Research Article

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Prevalence of Bovine Fasciolosis in Postmortem Examination at Dinkula town of Endegagn Woreda Municipal Abattoir, Ethiopia

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Abstract

A cross sectional study was conducted to determine the prevalence of Fasciolosis in Dinkula town of Endegagn Woreda Municipal Abattoir, Gurage Zone, Southern Ethiopia from November 2020 to May 2021. A total of 384 slaughtered cattle were randomlyselected and examined for the presence fasciola to estimate the prevalence of fasciola in the area. The age, sex, origin, and body condition of selected individual cattle was recorded during ante mortem examination and post mortem examination of their livers and associate bile duct were carefully examined by visualization and palpation of the entire organ was followed by incision along the bile ducts of the lobes. From 384 examined cattle, 151 (39.3%) were found positive for fasciolosis. However, F. hepatica was the more predominant (60.9%) liver fluke species infecting cattle slaughtered in the area when compared to F. gigantic (19.2%).The prevalence of fasciolosis was significantly (P<0.05)associated with origin and body condition of cattle. However, there was no significant difference (p>0.05) in the prevalence of fasciolosis among different sex and age groups. The study indicates the presence of significant infection on the study area which indicates the existence of conducive environmental conditions for the development and survival of the parasite. Therefore, regular Dewormng of the cattle and controlling of the parasites and drainage of swampy areas which are favourable for snail multiplication were recommended for better handling of their cattle and being beneficiary from their animal.

Keywords: Abattoir, Bovine, Cattle, Endegagn, Fasciolosis, Prevalence

Introduction

Ethiopia has the largest cattle population in Africa, with around 59.5 million cattle, 30.7 million sheep, and about a similar number of goats, 1.2 million camels, and 59.5 million chickens (CSA, 2017). The contribution of livestock industry to the national economy is considerably less than its tremendous potential. Among many constraints that made the livestock sector marginal is due to prevalent of different diseases, malnutrition, and management constraints. Parasitism represents a major obstacle to the development of the sector (Mage*et et al*., 2002).

Fasciolosis is one of an important parasitic disease of domestic ruminants (Mas *et al*., 2005). The disease is caused by digeneantrematodes of the genus *Fasciola*, commonly referred to as liver flukes. The two species most commonly implicated as the etiological agents of fasciolosis are *F. hepatica* and *F. gigantica. F. hepatica* has a worldwide distribution but predominates in temperate zones while *F. gigantica*is found on most continents, primarily in tropical region (Anderws, 1999). The damage caused by liver flukes to the animal host includes the destruction of tissues during their migrations in the body, especially in the

liver and in the case of *F.hepatica* thickening of bile ducts. Such liver, when they are seriously damaged, are subject to condemnation at meat inspection.

The disease is responsible for considerable economic losses in the cattle industry, mainly through mortality, liver condemnation, reduced production of meat, milk, and wool, and expenditures for anthelmintic ((Ramjo*et al.*, 2009) and morbidity in cattle characterized by weight loss; reduce carcass quality, anemia and hypoproteinemia (Urqauhrt *et al*., 2007. The disease is found in vast water lodged and marshy grazing field condition, these provide suitable habitats year round for the snail intermediate hosts (Solomon and Abebe, 2007). Many researchers have reported the prevalence of fasciolosis in cattle in different parts ofEthiopia. However, no information is available about its prevalence and species of bovine fasciolosisin the study area. Therefore, the aim of this study was to determine the prevalence of bovine fasciolosis and to identify species of bovine fasciolosis at the study area.

Materials and Methods

Study Area

A cross sectional study was conducted from November 2020 to May 2021 at Dinkula town of Endegagn Woreda Municipal Abattoir, Gurage Zone, Southern Ethiopia. The area is located 230 km Southwest of Addis Ababa with a latitude and longitude of 7º45' East and 37º36' West, respectively. The agro ecology of the study area is 70.5% Highland 29.5%, Midland. The mean minimum and maximum annual temperature ranges from 15ºC to 25ºC, and mean annual rainfall ranges between 1200 and 1400 mm (AGP , 2017).

Study Animal

The study animals were local cattle breeds brought from different area to Dinkula municipal abattoir for slaughter. The origin (place), sex, age, and body conditions of all sample cattle were record to estimate the prevalence of fasciolosis.

Study design

A cross-sectional study was carried out from November 2020 to May 2021 on randomly selected cattle to investigate the prevalence of fasciolosis in bovine slaughtered at Dinkula municipal abattoir and

postmortem inspection of liver was carried out. During the study period special attention was given to the liver of each slaughtered animal and carefully examined by visualization and palpation of the entire liver that was followed by transverse incision of the organ across tinny left lobe of liver to confirm the problem (Jenny, 2009).

Sample Size Determination

The sample size was determined by taking 50% expected prevalence since there is no recorded prevalence of bovine fasciolosis in Endegagn Woreda municipal abattoir. Confidence interval of 95% and 5% desired absolute precision was taken. The sample size of study was determined by using the formula given by Thrustfied (2005).

$$N= \frac{1.96^{2} \times pexp(1-pexp)}{d^{2}}$$

Where; N=require sample size, 1.96 = the value of z at 95% confidence interval
d= desired absolute precision(5%), pexp=Expected prevalence (50%) accordingly,
a total of 384 cattle

Ante Mortem Examination

Data collect was include age, sex, body condition score (BCS), origin of animals. Study animals was categorized in to two age groups as young (<6 years) and adults (> 6years) based on their dentition (Johnson,2007). In addition, animals was also classified in to three groups based on their body condition score (BCS) as poor, medium, good and sex as female and male.

Post Mortem Examination

Animals were examined during the ante mortem further supervise and their livers and associate bile duct were carefully examined by visualization and palpation of the entire organ was followed by incision along the bile ducts of the lobes (FAO, 2003). Liver parenchyma and major bile ducts was examined for the presence of immature and adult Fasciola parasites, respectively. Species are identify based on size and morphological characteristics according to Soulsby (1982)

Data Analysis

Data of the current study was entered into Microsoft Excel spread sheet to create a data baseand analyzed using SPSS software version 20. Descriptive statistics was used to determine the prevalence of the parasite and Chi-square (2) test was used to assess the association of the prevalence of fasciolosis and its associated risk factors such as sex, age, origin, and body condition score of the animals.

Results

Out of 384 examined cattle, 151 (39.3%) were positive for fasciolosis. The prevalence of *Fasciola hepatica* was the highest with 60.9% followed by *F.gigantica*19.2%. The prevalence of mixed infestation and immature flukes were 8.6% and 11.9% respectively shown by Table 1.

Table1: Prevalence of Fasciola species in cattle slaughtered at Dinkula municipal abattoir

Fasciola species	no of infected liver	Prevalence (%)
F. hepatica	92	60.9
F. gigantica	29	19.2
Mixed	13	8.6
Immature	18	11.9
Total	151	39.3

A total 340 male and 44 female animals were examined for fasciola prevalence and a prevalence of 40% and 34% were obtained in male and female animals respectively. The result indicated that there

was no a significant difference (*P> 0.05*) in the prevalence of fasciolosis between different sex group shown in the Table2 below

Table 2. Prevalence of bovine Fasciolosis based on sex

Sex	no of examined cattle	Positive	Prevalence(%)	2	P-value
Male	340	136	40	0.57	0.450
Female	44	15	34		
Total	384	151	39.3		

A total of 312 adult and 72 young cattle were examined for the prevalence of fasciolosis. *Fasciola*was detected in all age groups and a higher prevalence of fasciolosis was recorded in old animalsand the prevalence of these age groups was

found to be 37.8% for adult and 45.8% for young.However, there was no significant difference *(p>0.05)*in the prevalence of bovine fasciolosis between the different age groups shown below in the Table3.

Table 3. Prevalence of bovine Fasciolosis based on age

Age	no of examined cattle	Positive	Prevalence(%)	2	P-value
Young	72	33	45.8	1.57	0.210
Adult	312	118	37.8		
Total	384	151	39.3		

The prevalence of fasciola from examined animals of different origin was Endegagn (41.6%), Geto (54.4%), Enamoraner (24.2%), and Amaka (31%). High prevalence of bovine fasciolosis was observed from animals of Geto origin. There was high significant difference$(P<0.05)$ in bovine fasciolosis between animals of different origin shown in the Table4 below.

Table 4: Prevalence of Bovine fasciolosis on orgin basis

Origin of cattle	No of animal examined	positive	Prevalence(%)	2	P-value
Endegagn	185	77	41.6	17.55	0.001
Geto	79	43	54.4		
Enamoranear	91	22	24.2		
Amaka	29	9	31		
Total	384	151	39.3		

Out of 384 examined cattle, 183 good, 122 medium and 79 poor body condition animals were examined and the prevalence was 31.6%, 41.8%, and 53.1% respectively. The result showed that there was a significant difference $(P<0.05)$ in the prevalence of bovine fasciolosis in different body condition score shown in the Table 5 below.

Table 5: Prevalence of bovine fasciolosis on body condition basis

Body condition	No. of animal examined	Positive	Prevalence (%)	2	p. value
Good	183	58	31.6	11.12	0.004
Medium	122	51	41.8		
Poor	79	42	53.1		
Total	384	151	39.3		

Discussion

The current study indicated that the prevalence of bovine fasciolosis during the study period was (39.3%). The result of the current study was higher than the report of Abunna *et al.,* (2009) and Nuraddis *et al*. (2010) who reported prevalence of 14.0% and 28% at Wolaita Soddo abattoir and at Kombolcha Industrial Abattoir, Ethiopia. However, it is lower than the results of Gebrie and Wondmnew (2020)who reported prevalence of 56.4% at Bahir Dar Municipal Abattoir and Tadele and Worku (2007) that showed prevalence of (46.58%) fasciolosis in cattle in Jimma municipal abattoir. This variation may be due to the ecological and climatic condition such as altitude, rain fall, and temperature for the presence of their intermediate snail host.

Fasciola hepatica wasthe highestspecies causing bovine fasciolosis in the current study abattoir (*F.hepatica* (60.9%), *F.gingatica* (19.2%), mixed (8.6%), and imature fluke (11.9%)). The result of the current study was inline with the result of Tolosa and Worku (2007) who reported prevalence of 60.3% of *F. hepatica*, 23.85% of liver harbored *F.gigantica*; and 11.93% harbour immature fasciola species were recorded at Jimma municipal abattoir respectively. However the current result was not in agreement with the report of Fufa *et al.,* (2009) who reported the highest prevalence of *F.gigantica* in Soddo municipal abattoir. The high prevalence of *Fasciola hepatica* may be associated with the existence of favorable ecological conditions for the intermediate host of *Fasciola hepatica (Lymnaeatruncatula).*

The current study indicated that there was no a significant difference in the prevalence of fasciolosis in animals of different sex group. The result of the current study was consistent with several previous studies in different parts of the countries (Keyyu *et al.,* 2005; Kabir *et al.*, 2010). This could be associated with similar management given to both male and females cattle. Moreover, it might also be that fasciolosis is not a disease directly related to animal reproductive system. However, in the study, the number of male cattle examined was higher than the female cattle.

These female cattle may not have been adequately represented in the study. The result of the current study indicated that age has no significant effect on the prevalence of bovine fasciolosis. The current finding was in line with the result of Seid *et al.*, (2017) who reported that age has no significant effect on the prevalence of bovine fasciolosis. The result of current study showed that the origin the cattle has significant effect on the prevalence of bovine fasciolosis. The highest prevalence of fasciolosis was observed in Geto (54.4%) followed by Endegagn (41.6%). This difference is strongly associated with the difference in the presence of favorable environments for the existence, multiplication and spread of host snail and the parasite in the area and may be due to the presence of good husbandry control and strong cattle management Radostits *et al.*, (2007).

The prevalence of fasciolosis was found to be 53.1%, 41.8% and 31.6% in poor, medium and good body conditioned animals, respectively. The result of the present study indicated that fasciolosis in poor body condition cattle were significantly higher (p<0.05) than that of medium and good body conditioned animals. This indicates that the body condition of the animal has significant association with the occurrence of fasciolosis. The prevalence of fasciolosis was higher in the animals with poor body condition because this body condition in cattle is manifested when fasciolosis reaches at itschronic stage, in addition to this,the high prevalence of fasciolosis in poor body conditionanimals could be justified by the fact given by Devendra and Marca (1983) who indicated that cattle of poor body condition are vulnerable to parasitic diseases.

Conclusion

The result of the present study on bovine fasciolosis at Dinkulatown of EndegagnWoredaMunicipal Abattoir reveals that fasciolosis significantly prevalent parasitic disease affecting the health and productivity of the animals, and the disease remains an important health problem to the animals in the study area. The study indicates presence of significant infection on the study area which indicates the existence of favorable environmental conditions for the growth and survival of the parasitein the areas of the source origin of the animals. Therefore, based on the above conclusion, the following points are recommended;

➢ Identification and mapping of snail habitats may enable grazing plans to be devised that avoid danger areas at times of high risk where habitats are restricted in size and clearly defined, it may be possible to exclude stock by fencing.

➢ Drainage of swampy areas which are favourable for snail multiplication should be control by snail control methods.

➢ Strategic antihelmenthics treatment with appropriate flukicidal is most suitable measures if supported by detailed local epidemiological study on the seasonal dynamics of infection in particular area.

➢ Further studies should be conducted on the epidemiology, biology and ecology of intermediate host snail in the area, to help the planning and implementation of disease control strategies and husbandry measures.

Acknowledgments

References

Abunna, F., Asfaw, L., Megersa, B., andRegassa, A., 2010. Bovine fasciolosis: coprological, abattoir survey and its economic impact due to liver condemnation at Soddo municipal abattoir, Southern Ethiopia. *Trop. Anim. Health Prod. 42:289-292*.

AGP ., 2017. Agricultural production constraints in agricultural growth program woredas in SNNPR.

Anderws, S.J., 1999. The life cycle of Fasciola hepatica.Fasciolosis (CABI publishing, walling Ford, UK.Pp.1-30

CSA.,2017. Report on livestock and livestock characteristics, Agricultural Sample Survey 2016/17 (2009 E.C.). Statistical Bulletin No. 585, Vollume II. Addis Ababa.

Devndra.C. and Marca,B., 1983.Livestock production in tropics: Common Wealth Agriculture Bureaux.Published by Unwin Limited.Old working.Surrey.Pp: 90-92.

FAO. 2003. Food and agricultural organization production year book, Rome, Italy, pp 32.

Fufa, A., Loma, A., and Bekele, M., 2009.Bovinefasciolosiscoprological, abattoir survey and its economic impact due to liver condemnation at Soddo municipal abattoir, Southern Ethiopia.*Trop .Anim.HealthProd*.

Gebrie, Y. and Wondmnew, T.,2020.Prevalence Bovine Fasciolosis in Postmortem Examination at Bahir Dar Municipal Abattoir, Bahir Dar, Ethiopia.Journal of Animal Husbandry and Dairy Science Volume 4, Issue 2 , PP 30-36.

Jenny T., 2009. How to estimate the age of cattle, Department of Agriculture, Forestry, Fishery, and Republic of South Africa.

Kabir, M. H., Eliyas, M., Hashem, M. A. and Miazi, O. F., 2010.Prevalence of zoonotic parasitic diseases of domestic animals in different abattoir of Comilla and Brahman Baria region in Bangladesh.*Journal of zoology,*28, 21-25.

Keyyu.,G.D., Monrad, J., Gaard,N. C. and Kassuku, A., 2005. Epidemiology of *Fasciolagigantica*and*Amphistomes*in cattle on traditional small scale dairy and large scale dairy farm in the southern highlands of Tanzania.

Mas, S, Bargues, M.D, & Valero, M. A., 2005.Fasciollosis and Plant borne trematode zoonosis.*International Journal of parasitology*, 35, 11-12.

Mage, C., Bourgne, H., Toullien, J. M., Rondelaud, D., Drefuss, G., 2002. Fasciola hepatica Paramphistomumdaubneyi: changes in prevalences of natural infections in cattle and in Lymnaeatruncatula from central France over 12 years. Veterinary Research, 33, 439- 447.

Nuraddis I., Wasihun P.and Tolosa, T., 2010.Prevalence of Bovines Fasciolosis and Economic Importance due to Liver Condemnation at Kombolcah Industrial Abattoir, Ethioipia.*The Internet J. Veterinary Medicine, 8(2).*

Radostits, O., Gay, C., Hinchcliff, K. and W. Constable, P., 2007.Veterinary Medicine.A textbook of the diseases of cattle, horses, sheep, pigs and goats.10th edition. SAUNDERS ELSEVIER London. Pp: 1575.

Ramajo, V., Oleaga, A., Casanuera, P., Hillyer, G. &Muro, A., 2009. Vaccination of sheep

Against Fasciola hepatica with homologous fatty acid binding protein. Veterinary Parasitology 97(1), 35-46.

SeidHusen, ShimelisGirma, JibichoGuye, MengistuGeleta,TegenuHabebie, Mohammad Hussen, MukarimAbdurahaman.,2017. Prevalence of Bovine Fasciolosis in Gechi District, BunoBedelle Zone, South West Ethiopia. *Volume 5, Issue 12, 28-33.*

Solomon, W. and Abebe, W., 2007.Effects of astrategyantehelmtic treatment intervention bovinefasciolosis.A conducted in facilities in endemic area in north western Ethiopia.*Veterinary, journal. 11(2) Pp, 59-68.*

Soulsby, E., 1982. Helminth, Artropods and protozoa of domesticated animals, Bellaire Tindal,London, UK. 7, 40-52.

Tadelle, T. and Worku, T., 2007.The Prevalence and economic significance of bovine Fasciolosis at Jimma abattoir, Ethiopia.*The internet journal of veterinary medicine, 3, 15.*

Tolosa, T.,and Worku,T.,2007. The Prevalence and Economic Significance of Bovine Fasciolosis atJimma Abattoir, Ethiopia.*The Internet J. Vet. Med.3(2).*

Thrusfied, M., 2005. Veterinary epidemiology, second editon,university of Edinburgh,Black well science, Pp: 180-188.

Urguhart, G. ,Armour, J. , Duncan , J. L., Dunn , A , M. & Jennings,F., 2007. Veterinary parasitology, secondition, singapor,Longmann