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Prevalence Bovine Fasciolosis in Postmortem Examination at Bahir Dar Municipal Abattoir, Bahir Dar, Ethiopia

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ABSTRACT

A cross-sectional study was conducted from June 15/2018 to November 15/2018to estimate the prevalence of fasciolosis from slaughtered cattle population in Bahir Dar municipal abattoir. A total of 580 liver samples were examined from cattle's selected by systematic random sampling for presence and burden of liver fluke. Among 580 examined cattle, 327 (56.4%) were found positive for fasciolosis. From which Fasciola hepatica had the highest prevalence with 22.6% (131/580), while F. gigantica had the prevalence of 18.1% (105/580). Immature flukes 11.4% (66/580) were not identified to species level and 4.3% (25/580) mixed infestation was recorded. F. hepatica and F. gigantica arecommon during the examination. From the total examined animals 62% and 50.8 % was positive for fasciolosis that came from Bahir Zuria and South Gondar respectively. The prevalence of fasciolosis was 70.4% (19/27) and 40% (30/75) in August and June respectively. Proportion of Fasciola with body condition among 580 animals; 149 poor, 330 medium and 101 good body conditions animals were examined and the prevalence was 105(70.4%), 182(55.2%) and 40(39.6%) respectively. Association with sites, season and body Condition are statistically significant, (P <0.05). There for, regular Dewormng and aware of community were recommended for better handling of their cattle and being beneficiary from their animal.

Keywords: *Abattoir, Bahir Dar, Bovine, Fasciolosis.*

INTRODUCTION

Ethiopia has the largest livestock population in Africa. This livestock sector has been contributing considerable portion to the economy of the country, and still promising to rally round the economic development of the country. The estimated livestock populations are 52 million cattle, 25.5 million sheep, and goat population is nearly 24 million, 8.6 million equine, 1 million camels, and 55.4 million chickens are found. Cattles are the most economically important livestock species with high estimated population and the majorities are indigenous zebu breed. In spite of the presence of huge number of ruminant population, Ethiopia fails to optimally exploit these resources due to a number of factors such as recurrent drought, infrastructures problem, rampant animal diseases, poor nutrition, poor husbandry practices, and shortage of trained man power and lack of government policies for disease prevention and control, [1], [2],[3],[4],[5] Parasitism represents a major problem/obstacle to the development of this sub- sector [6].

Fasciolosis is an economically important disease of domestic livestock, in particular cattle and sheep. The disease is caused by digenean trematodes 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 [7]. Many abattoir surveys conducted in different parts of Ethiopia have demonstrated the presence of fasciolosis, due to *F. hepatica* and *F. gigantica*, in ruminants. Some studies tried to demonstrate the economic losses associated with liver condemnation [8], [9], [10], [11]. Because of the epidemiology of fasciolosis is dynamic and may change with years [12], it is important to monitor its development to determine trends in prevalence. In Ethiopia different works reported variable

prevalence rates of bovine fasciolosis in different localities of the country. [13]

Fasciolosis is the priority diseases in the highland and low land areas of Amhara region ([14]). Fasciolosis also common emerging human diseases, the World Health Organization (WHO) has estimated that 2.4 million people are infected with Fasciola species and 180 million are at risk of infection [15]. In Ethiopia the prevalence of bovine fasciolosis has shown to range from 11.5% to 87% [6]. *F. hepatica* was shown to be the most important fluke species in Ethiopian livestock with distribution over three quarter of the nation except in the arid northeast and east of the country. The distribution of *F. gigantica* was mainly localized in the western humid zone of the country that encompasses approximately one fourth of the nations [9], [6][8]. The disease is found in vast water lodged and marshy grazing field condition, these provide suitable habitats year round for the snail intermediate hosts [14]. The prevalence of bovine fasciolosis in and around Bahir Dar was recorded 36.7% and 21.2% [16], [17] respectively and the current prevalence was 56.4%. Therefore, the objectives of this work was

- To estimate the prevalence of bovine Fasciolosis in Bahir Dar Municipal abattoir, Bahir dar Ethiopia.
- To assess the epidemiological risk factors that might contribute for fasciolosis and to generate(have) valuable base line (information) data for further studies that will be conducted in the area.
- The present study was, therefore, aimed at estimating the prevalence of fasciolosis in
- Cattle brought from different parts of area in the region and slaughtered in Bahir dar municipal abattoir.

Material and Methods

Study Area: A cross sectional study was conducted from June 2018 to November 2018 in Bahir Dar municipal abattoir. Bahir Dar is the capital city of Amhara Regional State, which is found 565km away from Addis Abeba, northwest of Ethiopia. The altitude of the area is 1500-2600 m.a.s.l. Bahir Dar is located between 12^{0}29'N latitude and 37^{0}29'E longitude with an average annual rain fall ranging from 1200mm to 1600mm, annual temperature ranging from 8^{o}cto 31^{o}c(National Meteorological Agency, Bahir Dar, Ethiopia). About 70% of the land is featured by plain plateaus and covered by various bush formation, low woods mainly ever green lands some semi-humid highland vegetation with a major agricultural products like teff, wheat, and maize and pulse crops. The biggest lake and river in Ethiopia, Tana and Blue Nile(Abay) are found in this area [18].

Study Animals: The studied animals were bovine that were found in the Bahir Dar Municipal abattoir for slaughter came from in Bahir dar and south Gondar (Estie, Farta and Fogera Woreda). A total of 580 slaughtered bovine of adult groups and males were examined that came from in different origins. The average bovine age determine by dentition as adult [19], [20], body condition score was recorded.

Study Design and Period: This study design is used to determine prevalence/incidence of bovine fasciolosis in Bahir Dar municipal abattoir from June 2018 up to November, 2018. Sites (origins), season and body conditions were considered as the risk factors for the occurrence of fasciolosis.

Sampling Method and Sampling Procedure: The study was cross-sectional study whereby the study animals were selected from the slaughter line using systematic random sampling. List of the animals to be slaughtered, from which study animals were selected, was prepared while the animals were kept in lairage. Information regarding sites, season, and body condition of the study animals was recorded during ante-mortem examination. Body condition was scored following the guidelines[19]. Accordingly, animals were classified into lean (score 2 and 3), medium (score 4, 5 and 6) and fat (score 7, 8 and 9) categories.

Liver/Post Mortem 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 1cm, slices with a sharp knife according to [21]. Each mature fluke was identified to species level according to its shape and size [22]. All intact immature and mature flukes and only fluke heads-when a portion of fluke was found- were counted. A total of 580 cattle livers were examining to determine the prevalence to bovine fasciolosis in abattoir. The cattle were slaughter at Bahir dar municipal

abattoir during the study period. Post mortem examination technique was under take to recover the young flukes and adult parasites from the liver parenchyma and major bile duct respectively.

Data Analysis: All raw data generated from this study were coded and entered to Microsoft office excel data base system. The findings were analyzed using SPSS version-16.0 computer program; and data were analyzed to find percentage and Chi-squire (χ^2). P-value was determined for determination of the significance. Chi-square test was also used to determine the variation in infection, prevalence between study sites and body condition, spices of liver flukes and season. Estimation of age based on teeth development was done (annex 5). The total prevalence was calculated by dividing the number of disease positive animals by the total number of animals examined (table 1). Statistical significance was set at $P < 0.05$ to determine whether there are significant differences between the parameters measured between the groups. Breed, sex and age were not included in the analysis because of the very low number of observations; while all animals included in this study were adults. The sites were selected by using simple random sampling around Bahir Dar and south Gondar. Liver samples were collected from cattle to study the prevalence of bovine fasciolosis and associated risk factors.

RESULT

Post mortem examination: Out of the total 580 animal slaughtered at Bahir dar municipal abattoir, 327 (56.4%) were positive for bovine fasciolosis. Animals of adult age group was examined in postmortem to determine the prevalence of bovine fasciolosis and economical significance, post mortem liver samples examined direct looking by ocular eye technique and microscope for further species identification. 327, animals were infected by fasciolosis and an overall prevalence of 56.4% was recorded for fasciolosis in the study area. In Ethiopia the prevalence of bovine fasciolosis has shown to range from 11.5% up to 87% [6] in Bahirdar municipal abattoir. The prevalence was 36.7% and 21.22% [16], [17] respectively. The current study the prevalence (56.4%) of bovine fasciolosis was higher than that of studied [16],[17] (36.7%)and (21.22%) in and around Bahir Dar. This is due to different study time (season), many studies conducted in dry season of the year, but this study was conduct during rainy season.

Species of Fasciola Identified in the Abattoir

Out of 327 infected livers examine carefully to determine the species of Fasciola involved *Fasciola hepatica* was the highest with 22.6% (131/580) prevalence, while *F. gigantica* was 18.1% (105/580). Immature flukes which were not identified to species level were found in 11.4% (66/580) livers and mixed infestation with the two species was recorded in 4.3% (25/580) livers (Table 2).

Prevalence of Fasciolosis on Study Site Basis

The prevalence of fasciolosis is varied significantly among the two areas (origins) and the highest prevalence of fasciolosis was observed in Bahir dar 139/215 (64.6%) and south Gondar, 188/365 (51.5%) indicated in (Table 4). Statistical analysis revealed that there was significant difference ($P < 0.05$) in infections between areas.

Prevalence of Fasciolosis on Seasons/Months Basis

Prevalence of fasciolosis was (19/27) 70.4% and (30/75) 40% in August and June Month respectively and this is higher prevalence in August due to comfortable month for snail production of intermediate host for fasciolosis (Table 5).

Prevalence of Fasciolosis Body Condition Score Basis

Body condition scoring was one of the risk factor for the occurrence of bovine fasciolosis. Among 580 animals, 149 poor, 330 medium and 101 good body conditions animals were examined and the prevalence was 105/149(70.4%), 182/330(55.2%) and 40/101(39.6%) respectively (table 6). Association with body condition, there was a statistically significant association (P <0.05) between *Fasciola* infection and body condition of the animals (Table 6).

Table1: *Prevalence of Bovine fasciolosis based on liver examination*

Number of animal examined	Total number of positive	Prevalence
580	327	56.4%

Table2: *Prevalence of Fasciola species in cattle slaughtered at Bahir dar abattoir (n=580)*

Fasciola species	no of infected liver	Prevalence (%)
F. gigantica	105	18.1
F. hepatica	131	22.6
Mixed	25	4.3
Immature	66	11.4
Overall	327	56.4

Table3: *Prevalence of Fasciola species in cattle slaughtered at Bahir dar abattoir (n=327)*

Fasciola species	no of liver condemned	Percentage (%)
F. gigantica	105	32.110
F. hepatica	131	40.061
Mixed	25	7.645
Immature	66	20.183
Overall	327	100

Table4: *Prevalence of Bovine fasciolosis on Sites/Locality basis*

Site (%)	No of animal examined	positive	Prevalence	χ^2	P-value
Bahir dar	215	139	64.6	38.793	0.00
south Gondar	365	188	51.5		
Total	580	327	56.4		

Table5: *Prevalence of Bovine fasciolosis as compared with season/month*

month/season	no liver examine	no positive liver	Prevalence (%)	χ^2	p-value
June	75	30	40	253.876	0.000
July	39	22	56.4		
august	27	19	70.4		
September	84	59	70.2		
October	141	97	68.8		
November	214	100	46.7		
total	580	327	56.4		

Table6: *Prevalence of bovine fasciolosis on body condition basis*

Body condition	No. of animal examined	Positive	Prevalence (%)	χ^2	p. value
Good	101	40	39.6		
Medium	330	182	55.2	152.455	0.00
Poor	149	105	70.4		
Total	580	327	56.4		

DISCUSSION

Out of the total 580 animals slaughtered in Bahir dar municipal abattoir, 327 (56.4 %) were positive for faciolosis diseases. Most of the animals slaughtered in the abattoir were come from farta breed of cattle, which are low cost than Bahir dar cattle which come from distant area (around este and Debretabor). In this study period the prevalence was greater than that of the reported in the country and elsewhere Africa, like Fasciolosis in Slaughtered Cattle in Addis Ababa Abattoir, Ethiopia was 23% [23], from northern Ethiopia who reported 24.3%,[9] recorded, a prevalence of 46.2% at Jimma abattoir, (24) from Zambia and [24] from Zimbabwe reported 53.9% and 31.7% prevalence respectively. On the other hand a lower prevalence of fasciolosis (14.0%) has been observed in slaughter cattle at Wolaita Soddo abattoir [10]. However, it is much lower than that of reports of in the country [8], reported a 90.7% prevalence of fasciolosis in cattle slaughtered at Gondar abattoir. In this study the reason why higher prevalence was due to the season/months of samples collected, it was rainy time, which was in Ethiopia June to October.

The land is marsh which was favorable to snail and Fasciola multiplication. Difference in prevalence among geographical locations is attributed mainly to the variation in the climatic and ecological conditions such as altitude, rainfall and temperature. *Fasciola* prevalence has been reported to vary over the years mainly due to variation in amount and pattern of rainfall [24].Consistent with this finding, several abattoir studies in different parts of Ethiopia reported the predominance of *F. hepatica* to *F.*

gigantica [8], [11], [25]. The finding of mixed infection with the two species of *Fasciola* indicates that there are places in the region where the climato-ecological conditions favour the existence of the intermediate snail hosts for both species. Several studies in other Africa countries, however, showed that *F. hepatica* is the predominant [24], [26], [27], [28][29]. There was a statistically significant association (P <0.05) between *Fasciola* prevalence and body condition of the animals. In a similar studied high prevalence of fasciolosis in cattle with poor body condition compared to cattle in medium and good body condition reported by [30]. Chronic fasciolosis is characterized by progressive loss of condition [31]. The climato-ecological conditions favorable for survival and development of the intermediate snail hosts for the two species of *Fasciola* are also prevalent. The prevalence of bovine fasciolosis was different in different districts (location). In this study the higher prevalence of bovine fasciolosis was recorded at Bahir dar than south Gondar; this difference might be due to the difference in geographical location favorable to maintain the intermediate host and the disease. The prevalence of the disease in the two different sites of the study areas were 54%, and 41.2%, Bahir dar and south Gondar, respectively. This showed statistical difference in the prevalence of the disease between these sites ($P < 0.05$). In addition to this, Bahir dar is also near location to the Abay River basin and Lack Tana which is permanently wet and water logged maintaining cyclic lifecycle of the parasite of intermediates host. In season/month the prevalence of the bovine fasciolosis higher in August and lower in June and it was recorded as 70.4% and 40% respectively (Table 3), respectively. Even if there were difference in prevalence, there was significant difference ($P < 0.05$) between the two groups. Body condition was a risk factor for bovine fasciolosis and prevalence was (70.4%), (55.2%) and (39.6%) in poor, medium and good body condition score respectively. There was significant variation among body condition scoring groups. The lower prevalence was observed in good body condition (39.6%) and the higher was in poor body condition (70.4%). This might be association (due to) less resistance as a result of malnutrition or other chronic disease and environmental conditions are made available. Similarly prevalence of other infection (parasitic or non parasites) might make the animal to have poor body condition to infect by fasciolosis. Their existence along with fasciolosis might have impact on body condition and body weight of the animals [32].

Conclusion and Recommendations

Bovine fasciolosis is the major problem in the animal production, which causes decreases production, fertility, emaciation and disease and finally death in the study area. The result of the present study indicated that fasciolosis is highly prevalent i.e. 56.4%. The prevalence reported in this study clearly indicated that the lack of strategic control measures against the disease and the presence of associated risk factors for the continual presence of the disease. In conclusion, bovine fasciolosis is major reason for the removal of bovine liver due to its ill-favored texture. There for; based on the above conclusion the following recommendations are forwarded:

- Strategic application of Fluckicide/ Dewormng and avoiding animals grazing from marshy land plays considerable success for the control of fasciolosis in these study areas.
- Awareness creation on the preventive strategies such as drainage of marshy areas, clearing of aquatic vegetations and seasonal strategic deworming of animals should be practiced.
- Draining or fencing of marshy areas, utilization of swampy areas for crop production, to protect the animals from infection during grazing.
- Training need to be organized farmers with economical significance and control methods of this disease (for both treatment cost and liver condemnation) in the study area.
- Detail epidemiological study should be carried out on biology and ecology of the intermediate host so as to develop a substantiable planning and implementation on the control strategies of the disease.
- Expansion of animal health care delivery in the area including drug supply, prophylactic and other disease control strategies.

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