



Prevalence and Economic Losses Due To Bovine Fasciolosis on Cattle Slaughtered at Bonga Municipal Abattoir, South-West Ethiopia

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Abstract

A longitudinal study was conducted from September to January 2021 to determine the prevalence and its economic losses due to bovine fasciolosis in cattle slaughtered at Bonga municipal abattoir, Kaffa Zone, South-West Ethiopia. A total of 450 animals' livers were examined, from which 89 were found positive for liver fluke infection (fasciolosis) with an overall prevalence of 19.78%. The prevalence of fasciolosis has shown variations between animals originating from five different districts namely Gesha, Saylem, Gimbo, Tello and Adiyo. Higher prevalence 25.20% (n=123) was found in animals originating from Gesha districts, than the other four districts that include 17.18% (n=64) Saylem districts 20.00% (n=110) from Gimbo districts, 12.96% (n=54) 18.18(99) tello districts and the least 12.96% (n=54) from Adiyo districts. There was statistically significant difference ($p < 0.05$) in prevalence of fasciolosis between cattle originating from the five different districts. Sex has statistically significant ($p > 0.05$) influence on the prevalence of fasciolosis. The prevalence of fasciolosis was analysed by body condition score and there was significantly ($p < 0.05$) higher infection in animals with poor body condition than with good body condition. The study shows that prevalence of fasciolosis was 26.23% on adult and 15.35% on older cattle. There was statistically significant difference ($p < 0.05$) in prevalence between the two age groups. Based on the prevalence of bovine fasciolosis in the current study, the direct financial loss resulted from livers condemned due to fasciolosis during the 150 days of study period was estimated at 71,200 ETB. The study has recommended that farmers should be made more aware of the fact that fasciolosis is a serious animal health problem in the study area with additional financial loss from condemnation of affected livers. Appropriate methods of controlling fasciolosis should be adopted that include regular deworming of cattle with correct doses and regime; and the use of molluscicides to kill snails in the breeding places where cattle graze.

Keywords: Abattoir; Bovine fasciolosis; Economic losses; Liver; Prevalence; Bonga

Introduction

Ethiopia is known by huge livestock population. According to reported data livestock population is assumed to be 59 million cattle, 35 million sheep, 31 million goats, 2.3 million camels, more than 9 million equines (donkey, horse and mule) and 38 million Poultry and leading the other African countries. However, such a large number domestic animals that the country possesses, the production and productivity still remains low of which the country at large could not be benefited as been expected, because of different reasons, such that the prevailing animal diseases, low genetically potential, feed scarcity, backward managements constraints and cultural practices. Fasciolosis, also known as liver fluke disease, is an economically important disease of domestic livestock, in particular cattle and sheep, and occasionally man. The disease is caused by digenean trematodes of the genus *Fasciola*, family Fasciolidae, commonly referred to as liver flukes. The two species most commonly implicated as the aetiological agents of fasciolosis are *Fasciola 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 regions (Andrews [1]). The Digenea are sub-class within the class Trematoda generally characterized by a complex life cycle in which one or more intermediate hosts are involved. Many variations on the life cycle exist, but each typically includes a molluscan primary or intermediate host in which larval multiplication occurs, and a vertebrate final or definitive host in which sexual reproduction occurs. Members of the family Fasciolidae are hermaphroditic and self-fertilization can occur, although sexual reproduction is normally by cross-fertilization in the final host (Andrews [1]). Integral to the successful completion of the life cycle, are biological and physical factors that favour occurrence of fasciolosis include moisture and temperature that could allow persistent

surface wetness on pasture for the snail and free living stages of the parasite to thrive (Ekwenife and Eneanya [2]). Grazing cattle in wet lands during dry season promote infestation of cattle with fasciolosis. Clinical signs of fasciolosis include weight loss, anemia, diarrhoea, and sub mandibular edema due to hypoalbuminemia (Abebe et al. [3]). But these are not pathognomonic for fasciolosis and therefore difficult to diagnose on the basis of clinical signs. The presence of fasciolosis due to *F. hepatica* and *F. gigantica* in Ethiopia has long been known and its prevalence and economic significance has been reported by several workers (Graber, Goll [4] and Scott, Fufa et al. [5]). Available published reports have indicated that bovine fasciolosis causes economic losses of roughly 350 million ETB per annum due to decreased productivity alone (Mulugeta et al. [6]). More recently, Tolosa and Tigre [7] and Fufa et al. [5] have reported financial losses of 6300 USD and 4000 USD per annum, respectively due to liver condemnations at slaughterhouses. Abattoir studies have shown that significant financial losses result from liver condemnation (Mwabonimana et al. [8]; Abebe et al. [3]). Fasciolosis causes economic losses to cattle farmers and cattle traders in many ways: by causing loss of body condition in affected cattle, unthriftiness and reduced growth rate; reduced fertility, milk

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production and drought power; increased costs of anthelmintics, drenches, lobar; losses due to condemned liver at slaughter, and sometimes of mortalities (Molime [9]). The prevalence of fasciolosis in many parts of Africa has been determined mainly at slaughter. Hence abattoir liver inspection plays a great role in establishing the prevalence of fasciolosis on the animal species of importance. From the two Spp. Of *Fasciola*, the one most frequently and commonly found in cattle in Ethiopia is *F. hepatica* (Abebe et al. [3]). However estimation of economic loss due to fasciolosis at national or regional level is limited by lack of accurate estimation of the prevalence of disease (Phiri et al. [10]). Therefore the objectives of the present study were:

- To determine the prevalence of bovine fasciolosis in cattle slaughtered at Bonga Municipal Abattoir, and
- Estimate the economic losses incurred by cattle owners due to abattoir condemnation of liver infested with the parasite in the study area.

Materials and Methods

Description of the study area

A longitudinal study design was carried out from September to January 2021 on cattle slaughtered at Bonga municipal abattoir, kaffa Zone, South-Western Ethiopia. The study has purposefully selected from Bonga municipal abattoir to involve cattle originating from different peasant association found in Bonga town of the kaffa Zone, that are covered with swampy/marshy grazing lands. Usually cattle comes from these peasant association are slaughtered at Bonga municipal abattoir found in Bonga town. Bonga is a town and separate woreda in south-western Ethiopia. Located southwest of Jimma in the Keffa Zone of the South western Ethiopia Peoples Region upon a hill in the upper Barta valley, it has a latitude and longitude of 7°16'N 36°14'E with an elevation of 1,714 meters above sea level.

Description of the abattoir

Bonga abattoir has a fence, guardroom, lairage, and slaughterhouse. The slaughterhouses are built of blocket and cemented floor. The wall has a facility to hang the carcasses at one side, and the offal and heads at one side. The floor has installed iron rod at the middle for casting

animals, while on the opposite side of the floor, where offal and heads are processed, is a drainage tunnel, while on the opposite side the carcasses are hanged.

Study design

A longitudinal study designs was chosen to undertake the desired study, based on an active abattoir-based examination of cattle slaughtered from september to January 2021 at Bonga municipal abattoir, South-Western Ethiopia. The study was based on ante-mortem examination of animals before slaughtering and post-mortem inspection of livers after slaughtering. The sample size was determined by Thrus field.

Results

As the study shows, based on the 450 cattle examined, the prevalence of bovine fasciolosis was found to be 19.782%. The prevalence of fasciolosis based on Sex, Age, Body condition and origin of the animal is also determined as shown in the following tables.

Prevalence of bovine fasciolosis based on post-mortem liver inspection

Out of 450 livers examined, 89 were found positive for liver fluke infection (fasciolosis) with an overall prevalence of 19.78%. The prevalence of fasciolosis showed variations between animals originating from the different districts. Higher prevalence 25.20% (n=123) was found in animals originating from Gesha districts, than the other four districts that include 17.18% (n=64) Saylem districts 20.00% (n=110) from Gimbo districts, 12.96% (n=54) 18.18(99) tello districts and the least 12.96% (n=54) from Adiyio districts, as indicated in Table 1. There was statistically significant difference (p<0.05) in prevalence of fasciolosis between animals originating from the five districts. Table 2 shows that prevalence of fasciolosis was 35.59% on females and 17.39% on males. Sex have statistically significant (p>0.05) influence on the prevalence of fasciolosis. The prevalence of fasciolosis was given by body condition score (Table 3) and there was significantly (p<0.05) higher infection (38.60%) in animals with poor body condition than with good body condition (9.58%) (Tables 3 and 4) shows that prevalence of fasciolosis was 26.23% on adult and 15.35%

Table 1: Prevalence of bovine fasciolosis in cattle originated from five districts.

Origin (kebele)	Number of cattle examined	Positive	Negative	Prevalence %
Saylem	64	11	53	17.18%
Gimbo	110	22	88	20.00%
Gesha	123	31	92	25.20%
Adiyio	54	7	47	12.96%
Tello	99	18	81	18.18%
Total	450	89	361	19.78%

Table 2: Prevalence by sex of an animal.

Sex	Number of cattle examined	Positive	Negative	Infection rate in %
Male	391	68	323	17.39%
Female	59	21	38	35.59%
Total	450	89	361	19.78%

Table 3: Prevalence by Body Condition of an animal.

Body condition	Number of cattle examined	Positive	Negative	Infection rate in %
Poor	158	61	97	38.60%
Good	292	28	264	9.58%
Total	450	89	361	19.78%

Table 4: Prevalence by age of an animal.

Age	Number of cattle examined	Positive	Negative	Infection rate in %
Adult	183	48	135	26.23%
Old	267	41	226	15.35%
Total	450	89	361	19.78%

on older cattle. There was statistically significant difference ($p < 0.05$) in prevalence between the two age groups.

Annual financial loss from livers condemned due to fasciolosis

During the study period, 450 cattle were slaughtered at Bonga municipal abattoir, Kaffa Zone, South-Western Ethiopia. Based on the 19.78% prevalence of bovine fasciolosis, and an average market price of a healthy liver at 800 ETB, the financial loss from livers condemned due to fasciolosis during the study period was estimated at 71,200 ETB.

Discussion

The prevalence of bovine fasciolosis on cattle slaughtered at Bonga municipal abattoir, Kaffa Zone, was 19.78%. The highest prevalence was 25.20% ($n=123$) noted in animals originated from Gesha districts, and the least 12.96% ($n=54$) in cattle from Adiyo. The origin of cattle in the five districts has shown to significantly affect ($p < 0.05$) the prevalence of fasciolosis when slaughtered at the abattoir. Although cattle in this study were traced to the five districts, the slaughter slab is a destination for cattle coming from some 11 districts in Bonga town.

Generally, the use of wetlands for grazing and watering of cattle during dry seasons is a common practice in the study area. This could explain the observed high prevalence of fasciolosis in cattle originating from some of the districts. This situation could be exacerbated by absence of proper cattle de-worming program and the movement of cattle by trading. Factors that favors occurrence of fasciolosis are moisture and temperature that allows persistent surface wetness on pasture for the snail and free living stages of the parasite to thrive. Grazing cattle in wet lands during dry season promote infestation of cattle with fasciolosis (Ekwenife and Eneanya [2]). In cattle, similarly high prevalence of 35% had been reported at Hawassa municipal abattoir in Ethiopia (Abebe et al. [3]), 32% at Arusha abattoir in Tanzania (Mwaabonimana et al. [8]) and 43.7% at slopes of Mount Elgon (Howell et al. [11]). However, the fasciolosis prevalence found in this study was found to be lower than what had been reported for most areas in Ethiopia. For example, a prevalence of 80% has been reported in Debre Berhan (Dagne, 1994 [12]) and Western Shoa. Also a prevalence of 50 - 63% has been reported in Ethiopia from Gonder (Bahiru and Ephrem [13]), around Lake-Tana. More generally, a prevalence ranging from 30 to 90% has been recorded for fasciolosis in tropical countries, the disease being considered as the single most important helminth infection of cattle Spithill et al. [14]. The current study also found that Bovine fasciolosis was more prevalent and more severe in poor body condition than good. This may be due to the fact that animals with poor body condition are generally more susceptible. Based on a 19.78% prevalence of bovine fasciolosis in the current study, the financial loss from livers condemned due to fasciolosis during the study period was estimated at 71200 ETB. The financial losses estimated could be much higher if all the direct and indirect losses associated with the disease, including that caused by weight loss, were included. A study done at Assela Municipal abattoir in Ethiopia by Mulugeta et al. [6] Found that losses associated with fasciolosis weight loss were 17.5 time more than losses caused by liver condemnation. The projections were based on the fact that fasciolosis

causes 10% weight loss. Condemnation of a large quantity of liver due to fasciolosis reduces its market availability (supply) and increases its market price (Ibrironke and Fasine, [15]) thus making it unaffordable by the vulnerable people who need it most. Liver tissue is a very rich source of nutrients including proteins, some important vitamins (A, D, E and K) and minerals. Liver is often recommended for pregnant mothers, children and for prevention and treatment of anemia and deficiencies of mineral and vitamins (Ibrironke and Fasina, [15]). Liver rejection at the abattoir tends to increase the level of aggregation by butchers who sometimes bear the complete financial burden of such condemnation (Wamae et al. Ibrironke and Fasina, [15-20]). Fasciolosis also has public health significance and it has been shown that fasciola fluke can cause human fasciolosis (Molime [9]).

Conclusion and Recommendations

Fasciolosis is a serious health problem of cattle which causes liver condemnation in the slaughter slab, and reduction in the production of the animals. In the current finding the slaughter slab prevalence of fasciolosis showed that the infection is common in most parts of the woreda as most of the animal were originated from the different districts. The parasite (*Fasciola*) mostly affects animals which were originated from marshy areas. Thus, the infection is common in the region due to marshy grazing areas and different ponds which merits attention by the responsible bodies to control the parasites (*fasciola*) and its vectors. The current study also found that Bovine fasciolosis was more prevalent and more severe in poor body condition than good. The high prevalence of bovine fasciolosis observed in cattle slaughtered at Bonga municipal Abattoir, kaffa Zone, South-Western Ethiopia, and the significant annual financial loss that results from condemnation of infected liver associated with the disease signifies fasciolosis is a disease of prime concern in the study area. Therefore, based on the above conclusions the following recommendations are forwarded

- The disease must be considered in the urgency list in any disease control program to be applied in the study area.
- To minimize pasture contaminations strategic anthelmintic treatment should be practiced at the beginning of the rainy season.
- Drain swampy areas and awareness creation among livestock owners is important to diminish the prevalence of the disease.
- Prominence must be given for the control of the disease to reduce its prevalence rate and -concurrent should be treated and controlled.
- Improving of animal health service is important to reduce the prevalence rate of fasciolosis.
- Future study should be conducted on the epidemiology of the disease, biology and ecology of intermediate host snails (*Lymanea*) for appropriate control strategies.

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