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Incidence and economic impact of fasciolosis in Wolkite town, Community Abattoir

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The study was conducted to explore the incidence and economic loss related with fasciolosis in cattle at Wolkite town, Community Abattoir, Wolkite, Ethiopia. A cross-sectional study was conducted from February, 2016 - May, 2016 on bovine fasciolosis in Wolkite town, Community Abattoir. From a total of 392 cattle inspected coprologically 41.8% (164) were found positive for fasciolosis. The occurrence of cattle fasciolosis in the study sites was considerable ($p<0.05$) which is mainly determined based on body conditions. Post mortem assessment was conducted on a total of 392 bovine and 41.8% were found infected by Fasciola. *Fasciola hepatica* was the major *Fasciola* species causing bovine fasciolosis at the study areas. Analysis of the abattoir data indicated a total yearly liver disapproval was identified to result in 182582.4 Ethiopian birr. Likewise, the mean carcass weight loss was calculated to be 4984499.52 Ethiopian birr due to fasciolosis in cattle. The total yearly monetary loss due to fasciolosis in Wolkite town, Community Abattoir was calculated to be 5167081.92 birr. The results of the present study thus illustrated that the incidence and economic loss of fasciolosis in bovine slaughtered at Wolkite town, Community Abattoir was exceptionally elevated and necessitates urgent need for control and prevention of the parasite in the study area in specially and in Ethiopia as a whole.

Key words: Cattle, *Fasciolosis*, incidence, Wolkite town.

INTRODUCTION

Fasciolosis also named as distomitosis, or liver rot is an important helminth disease caused by trematode Fasciola commonly called “liver fluke”. This disease belongs to plant born trematode (Mas-Coma et al., 2005). The definitive host range is very broad and includes many herbivores, mammals, including humans (Chhabra and Singla, 2009). The life cycle include fresh water snail as intermediate host of parasite (Torgerson and Claxton, 1999). The disease is a type of helminthsis and has been classified as Neglected tropical disease.

In recent times, worldwide fatalities in animal production because of *Fasciola hepatica* where predictably expected above 3.2 billion per annum. The WHO estimated at 180 million are at possibility of infection and 2.4 billion peoples are infected with *F. hepatica* (Spithil et al., 1999). In Europe, the American and Asia only *F. hepatica* is concerns but the distribution of the two species overlie in many areas of Africa as well as Asia (Mas-Coma et al.,

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2005). The prevalence of fasciolasis in cattle in various parts of the world has been reviewed. In Africa, Ethiopia 30-90% (Magaji et al., 2014), Addis Ababa 20.3% (Kassaye et al., 2012), Nekemte 20% (Alula et al., 2013), Hossona 34.9% (Bekele et al., 2014). Ethiopia has enormous number of cattle having high role for meat expenditure and produces cash revenue from export of live cattle, carcass, organs and skin.

The monetary losses due to fasciolosis throughout the humanity are massive and these losses are coupled with death, illness, stunted growth condemnations of fluky liver, and greater than before vulnerability to secondary infection and outflow because of have power over a measure (Malone et al., 1998).

Despite the aforesaid existing condition and the incidence of a number of troubles due to fasciolosis, there is scarcity of well-documented information on the incidence of fasciolosis among cattle in Ethiopia. For that reason, the present investigation was intended with the objectives of assessing the incidence of fasciolosis in cattle and the extent of direct economic loss due to liver disapproval and not direct carcass loss at Wolkite community abattoir, Ethiopia.

MATERIALS AND METHODS

Study period and area

The investigation was carried out from March, 2016 to May and it was carried out at Wolkite municipal Abattoir. Wolkite is located at south western part of Ethiopia 152 km away from Addis Ababa.

Study design and population

The study population comprised of 392 adult cattle from different parts intended for slaughter at Wolkite municipal abattoir.

Study design and sampling procedure

The study was cross-sectional study whereby the study animals were prevalence of fasciolosis in cattle brought from selected from the slaughter line using systematic random sampling in such a way that 14 animals were examined per a day from a group of varying number of cattle slaughtered in one day. Information regarding sex, age, breed and body condition of the study animals was recorded during ante-mortem assessment. Body condition was scored following the guidelines set by Nicholson and Butterworth (1986). Accordingly, animals were classified into lean (score 2 and 3), medium (score 4, 5 and 6) and fat (score 7, 8 and 9) categories. There was no animal with score 1.

Liver examination

The liver of each study animal was carefully examined for presence of lesions suggestive of *Fasciola* infection externally and sliced for confirmation. Liver flukes were recovered for differential count by cutting the infected liver into fine, approximately 1 cm, slices with a sharp knife according to Hansen and Perry (1994). Each mature fluke was identified to species level according to its shape and size (Soulsby, 1982). All intact immature and mature flukes and only fluke heads -when a portion of fluke was found- were counted.

Sample size determination and sampling methods

Simple random sampling method was used for selection of sampling units at equal intervals. The sampled cattle were screened for the presence of trematodes of interest by coprological and post-mortem examinations. The body condition score was estimated using techniques suggested by Nicholson and Bufferworth (1986), and accordingly, animals were classified into lean (score 2 and 3), medium (score 4, 5 and 6) and fat (score 7, 8 and 9) categories. Sample size for this study was determined using the formula described by Thrusfield (1995). Since no study has been carried out so far on the prevalence of *Fasciola* in cattle at this abattoir, the expected prevalence was taken as 50%. Thus, using the following formula the sample size for the study was calculated as 384. However, to increase the precision of the study, we decided to include 392 cattle in our investigation.

Abattoir survey

Examination of livers for *Fasciola* was done immediately after removal of internal organs. The livers were examined by inspection, palpation and systematic incision to recover immature and adult *Fasciola* flukes. Those livers condemned as unhealthy for human consumption due to fasciolosis during post mortem examination were registered.

Data analysis

The data was record on particularly intended types. The occurrence of fasciolosis was calculated as the number of cattle found to be infected by *Fasciola* expressed as a proportion of the total number of cattle slaughtered. Difference between the results by body condition score examination and by post-mortem examination was estimated. A 95% CI and 5% significance level was used to agree on whether there was considerable difference in the parameters calculated between different groups.

RESULTS

Postmortem examination

Three hundred and ninety-two liver sections were scrutinized in the present study. More than one or only one *Fasciola* species were identified by regular postmortem inspection of the liver. The identification results proved a prevalence of 41.8% (182/392) (Figures 1 and 2) fasciolosis. All the parasites identified as Fasciola were tested for species assignment using customary guiding principles. The explicit incidence of *Fasciola* species were known to be 32.6% (128/392) *F. hepatica*, 0.51% (20/392) *F. gigantic*, 0.3% (12/392) mixed (both *F. hepatica* and *F. gigantic* species) and 10.01% (4/392) unidentified immature flukes (Table 1).

Body state score was taken as possible threat reason for the incidence of fasciolosis in the present study cattle. Maximum contagion rate of fasciolosis was existed in low

Table 1. Prevalence of fasciolosis by species.

Species	Positive	Prevalence (%)
F .hepatica	128	32.6
F. gigantica	20	0.51
Mixed infection	12	0.3
Unidentified (immature flukes)	4	0.01
Total	164	41.8

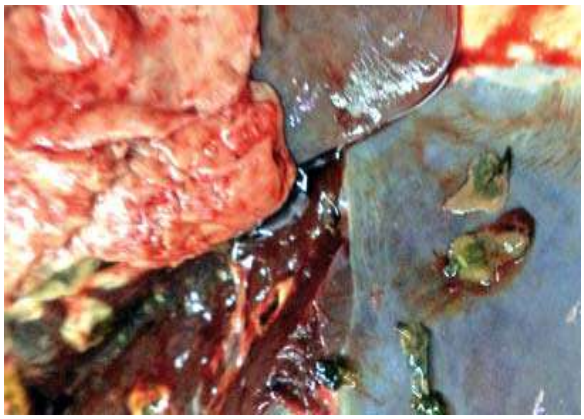

Figure 1. *Fasciola* in the liver of cattle.

Figure 2. Bovine liver with heavy infection due to *Fasciola.*

body state cattle (68.2%) go after by average body state cattle (44.1%). The least incidence of fasciolosis was identified to happen in better body state cattle (21.5%). Arithmetical scrutiny of the figures indicated the existence of arithmetical considerable disparity (P<0.05) on the contagion rate of cattle with fasciolosis amongst the three dissimilar body stated examined cattle (Table 2).

Monetary loss

All the affected livers were condemned totally. Partial condemnation is not practiced. The data was collected from the abattoir to estimate the economic losses by considering annually condemned livers. Annual data of the last three years regarding animals slaughtered and livers condemned were collected from retrospective abattoir record. Current retail market price of single liver and 1 kg meat in Wolkite, at the study time was known to be around 60 and 130 Ethiopian birr, correspondingly was determined from interviews with local butchers in Wolkite town according to the formula set by Ogunrinade and Ogunrinade (1980).

Based on this information, the total yearly liver disapproval (ALD) was identified to cause in 36,516 Ethiopian birr (1826 United States Dollar) loss (ALD=7280×60×0.418) = 182582.4.

Likewise, the common carcass weight loss was known to be 99,690 Ethiopian birr (4984 United States Dollar) because of fasciolosis in livestock.

(IACW=7280 × (10%×126)×130× 0.418)= 4984499.52

The total yearly economic loss due to fasciolosis at Wolkite town, Community Abattoir was known to be 5167081.92 Ethiopian birr (240329 United States Dollar).

ALC=CSR x LC x P

DISCUSSION

The ecological and climatic condition of the countries such as temperature, altitude, rainfall though variations in livestock managing method and the capability to notice infection can play a part. On the other hand, when we compare prevalence of Fasciolasis with Africa country the highest prevalence (53.9%) was recorded from Zambia (Phiri et al., 2005).

The world losses of animals due to fasciolosis agricultural communities and commercial producers in urbanized countries as well as the occurrence of *F. hepatica* can be up to 77% in hot countries. Fasciolasis is taken as the solitary and largest part important helminthes interaction of cattle with shown prevalence of 30-90 (neglected tropic disease).

The aggregate incidence of cattle fasciolosis (41.8%) calculated in the present study is in contrary with the

Table 2. Proportion of Fasciolasis among dissimilar body stated animals.

Body state	Inspected	Positive	Proportion (%)	X^2 value	P-value
Better	140	32	21.5		
Moderate	184	72	44.1	8.48	0.001
Low	88	60	68.2		
Total	392	164	41.8		

work of Berhe et al. (2009) from northern part of the country who notified 24.3% proportion. Still, it is greatly less than that of many other reports of analogous studies from diverse abattoirs in the country and somewhere else in Africa. Yilma and Mesfin (2000) indicated a 90.7% prevalence of fasciolosis in cattle slaughtered at Gondar, whereas Tolosa and Tigre (2007) reported a prevalence of 46.2% at Jimma which was in concord with this study. The resemblance may be owing to the fact that two study places are so nearby and have more or less the same climatic conditions. Phiri et al. (2005) from Zambia and Pfukenyi and Mukaratirwa (2004) from Zimbabwe indicated 53.9 and 31.7% proportion respectively. On the other hand, a less occurrence of fasciolosis (14.0%) has been pragmatic in slaughter cattle at Wolaita Abattoir (Abunna et al., 2009). Dissimilarity in incidence amongst geographical locations is accredited primarily to the difference in the climate and ecology of the area. *Fasciolosis* commonness has been taught to be varying over the years largely due to deviation in quantity and pattern of rainfall (Mungube et al., 2006).

Similar to the present study's outcomes, numerous abattoir investigations in diverse localities of Ethiopia reported the high prevalence of *F. hepatica* to *Fasciola gigantica* (Tolosa and Tigre, 2007; Ibrahim et al., 2010; Berhe et al., 2009). Abunna et al. (2009), still, recorded privileged incidence of *F. gigantica* than *F. hepatica* in livestock butchered at Wolaita Abattoir in Ethiopia. The result of mixed infection with thus two species of *Fasciola* shows that there are places in the country where the climato-ecological conditions favor the existence of the intermediate snail hosts for both species. Disparity amongst the virtual incidence of the two species of *Fasciola* in cattle slaughtered in abattoirs situated in diverse regions of the country may possibly be clarified by the deviation in the climate-ecological conditions of the areas feeding the abattoirs. Quite a lot of studies in other African countries, however, indicated that *F. gigntica* is the leading if not only species ubiquitous (Phiri et al., 2005; Pfukenyi and Mukaratirwa, 2004; Kithuka et al., 2002; Opara, 2005).

This study showed there was a numerically considerable relationship (P <0.001) among *Fasciola* incidence and body states of the cattle. In an analogous investigation, Bekele et al. (2010) identified elevated incidence of fasciolosis in livestock with low body state contrasted to cattle in moderate and better body state. Chronic fasciolosis is distinguished by continuous loss of state (Urquhart et al., 1996). Though, it should be noteworthy that livestock originated from feedlots, which are anticipated to be in better body state, and are nearly all probably to be de-wormed than livestock originating straightforwardly from grazing.

As cattle butchered at Wolkite Abattoir came from roughly all place of the zone it could be said that Fasciolasis is still ubiquitous in cattle in the surrounding area. The climates as well as ecological situations are sympathetic for continued existence and expansion of the intermediate snail hosts for the two species of *Fasciola* are also common in the study area.

Conclusion

The present study confirmed that fasciolosis is a significant disease cause substantial loss of income at Wolkite town Abattoir. The country was known to suffer loss of 5167081.92 Ethiopian Birr (240329 United States Dollar) annually due to liver disapproval and corpse weight loss that occurred from fasciolosis. For this reason, from the present study one can wind up that fasciolosis is among the key livestock parasitic disease of cattle which has a blow on the country's wealth further than its crash on the farmers. Consequently, stress should be given to management of its distribution while fasciolosis is one of the prominent parasitic diseases that have gigantic indirect and direct losses in domestic animals population.

CONFLICT OF INTERESTS

The authors have not declared any conflict of interests.

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