ABATTOIR PREVALENCE OF BOVINE FASCIOLOSIS IN THE MANUCIPAL ABATTOIR OF WUKRO, NORTHERN ETHIOPIA

HADUSH TEKLU*
DR. NIGUS ABEBE**
DR. NIRAJ KUMAR***

*DVM, College of Veterinary Medicine, Mekelle University, Ethiopia
**Asst. Professor, College of Veterinary Medicine, Mekelle University, Ethiopia
***Asst. Professor, College of Veterinary Medicine, Mekelle University, Ethiopia

ABSTRACT

A cross-sectional study was conducted to determine the abattoir prevalence of bovine fasciolosis in Wukro municipal abattoir. A total of 255 animals originated from different market areas of the South Eastern zone of Tigray National Regional State and slaughtered at Wukro municipal abattoir were studied. The current finding revealed that overall abattoir prevalence of bovine fasciolosis was 18.4%. The prevalence of the parasites in abattoir among male and female was 17.3% and 25% for *Fasciola hepatica* and 0.82% and 0% for *Fasciola gigantica*, respectively. Prevalence of the parasite in adult was higher (17.8%) than the young animals (16.2%). The abattoir prevalence in local and cross breeds were also determined and it was 13.9% and 31.5% for *F. hepatica* and 0.99% and 0% for *F. gigantica*, respectively. The current finding also showed the prevalence of *F. hepatica* in poor, medium and good body condition animals was 48.4%, 22.2% and 9% whereas the prevalence of *F. gigantica* in poor, medium and good body condition animals was 3.2%, 1.2% and 0% respectively.

KEYWORDS: Abattoir, Bovine, Fasciola, Prevalence, Wukro

INTRODUCTION

In developing countries cattle are the most important animals in the farming, as a food source and for skin production. Ethiopia has a large livestock population in Africa with an estimated population of 53.99 million heads of cattle, 25.49 million sheep, 24.06 million goats (CSA, 2012/13). However, there are constraints that hindered the potential of livestock production including traditional management systems, limited genetic potential, lack of appropriate disease control policy and poor veterinary services. Due to these and related factors, each year significant economic losses resulting from condemnation of edible organs and carcass were estimated from different abattoirs of the country (Amene et al., 2012).
Parasitic diseases are considered as a major health problem and cause a significant economic loss in countries where livestock production is an important segment of the agricultural practice (Alembhran and Haylegeberiel, 2013). Among many parasitic problems of farm animals, fasciolosis is a major disease, which imposes direct and indirect economic impact on livestock production, particularly of sheep and cattle (keyyu et al., 2005; Menkir et al., 2007). Fasciolosis is a parasitic disease mainly of cattle, sheep, goats and buffaloes characterized by poor weight gain, anemia and hypoproteinemia. Furthermore dairy cattle have lower milk yield, and possibly metabolic disease (Urquhart et al., 1996; Mason, 2004). *Fasciola hepatica* and *F.gigantica* are the two liver flukes commonly reported to cause fasciolosis in ruminants. The life cycle of these trematodes involve snail (*Lymnae truncatula* and *Lymnae natalensis*) as an intermediate host and the distribution of liver flukes depends on the presence of suitable environment such as swampy area (Walker et al., 2008). The ideal moisture condition for snail breeding and the development of *F. hepatica* within snail are provided when rainfall exceeds transpiration and field saturation is attained. Such conditions are also essential for the development of fluke eggs, for miracidia searching for snails and for the dispersal of cercaria being shed from the snails (Urquhart et al., 1996).

Generally the distribution of fasciolosis is worldwide, however the distribution of the *F. hepatica* is limited to temperate areas and highlands of tropical and sub-tropical regions (Soulsby, 1982). The geographic distribution of trematode species is dependent on the distributions of suitable species of snails. The genus lymnaea in general and *L. truncatula* in particular is the most common intermediate hosts for *F. hepatica*. This species of snail was reported to have a worldwide distribution (Urquhart et al., 1996). Apart from its veterinary and economic importance throughout the world, fasciolosis has been shown to be re-emerging and widespread affecting many people (Esteban et al., 2003).

A number of studies have been undertaken with regard to abattoir based prevalence and evaluation of the economic loss due to fasciolosis in different parts of Ethiopia (Tadele and Worku, 2007; Jibat et al., 2008; Fufa et al., 2009; Gebretsadik et al., 2009). In the present study area the livestock population is very high and the management of the animal is extensive type of system. Besides there are numerous marshy areas which serves as water sources for the animals due to the irrigation system which helps them as means of food security hence, this will serve as conductive environment for the multiplication of the intermediate hosts. In addition, there are high condemnation rates of liver due to this parasite in the municipal abattoir and also there is limited study conducted to assess the prevalence of
the parasites in the study. Therefore, the objective of this research work was to determine the prevalence of the parasite and its associated risk factors in the abattoir.

MATERIALS AND METHODS

Study Area

The study was conducted in South Eastern zone of Tigray National Regional State, Wukro municipal abattoir which is located at a distance of 825 KM from Addis Ababa, the capital city of Ethiopia and 45 KM North of Mekelle, the capital city of Tigray National Regional State. Wukro is found 20° 23’N longitude and 39° 29’E latitude with an elevation of 1800-3200 meters above sea level (masl). The annual rainfall ranges from 450-600 mm and the temperature ranges from 10-21°C. The district has different agro-ecological areas. In the study area the maximum rainfall occurs from mid-June up to September and between March and May but the minimum rainfall occurs from April to May. The farming system is mixed farming system; crop cultivation and animal husbandry similar to that of most Ethiopian husbandry system are practiced (GBOANR, 1999).

Study Animal

The study was conducted in animals originated from different market areas of the zone and slaughtered at Wukro municipal abattoir. The slaughtered animals were both male and female. Particularly female animals were slaughtered as a result of obesity which is not advisable for production purpose, repeating in heat i.e. not respond for treatment and due to bone fracture as an emergency slaughter. Study animals were categorized as young (1-3 years old) and adult (greater than 3 years old) according to dentition.

Study Design

Cross sectional study was employed to examine animals which were slaughtered in the abattoir and the observation at each and every individual animal were both anti-mortem and post-mortem examination.

Sampling techniques and sample size determination

Complete anti-mortem examination of the animals was conducted shortly prior to slaughter. Inspection of the animal was made while at rest and/or in motion for any obvious signs of disease. Each and every animal were tagged with identification number before the
slaughter commences and each animal which was examining during the anti-mortem were also observed for the post-mortem results. During the post-mortem, the liver of animals were examining by incision for detection of the presence of adult Fasciola in the bile duct. The sample size (n) was projected using the formula described by (Thrusfield, 2005),

\[ N = \frac{Z^2 (p_{exp} (1-p_{exp}))}{d^2} \]

Where, \( N \) = minimum number of sample size \( Z = 1.96 \) at 95% level of confidence \( P_{exp} = \) expected prevalence \( d = \) absolute precision

Sample size was determined based on the previous prevalence (21%) from a study reported by Gebrecherkos (2011). Based on the above formula the minimum desired sample size was calculated to 255.

**Anti-mortem inspection and body condition scoring**

Anti-mortem examination of the animal was carried out shortly prior to slaughter. Inspection of the animals was done while at rest or in motion for any obvious sign of disease. Body condition for each cattle was estimated on Nicholson and Butterworth (1986) ranging from score 1 (emaciated) to score 5 (obese).

**Post-mortem inspection**

Post-mortem examination of liver and associated organs was carefully performed by visualization and palpation of the entire organ followed by transverse incision of the organ across thin left lobe in order to confirm the case (Urquhart, 1996).

**Fasciola species identification**

Species identification of the recovered fasciola was also conducted based on morphological features of the parasite and classified into *F. hepatica*, *F. gigantica* and unidentified or immature forms of liver fluke (Urquhart, 1996).

**RESULTS**

A total of 255 animals (male = 243 and female = 12), of which about 52% of the slaughtered animals were with good body condition. Figure 1 summarizes the characteristics of the study animals. The study revealed that the overall abattoir prevalence of bovine
The prevalence of fasciolosis was 18.4% (47/255). The prevalence of fasciolosis in female and male cattle was recorded as 25% (3/12) and 18.1% (44/243), respectively as indicated in Table 1.

Table 2 summarizes abattoir prevalence of bovine fasciolosis in the study area. The abattoir prevalence of fasciolosis between the age group also indicated that the prevalence of \( F.\) hepatica was 16.2% (6/37) and 17.8% (39/218) in young and adult cattle, respectively. Similarly, the prevalence of \( F.\) gigantica in young and adult cattle was 0% (0/37) and 0.9% (2/218), respectively. Similarly, the abattoir prevalence of the parasite between different breeds (Table 3) was also assessed and the prevalence of \( F.\) hepatica in local and cross breeds was 13.9% (28/201) and 31.5% (17/54) respectively and that of \( F.\) gigantica was 0.99% (2/201) and 0% (0/54), respectively. The abattoir prevalence of bovine fasciolosis based on the body conditions (Table 4) was also assessed and the current finding of bovine fasciolosis was highest in poor body condition animals (51.6%) than medium (23.4%) and good (9%) body condition animals.

DISCUSSION

Fasciolosis is widespread ruminant health problems and causes significant economic losses to the livestock industry in Ethiopia. As reported by (Brook et al., 1985; Heinonen et al., 1995) water logged and poorly drained areas with acidic soils in the highlands and often endemic areas for fasciolosis.

The overall abattoir prevalence of fasciolosis in the present study was 18.4% which is lower than that of the study conducted by Abdul (1992) and Adem (1994) with prevalence rates of 47% and 56.6% at Sodo and Ziway municipality abattoir, respectively. The prevalence rate reported in present study is lower than that reported by Gebretsadik et al., (2009) at Addis Ababa municipal abattoir with the prevalence of 24.32%. However, prevalence rate is higher than the study conducted by Daniel, (1995) having a prevalence of 14.4%. The variation among the different studies could be attributed by the different agro ecological condition of the study areas.

The findings of present study for the prevalence of the infection in abattoir due to female and male animals was in agreement with the study conducted by Daniel, (1995) which reported higher prevalence of this parasite in female than male. The abattoir prevalence of bovine fasciolosis in adult and young animals was lower than that of the study conducted by Abebe et al. (2011) with the prevalence of 30.04% and 35.97% in the adult and young animals, respectively. The difference in prevalence of the infection between sex and age of
animals could be due to lower number of samples taken particularly for the female animals. The abattoir prevalence in local and cross breeds was also determined and it was 13.9% (28/201) and 31.5% (17/54) for *F. hepatica* and 0.99% (2/201) and 0% (0/54) for *F. gigantica* respectively. This variation might be due to the management of the animals as most of the animals were reared in the extensive system of management which makes the easily susceptible to the parasites.

The prevalence of the parasite in the different body condition of the animals were also determined and its prevalence for *F. hepatica* and *F. gigantica* in poor body condition was 48.4% and 3.2%, in medium body condition 22.2% and 1.2% and in that of good body condition animals was 9% and 0% respectively. The current finding shows higher prevalence for *F. hepatica* and lower for *F. gigantica* than the findings reported by Mihreteab *et al* (2010) in animals with poor body condition with the prevalence of 23.1% and 11.9% respectively. This might be due to the fact that animals with poor body condition are usually less resistance and are consequently susceptible to infectious disease. The prevalence of the parasites in medium body condition in the present finding was higher for *F. hepatica* compared with the previous finding having the rate of 14.5% but lower than that of the previous finding with the prevalence of *F. gigantica* 8.1%.

**CONCLUSION**

Fasciolosis is a serious health problem of cattle which causes liver condemnation in the abattoir, reduction in the production of the animals. In the current finding the abattoir prevalence of the parasite showed the disease is common in most parts of the zone as most of the animals were originated from the different sites of the zone. *F. hepatica* is the most predominant fasciola in the zone. The prevalence in the different breeds of the animals also indicate the existence of the parasite which was higher in cross breeds than local breeds and it is also common in female animals as compared to male.

**ACKNOWLEDGEMENTS**

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Table 1. Abattoir prevalence of bovine fasciolosis by sex of animals

<table>
<thead>
<tr>
<th>Sex</th>
<th>Total examined animals</th>
<th>Prevalence</th>
<th>Negative</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td><em>F. hepatica</em></td>
<td><em>F. gigantica</em></td>
</tr>
<tr>
<td>Male</td>
<td>243</td>
<td>17.3% (42)</td>
<td>0.82% (2)</td>
</tr>
<tr>
<td>Female</td>
<td>12</td>
<td>25% (3)</td>
<td>0% (0)</td>
</tr>
<tr>
<td>Over all</td>
<td>255</td>
<td>17.6% (45)</td>
<td>0.82% (2)</td>
</tr>
</tbody>
</table>

Table 2. Abattoir prevalence of bovine fasciolosis by age of animals

<table>
<thead>
<tr>
<th>Age</th>
<th>Total examined animal</th>
<th>Prevalence</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td><em>F. hepatica</em></td>
</tr>
<tr>
<td>Young</td>
<td>37</td>
<td>16.2% (6/37)</td>
</tr>
<tr>
<td>Adult</td>
<td>218</td>
<td>17.8% (39/218)</td>
</tr>
<tr>
<td>Total</td>
<td>255</td>
<td>17.6% (45/255)</td>
</tr>
</tbody>
</table>

Table 3. Abattoir prevalence of bovine fasciolosis by breeds of animals

<table>
<thead>
<tr>
<th>Breed</th>
<th>Total examined animals</th>
<th>Prevalence</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td><em>F. hepatica</em></td>
</tr>
<tr>
<td>Local</td>
<td>201</td>
<td>13.9% (28/201)</td>
</tr>
<tr>
<td>Cross</td>
<td>54</td>
<td>31.5% (17/54)</td>
</tr>
<tr>
<td>Total</td>
<td>255</td>
<td>17.6% (45/255)</td>
</tr>
</tbody>
</table>

Table 4. Abattoir prevalence of bovine fasciolosis by body condition of animals

<table>
<thead>
<tr>
<th>Body condition</th>
<th>Total examined animal</th>
<th>Prevalence</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td><em>F. hepatica</em></td>
</tr>
<tr>
<td>Poor</td>
<td>31</td>
<td>48.4% (15/31)</td>
</tr>
<tr>
<td>Medium</td>
<td>81</td>
<td>22.2% (18/81)</td>
</tr>
<tr>
<td>Good</td>
<td>133</td>
<td>9% (12/133)</td>
</tr>
</tbody>
</table>

Figure 1. Summary of the characteristics of the study animals
REFERENCES