattle Pract* 12 (2004): 7-13.
10. Phiri, I. K., A. M. Phiri, and L. J. S. Harrison. "Serum antibody isotype responses of -infected sheep and cattle to excretory and secretory products of species." *Vet Parasitol* 3 (2006): 234-242.
11. Eman, K. A., M. B. Sherif, and S. F. Reda. "Molecular characterization of hepatica infecting cattle from Egypt based on mitochondrial and nuclear ribosomal DNA sequences." *J Parasitol* 11 (2016): 61-66.
12. Biu, Abdullahi A., Musa I. Ahmed, and Simon S. Mshelia. "Economic assessment of losses due to parasitic diseases common at the Maiduguri abattoir, Nigeria." *African Scientist* 3 (2021).
13. Abraham, J. T., and I. B. Jude. "Fascioliasis in cattle and goat slaughtered at Calabar abattoirs." *J Biol Agric and Healthcare* 18 (2014): 34-40.
14. Rokni, Mohammad Bagher, Hossein Mirhendi, M. Behnia and Majid Fasihi Harandi, et al. "Molecular characterization of hepatica isolates by RAPD-PCR and ribosomal ITS1 sequencing." (2010): 27-32.
15. Soulsby, E. J. L. "Helminths." *Arthropods and Protozoa of domesticated animals* 291 (1982).
16. Urquhart, G. M., J. Armour, J. L. Duncan, A. M. Dunn, and F. W. Jennings. "Veterinary parasitology." Great Britain: Black Well P 232 (1999).
17. Thrusfield, Michael. "Veterinary epidemiology." John Wiley & Sons, 2018.
18. Talukder, Saidul., M. J. Bhuiyan, Md Mukter Hossain and M. M. Uddin, et al. "Pathological investigation of liver fluke infection of slaughtered black Bengal goat in a selected area of Bangladesh." *Bangladesh J Vet Med* 1 (2010): 35-40.
19. Morsy, Tosson A., Hala S. Salem, Fouad M. Haridy and Manal M. Rifaat, et al. "Farm animals' fascioliasis in Ezbet El-Bakly (Tamyia Center) Al-Fayoum Governorate." *J Egypt Soc Parasitol* 3 (2005): 825-832.
20. Pflukenyi, Davies Mubika, and S. Mukaratirwa. "A retrospective study of the prevalence and seasonal variation of *gigantica* in cattle slaughtered in the major abattoirs of Zimbabwe between 1990 and 1999." *Onderstepoort J Vet Res* 3 (2004): 181-187.
21. Mellau, Lesakit S.B., Hezron Emmanue Nonga, and Esron Daniel Karimuribo. "A slaughterhouse survey of liver lesions in slaughtered cattle, sheep and goats at Arusha, Tanzania." *Res J Vet Sci* 3 (2010): 179-188.
22. Haridy, Fouad M., Gehad T. El-Sherbiny, and Tosson A. Morsy. "Some parasitic flukes infecting farm animals in Al-Santa Center, Gharbia Governorate, Egypt." *J Egypt Soc Parasitol* 1 (2006): 259-264.
23. Afrakhosravi, E.B. "Epidemiology of hepatica in Iran." *Int J Biol* 4 (2011): 87.
24. Mungube, E. O., S. M. Bauni, B-A. Tenhagen and L. W. Wamae, et al. "The prevalence and economic significance of *gigantica* and *Stilesia hepatica* in slaughtered animals in the semi-arid coastal Kenya." *Trop Anim Health Prod* 6 (2006): 475-483.
25. Soliman, Maha F.M. "Epidemiological review of human and animal fascioliasis in Egypt." *J Infect Dev Ctries* 03 (2008): 182-189.
26. Adedokun, Oyeduntan A., Adekunle B. Ayinmode and Benjamin O. Fagbemi. "Seasonal prevalence of *gigantica* infection among the sexes in Nigerian cattle." (2008).
27. Oryan, Ahmad, Maryam Mansourian, Mohammad Moazeni and Behrooz Nikahval, et al. "Liver distomatosis in cattle, sheep and goats of Northeastern Iran." *Glob Vet* 3 (2011): 241-246.
28. Mochankana, M. Ernest, and Ian D. Robertson. "A retrospective study of the prevalence of bovine fasciolosis at major abattoirs in Botswana: research communication." *Onderstepoort J Vet Res* 1 (2016): 1-5.
29. World Health Organization. "Report of the WHO informal meeting on use of triclabendazole in fascioliasis control: WHO headquarters, Geneva, Switzerland 17-18 October 2006." World Health Organization, (2007).
30. Spithill, Terry W. "Gigantica: Epidemiology, control, immunology and molecular biology." *Fasciolosis* (1999): 465-525.

How to cite this article: Itefa, Tesfaye, Yoseph Alemu, Ebisa Regasa and Amanuel Alemu, et al. "Prevalence of Fasciolosis (Liver Flukes) Infection in Cattle Slaughtered at Dambi Dollo Town Municipal Abattoir, Kellem Wollega Zone, Ethiopia." *J Anim Health Behav* 6 (2022): 161