

Research Article

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## The Major Cause of Organ Condemnation and its Economic Significance in Cattle Slaughtered at Debretabor Municipal Abattior

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### Abstract

This study was conducted at Debretabor municipal abattoir from February to June 2019. The objective was to investigate the major cause of organ condemnation and to estimate the economic losses due to the organ condemnation at Debretabor municipal abattoir. Standard ante mortem and post mortem examination procedure were used for the study. During the study, 384 cattle were inspected; among these 104 and 91 cattle had different abnormality at either antemortem or postmortem examination respectively. During course of ante mortem examination the abnormalities that were detected included branding, lameness, localized swelling, leech, poor body condition and tick infestation. A total of 48 (12.5%) liver, 27(7.03%) lung, 10(2.6%) heart, and 6 (1.56%) kidney were totally condemned due to different abnormalities. The major causes of condemnation were fasciolosis (87.5%) and calcification (12.5%) for liver; hydatid cyst(48.15%), pneumonia(37.04%) and emphysema(14.82%) for lung; abscess (60%), congestion(40%) for heart; hydronephrosis (100%) for kidney. Results of the present study showed that the parasitic infestations particularly fasciolosis and hydatid cyst were the major causes of liver and lung condemnation. An annual direct economic loss of 21798.5ETB was incurred in the abattoir due to condemnation of only edible organ.

### Keywords

Organ,  
Abattoir,  
Debretabor,  
Condemnation,  
Cattle,  
Financial Loss.

### Introduction

Ethiopia has an enormous livestock with a total contribution of 22% of gross domestic product and 47% of the agricultural output [1]. In Ethiopia, the ruminant livestock is important source of income for rural communities and is one of the nations major sources of foreign currency to prevailing traditional management, limited genecity from export. However, this great potential is not properly exploited mainly due potential, feed shortage and rampant animal disease. Of the disease that cause serious problem,

parasitism represents a major impact on livestock production in the tropics [2].

Diseases that occur in livestock have two major impacts on the society. These are economic and public health impacts. These two major impacts have highly pronounced effect on the large scale abattoir where there are large numbers of animal slaughtered and large number of workers present. In addition to the risk on them, abattoirs have high responsibility to provide risk free products to the society [3].

Upon slaughtering of edible animal, it is essential that bleeding should be as complete as possible. Any conditions which weaken the action of heart, lung and muscle cause the animal to bleed badly. The flesh of the animal which has been badly bled does not keep well and putrefaction soon ensues. So animal should be well rested before slaughter [4]

The primary function of meat inspection is to protect public health but it has additional economic duty in that there must be no unnecessary condemnation of valuable commodity. In recent years, however, more attention has been paid to another important aspect of meat inspection that of providing statistics which can be utilized for animal diseases control [5].

Ante mortem inspection should be carried out in adequate light where the animals can be observed both collectively, individually at rest in motion. The general behavior, nutritional status, cleaning, and sign of diseases are also given attention. There are reasons for ante mortem inspection, the most important is to remove from human food channels animals with condition that can not be detected at postmortem inspection. It also prevents unnecessary contamination of personnel and equipment inside the plant by diseases animal. Routinely post mortem examination of carcass should be carried out as soon as possible after the completion of dressing in order to detect any abnormality. So that, products only conditionally safe for human consumption are passed as food [2].

Various investigators have studied abattoir survey conducted to determine the prevalence and economic

importance of meat condemnation case in Ethiopia. However, most of the survey carried out in different abattoirs of the country paid much attention to the parasitic case of meat condemnation (Fasciolosis, Hydatidosis and Cysticercosis) as these are usually considered to be of major economic and public health importance in meat inspection [6].

## Materials and Methods

### Study area:

The study was conducted at Debretabor municipal abattoir which is the center of south Gondar zone. The town is located at the Northern west part of Ethiopia at a distance of 667 km far from the capital. The altitude of the area is 2706 masl and the latitude and longitude of the area 11.1°N, 38.1°E respectively. The topography of the area generally, is marked by the presence of numerous mountains, plateaus, hilly and sloppy area and rivers and the main topographic category of the area is Weina degas (mid land). The average rain fall of the area is estimated about 11497 mm and the short rains occur during March, April, and May, while long rains extends from June-September and the average daily temperature extends from 15° [7]. According to the current document of South Gondar zone livestock resource development office [8], the Livestock population of the zone comprise of 1787724 Bovine, 1148817 sheep, 687194 goats, 277470 equine, and 1143759 poultry and the main language is Amharic.

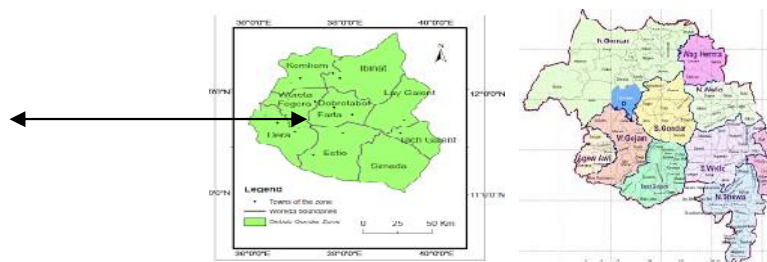


Fig 1. Map of south gondar zone showing the study areas(Debretabor)

### Study animal and Sampling Procedures

Study animals include local and cross breed cattle brought from various localities to Debretabor municipal abattoir for slaughtering purpose was

included in the study and all cattle inspected during antemortem and postmortem inspection with their identification number and record according to the format prepared for this purpose.

### Study Design:

A cross-sectional study designs was employed to generate the desired data. The cross-sectional study of active abattoir survey was made according to the standard procedures recommended for ante mortem inspection and postmortem inspection by FAO [9].

### Sample size determination

Due to the absence of previous study on in the study area the total number of cattle required for the study is calculated based on the formula given by Thrusfield [10]. The sample size is determined based on expected prevalence of 50%, confidence interval of 95% and desired level of precision of 5%. Accordingly, the sample size is 384.

$$\text{The formula } n = \frac{(1.96)^2 \times P_{\text{exp}}(1-P_{\text{exp}})}{d^2}$$

where, n = sample size, P = expected prevalence  
d=desired level of precision (5%).  
1.96 = the value of z at 95% confidence level.

### Abattoir survey

#### Ante mortem inspection

Ante mortem inspection was carried out on each animal, while the animal enter to the lairage and after enter to the lairage. Both sides of the animals were inspected at rest and in motion [9].

#### Postmortem Inspection

Postmortem inspection was carried out immediately after dressing of the carcass. During each visit in the abattoir all organs and carcass rejected at meat inspection was collected and examined thoroughly and systematically (via visual inspection followed by palpation and single or multiple incision). Then gross abnormality of any type is recorded according to the given identification in the body [9].

#### Economic loss assessment

Annual economic loose due to organ and carcass was estimated from the cost of organ condemned due to abnormality. Accordingly, the economic values of the loss from organ and condemnation was evaluate by considering the following parameters. These are:

1. Information on the mean retail market price of organs at Debretabor town obtained from butchers.
2. The average annual slaughter rate of cattle at Debretabor municipal abattoir was estimated from the retrospective data of the last three years, and the loss from organs condemned was estimated by the formula set by Ogunrinade and Ogunrinade [11] as follows.

$$L = \text{srx} \times \text{Coy} \times \text{Roz}$$

Where L=annual economic loss estimated due to organ and carcass condemnation from international market

srx=annual slaughter rate of the abattoir  
Coy= average cost of each organ and carcass  
Roz= condemnation rate of organ and carcass

### Data analysis

Data collected from the active abattoir survey was entered into Excel spread sheet and analyzed. Descriptive statistics was used to determine the level of condemnation defined as proportion of organs and carcasses condemned to the total number of organs and carcasses examined.

### Results

<b>Leech</b>	12	3.12
<b>Poor body condition</b>	22	5.71
<b>Total</b>	104	27.01

#### Post mortem inspection

Out of the total 384 cattle slaughtered at Debretabor municipal abattoir during the study period, only 91(23.69%) showed different abnormality. The disease conditions encountered in the slaughtered cattle is presented in Table 2. The most frequently condemned organ was liver followed by lungs. Fasciolosis was mainly responsible for liver condemnation (10.94%) followed by calcification (1.56%).

A total of 27 lungs were condemned due to different conditions. Among these conditions hydatid cyst was contribute (3.39%), followed by pneumonia (2.6%) and emphysema (1.04%).

The major causes of heart condemnation were abscess and congestion. Out of the total 10 hearts condemned due to abnormality abscess contribute 1.56% and congestion accounts 1.04%. Kidney was also condemned due to hydronephrosis 100%.

**Table 2. Summary of organ condemnation and its rejection rate.**

Organ	Condemnation			Percent of lesion
	Causes	frequency	Percent (n=384)	
liver	calcification	6	1.56	12.5
	Fasciola	42	10.94	87.5
	Total	48	12.50	100
Lung	empysema	4	1.04	14.82
	hydatidcyst	13	3.39	48.15
	pnemonia	10	2.60	37.04
	Total	27	7.03	100
heart	Abscess	6	1.56	60
	congestion	4	1.04	40
	Total	10	2.60	100
kidney	Hydronephrosis	6	1.56	100
	Total	6	1.56	100

### Economic loss assessment

The direct economic loss due to rejection of organs and carcass condemnation was calculated based on

average price per organ at Debretabor town. By using all the necessary information and formula, the annual direct economic loss incurred only due to rejection of edible organs was estimated 21798.5ETB.

**Table 3. Summary of economic loss**

Organ/carcass	No. organ condemned	Rejection rate of Organ/carcass	Average price of organ/carcass(ETB)	Average annual slaughter rate
Liver	48	12.5	30	2326
Lung	27	7.03	30	
Heart	10	2.6	96	
Kidney	6	1.56	65	

### Discussion

In this study all animal examined at postmortem were those who passed ante mortem inspection. The abnormality that was found during ante mortem inspection included lameness, localized swelling, branding, leech, poor body condition and tick infestation. The current study showed that fasciolosis, hydatid cyst, pneumonia, emphysema, hydronephrosis, calcification, congestion and Abscessation were the major causes of organs condemnation and associated economic loss in cattle slaughtered at Debretabor municipal abattoir.

Out of the total 384 cattle examined in postmortem, 46 (12.5%) livers, 27 (7.03%) lungs 10 (2.6%) hearts and 6(1.56%) kidneys were condemned due to various causes. The rejection rates of the liver in the current study were lower than the rate reported from Kombolcha [12] and from Jimma [13] municipal abattoirs. They reported 66.55% [12], and [13] 64.4% rejection rates of the liver . But it was observed higher as compared with studies conducted in Gonder, [14] and Iran [15] where their liver rejection rates were 31.1%, and 7.9% respectively. The rejection rate of lung in the current finding was lower than reports by Genet *et al.* [16] at Gondar, Asmare *et al.* [17]

at Bahir Dar and Amene *et al.* [13] at Jimma municipal abattoirs with a rejection rate of 19.68%, 25.8%, and 46.2% respectively. The rejection rates of hearts in the current study were lower than the rejection rate of 11% that reported by Amene *et al.* [13] from Jimma and 3.71% by Shagaw *et al.* [18] from Mekelle abattoirs.

The current finding showed that Fasciolosis (87.5%) was the main cause of liver condemnation. This finding was higher than reports at Jimma abattoir by Tadelle [19], at Gondar by Genet *et al.* [16] and at Kombolcha by Nurit *et al.* [15] who reported 63.89, 48.5 and 36.06 % respectively. Losses from liver condemnation were generally associated with the infection of public health importance and aesthetic reasons jibat [20]. Lung was the second most commonly condemned organ (7.3%). Lung was condemned due to hydatid cyst (3.39), pneumonia (2.6%) and emphysema (1.04%). Similarly, pneumonia, hydatid cyst and emphysema were reported from various abattoirs in the country as major and top causes for lung condemnation [21,22]. Kidney was rarely condemned organ (1.56%), which was mainly due to hydronephrosis.

The average annual cattle slaughter capacity of Debretabor municipal abattoir based on retrospective data is 2326. According to this study the total direct economic loss incurred due to condemnation of organs in active abattoir survey was 21798.5 Ethiopian birr. The current finding was lower than the annual loss of 39,490.0 and 172, 664.09 Ethiopian birr were reported from Gondar and Jimma municipal abattoirs, respectively genet and amene [13,16] and higher than the annual loss of 18,973.22 Ethiopian birr reported from Gondar Elfora abattoir by yifat [14]. Variations in the amount of economic lost in different abattoirs probably due to the differences in the prevalence of diseases, rejection rate of organs, slaughtering capacity of the abattoirs, local market price of organs and in the respective study areas.

## Conclusion and Recommendations

According to this study parasitic disease and pathological conditions were the major cause of organ and carcass condemnation at Debretabor municipal abattoir. Hydatidosis and fasciolosis were the major cause of lung and liver condemnation in the abattoir. The number of organs condemned due to various reasons has serious economic losses to the farmers and is a drawback to livestock industry in the country. Some of the zoonotic diseases like

hydatidosis may have health risks to the meat consumer.

Many research in the country shows that parasitic causes are the major cause of the economic loss in the livestock industry.

In line with the above conclusion the following recommendations is forward;

- The transportation and handling of animal before slaughter should be improved.
- Proper disposal of offals
- Destruction of all stray dogs, prohibitions against feeding uncooked offals to dogs
- The government should be prohibited back yard slaughtered of cattle
- The farmer should be well informed about the diseases control program.

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