Prevalence of Bovine Fasciolosis and associated risk factors in Nedjo municipal abattoir, western wollega, west Ethiopia

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Abstract: Fasciolosis is a public and economically important parasitic disease, which is caused by trematodes of the genus Fasciola that migrate in the hepatic parenchyma and establish in the bile ducts. A cross-sectional study was carried out from June 2015 to November 2015 to estimate the prevalence of bovine fasciolosis slaughtered at Nedjo municipal abattoir. Abattoir survey was conducted by using routine ante mortem and post mortem inspection. Descriptive statistics was used to compute prevalence and Pearson's chi-square (X^2) was used to determine differences in prevalence. Sex, peasant associations and body condition were taken into consideration where 79 and 21% prevalence were recorded for male and female animals respectively. However, no statistical significance ($P > 0.05$) was observed for thisvariable. Similarly, 48.5%and 51.5% prevalence were recorded for good and medium body conditioned cattle, respectively. The prevalence as determined from postmortem examination was highest (36.3%) in Were Jiru, while lowest (3.8%) in Sombo Guta kebeles. The overall prevalence rate of fasciolosis was 51.0%. There was also no statistically significant difference ($P > 0.05$) in infection rate between these kebeles. Therefore, further abattoir surveys are recommended to strengthen the result for better understanding on the epidemiology of bovine fasciolosis in the study area.

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1. Introduction

Fasciolosis is an economically important parasitic disease, which caused by trematodes of the genus Fasciola that migrate in the hepatic parenchyma, and establish and develop in the bile ducts [1]. Fasciola is commonly recognized as liver flukes and they are responsible for wide spread of morbidity and mortality in cattle characterized by weight loss, anemia and hypoproteinemia. The two most important species, *Fasciola hepatica* found in temperate area and cooler areas of high altitude in the tropics and subtropics and *Fasciolagigantica*, which predominates in tropical area. *Fasciola hepatica* is found in area above 1800 m.a.s.l. In between these altitude limits, both species coexists where ecology is conductive for both snail hosts, and mixed infections prevailed [2].

The snail of the genus *Lymnaenatalensis* and *Lymnaetruncatula* are known as intermediate host in life cycle of fasciolosis. Infection with *Lymneatruncatula* is usually associated with herds and flocks grazing wet marshy land. On the other hand, *Fasciolagigantica* is a fresh water snail and infection with this species is associated with livestock drinking from snails infected watering places as well as with grazing wetland, which may be seasonally in undated [3].

Fasciolosis is an economically important disease of domestic livestock, in particular cattle and sheep and occasionally man [4]. 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 anthelminthics [5, 6].

In developed countries, the incidence of *F. hepatica* can reach up to 77%. In tropical countries, fasciolosis is considered the single most important helminth infection of cattle, with reported prevalence of 30-90% [7].

The prevalence of fasciolosis in many parts of Africa has been determined mainly at slaughter. 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 [8]. 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 [9].

Livestock are major agricultural resource in west wollega zone. Nedjo is one of the areas where the environmental conditions and altitude of the area is conducive for the occurrence of fasciolosis. However; no information is available about its prevalence and its economic significance in the study area. Therefore, the objective of current study is to determine the prevalence of fasciolosis in bovine species in the study.

2. Materials And Methods

2.1. Description of the Study Area

The study was conducted in Western Ethiopia, Oromia Regional state, west wollega zone, at Nedjo district. Nedjo is located at about 515km from west of Addis Ababa and bounded by Benishangul Gumuz in the North, Jarsoworeda in the south, Boji Dirmeji in the east and Kiltu Kara woreda in the west direction. The altitude of the area ranges from 1600-1800 meters above the sea level. The mean annual rain fall of the area ranges from 1400-1500milimeter and the mean annual minimum and maximum temperatures are 19^{0c}and23^{0c} respectively. The main faring system in the area is mixed farming and cattle are the main abundant animal species kept in the area. The area possessed a total population of 290,500 cattle, 46,991sheep, 31,891goat, 14,711donkey, 60,831 poultry,799 mules and 40 horses. The cattle in the area are indigenous East African zebu breeds and are kept under traditional extensive husbandry system with communal herding [10].

2.2. Study population

The animals used in this study were apparently normal indigenous zebu cattle visiting Nedjomunicipalabattoir slaughter managed under extensive husbandry system.

2.3. Sample size Determination

Since there was no previous study in Nedjo woreda to establish the prevalence of bovine fasciolosis, the desired sample size was determined using the formula given by [11] at the 50% expected prevalence setting 95% confidence interval, 5% desired absolute precision and a P- value of less than 0.05 was taken as statically significance.

$n = 1.962Pexp (1-Pexp)/ d^2$ Where;

n = required sample size

Pexp = expected prevalence= 50%

d = desired absolute precision=5% Hence, d = 0.05 and p= 0.5 (50%). Accordingly, 384 animals were supposed to be sampled but in order to increase the precession a total of 400 study animals were sampled.

2.4. Study Design and Sampling Method

A cross-sectional investigation of the prevalence of bovine fasciolosis was conducted in the Nedjo municipal abattoir from June 2015 to November 2015. A simple random sampling technique was used to collect all the necessary data from abattoir survey of the study animals.

2.5. Study Methodology

Active abattoir survey was conducted based on cross sectional study during routine meat inspection on randomly selected cattle slaughtered at Nedjo municipal abattoir. A total of 400 cattle were examined during the study. During ante-mortem examination, detail records about sexes, origins and body conditions of the animals were performed. During post-mortem inspection, each liver was visually inspected, palpated and incised based on routine meat inspection [12].

2.6. Data management and Analysis.

The data were recorded on specially designed forms and preliminary analysis was done in Microsoft Excel. The outcome variables were the cases of Fasciolosis detected during abattoir survey. The descriptive statics was carried out to summarize the prevalence of the disease. Univariate logistic regression analysis was conducted to see the association between the risk factors and occurrence of the disease. Confidence interval and P-value was seen to see the presence of association.

3. Results

The result of this finding indicating that, high (79.0%) prevalence of fasciola was recorded in male animals than female animals. The higher number (51.5%) disease was recorded in medium body condition than good body condition. Fasciolosis were highly (36.3%) recorded in were jiru of Nedjo district of west wollega zone.

Table 1. Frequency result on bovine fasciola

Variables	Number of examined	Percent of positive (%)
Sex		
Male	316	79.0
Female	84	21.0
Body condition		
Good	194	48.5
Medium	206	51.5
Origin		
Nadjo Town	92	23.0
SomboGuta	15	3.8
GabaKamisa	63	15.8
WeriJiru	145	36.3
Gori	18	4.5
AboKami	67	16.8
Results		
Negative	196	49.0
Positive	204	51.0
Total	400	100

This cross-tab finding indicated that, there is statistically significant variation were recorded between two body condition (P= 0.00, OR=7.3, at 4.69-11.36 95%CI). On the other hand, the results show that, there is no statistically significant variations were recorded between sex and among origin of animals of the Nedjo district (Table 2).

Table 2. Prevalence of Fasciolosis versus different risk factors

Risk factor	No. of examined (%)	No. of positive (%)	P-value	Odd ratio (95%CI)
Sex				
Male	316(79.0)	161(40.2)	0.97	0.99(0.61-1.60)
Female	84(21.0)	43(10.8)		
Body condition				
Good	194(48.5)	53(13.2)	0.00	7.3(4.69-11.36)
Medium	206(51.5)	151(37.8)		
Origin				
Nadjo Town	92(23.0)	44(11.0)	0.69	
SomboGuta	15(3.8)	4(1.0)		
GabaKamisa	63(15.8)	33(8.2)		
WeraJiru	145(36.2)	82(20.5)		
Gori	18(4.5)	9(2.2)		
AboKami	67(16.8)	32(8.0)		

5. Discussion

The overall prevalence of bovine fasciolosis (40.2%) observed in this study is nearly agreement with finding of [13] recorded prevalence of 46.2% at Jimma abattoir, [8] from Zambia and [14] from Zimbabwe reported prevalence of 53.9% and 31.7%, respectively. However, higher than the report of [15], 16) and 17] who reported prevalence of (21.1%), 24.3% and 28% in cattle slaughtered at Nekemte municipal abattoir, Mekelle area and at Kombolcha Industrial Abattoir, Ethiopia. On other hand, it is lower than that of many other studies from different abattoirs in the country. [18] reported 90.7% prevalence of fasciolosis in cattle slaughtered at Gondar abattoir. Additionally, it is much a lower prevalence of fasciolosis (14.0%) has been observed in slaughtered cattle at Wolaita Soddo abattoir [9]. 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 species prevalence has been reported to vary over the years mainly due to variation in amount and pattern of rainfall.

The results of the present study indicated that body condition of the animal has significant association with the occurrence of fasciolosis. The prevalence was higher in (51.5%) medium conditioned than good body conditioned animals. The prevalence of fasciolosis was higher in the animals with medium body condition because this body condition in cattle is manifested when fasciolosis reaches at its advanced stage.

The result of present study revealed that HIGHER (79.0%) prevalence of fasciolosis in male than in female. However, the sex of animals did not have significant effect (P> 0.05) on the occurrence of bovine fasciolosis. This agrees with the report of [15] and with [19] who reported that sex has no impact on the infection rate and hence both male and female are equally susceptible and exposed to fasciolosis.

The result of present study showed that origin has significant effect on the prevalence of bovine fasciolosis; being higher in Were Jiru (36.3%) and Nadjo (23%) kebeles than the others kebeles (Table 1). According to [2], such discrepancy is attributed mainly to the variation in climatic and ecological conditions such as altitude, rainfall and temperature as well as livestock management system.

The ecological conditions and the number of intermediate host found around the area may also be another factor contributing to the decrement of the economic loss. To this end, it is economically important disease that warrants due attention.

6. Conclusion And Recommendation

In present study, moderate prevalence of bovine fasciolosis was obtained when compared with prevalence reported by different researchers at different area. Finally, the abattoir based prevalence recorded in the study area and the loss incurred suggests that a detailed epidemiological study is required to implement systematic disease prevention and control methods.

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