



## **Major Causes of Organ Condemnation and Economic Losses of Cattle Slaughtered at Hawassa Municipal Abattoir, Southern Ethiopia.**

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### **Abstract**

A cross sectional study was conducted from November 2014 to April 2015 to identify the major causes of organ condemnation and to estimate the direct financial losses attributed to the condemned organs in cattle slaughtered at Hawassa municipal abattoir, Southern Ethiopia. Out of the total 1000 cattle subjected to ante mortem examination, 54(5.4%) were found to have various types of abnormalities and the dominant abnormalities observed during ante mortem examination were local swelling (15.30%), tick infestation (10.58%) and coughing (16.92%). Likewise, from the total organs examined at postmortem, 419(41.9%) livers, 453(45.3%) lungs, 19(1.9%) hearts and 14(1.4%) kidneys were totally condemned due to gross abnormalities as unfit for human consumption. Moreover, major pathological conditions that caused a total condemnation of organs were fasciolosis (69.45) on liver, hydatidosis (51.66%) and emphysema (15.67%) on lung, cysticercosis (57.89%) on heart, hydronephrosis (57.14%) and calcification (21.43%) on the kidney. Organ condemnation rates did not show significant difference ( $P>0.05$ ) among animal origin and body condition in case of liver, heart and kidney. However, condemnation rates of the lung had significant difference among animal age groups and body conditions. Moreover, the economic loss due to organ condemnation was estimated to be 624,915.72 Ethiopian Birr per annum. The current study revealed that fasciolosis and hydatidosis were the principal causes for condemnation that lead to huge economic losses. In conclusion, the observation of such a level of abnormalities and substantial financial loss with condemnation of affected organs warrants the institution of appropriate control measures.

**Keywords:** Abattoir; Cattle; Economic loss; Hawassa; Organ condemnation

## Introduction

The world human population is growing at faster rate than food production and this increase is mainly in developing countries, which are unable to assure adequate food for their people. Developing countries have nearly 2/3 of the world's livestock population, but produce less than a third of the world's meat and fifth of its milk [1].

Meat is a nutritious food that has an important role in balanced human diet. Meat possessing high biological value also increases the ability of human body against virulent pathogens. Therefore, there is a demand to increase the rate of meat production and consumption throughout the world. Considering that meat is a relatively expensive food especially in some developing countries and its consumption is often a sign of social status and financial condition. Therefore, per capita consumption of meat is more in developed countries compared to the undeveloped or developing ones [2].

Safety and hygiene of meat and meat products is the most important concern of consumers and producers of these products. Some microbial pathogens cause severe complications. Usually few people get infected by pathogens, but the public health may be threatened if a lot of people are involved. Moreover, residual substances of veterinary drug such as antibiotics, antiparasitics and hormones could endanger human health. Therefore, comprehensive and perfect inspection of carcass and offal in slaughterhouses is very important [3].

In Ethiopia, meat inspection was started in 1910's with the aim of improving productivity and trade in animals and animal products as well as protecting the public from zoonotic diseases. Despite one century of experience on modern animal health activities, there exist very few legislation and regulation animal diseases control and meat inspection [4]. Monitoring and other conditions at slaughter has been recognized as one way of assessing the disease status of herd, however this source of information is not fully exploited worldwide [5]. Abattoirs played an important role in surveillance of various diseases of human and animal health importance.

Surveillance at the abattoir allows for all animals passing in to human food chain to be examined for unusual signs, lesions or specific disease [6].

Slaughterhouses are valuable sources for information about food borne and zoonotic diseases epidemiology, actual losses in meat production and the economic impacts for condemnations [7]. However, zoonotic threats prevention and control remains one of the major aspects in the developing countries [8]. Meat inspection at abattoirs, for hygienic quality, involves both ante and postmortem examination which include gross and microbiological investigation [9].

Ante mortem inspections were conducted on individual animals, while the animals were entering into the lairage and after they entered in to the lairage in mass. Both sides of the animals were inspected at rest and in motion. Moreover, the general behavior of the animals, nutritional status, cleanliness, sign of diseases and abnormality of any type were registered according to the standard ante mortem inspection procedures. Following the judgments passed by food and agricultural organization, animal fit for human consumption were allowed for slaughter [10].

During postmortem inspection liver, lungs, heart, kidney, brain and carcasses were thoroughly inspected by visualization, palpation and making systemic incisions where necessary for the presence of cysts, parasites and other abnormalities. Pathological lesions were differentiated and judged according to guidelines on meat inspection for developing countries and the results were recorded and the decisions at postmortem inspection are classified in to the following categories of judgment such as approved as fit for human consumption, conditionally approved as fit for human consumption, totally condemned as unfit for human consumption and partially condemned as fit for human consumption [10].

The purpose of meat inspection is to protect public health and to provide risk free products to the society. Also, it provides information that can be utilized for animal diseases control [11] option for detecting diseases of both economic and public health importance [12], especially in ascertaining the extent to which human is exposed to certain zoonotic diseases in addition to estimating the financial inspection and implications of carcass condemnations. Most of the abattoir studies undertaken on prevalence of fasciolosis and hydatidosis and the extent of loss from organs condemnation in different parts of Ethiopia [13].

Each year a significant economic loss results from mortality, poor weight gain, condemnation of edible organs and carcasses at slaughter. This production loss in the livestock industry is estimated at more than 900 million USD annually [14]. Apart from this economic loss diseases that occur in livestock have public health impact. This is one of the major impacts and has highly pronounced effect on the large scale abattoirs where there are large numbers of animal slaughtered and large number of worker present. The final judgment as to be taken with an organ, carcass or part of a carcass is based on the total evidence produced by observation, palpation and incision of each organ and carcasses, any ante mortem signs and the result of any laboratory test [15]. The main purpose of post mortem examination is to detect and eliminate abnormalities, including contamination, ensuring that only meat fit for human consumption passed for food [16].

In Ethiopia many studies have been undertaken to identify the major disease condition encountered during ante mortem and postmortem inspection and to determine the economic importance of organs and carcass condemnation. Keeping in view the economic and public health significance of organs condemnation, the present study was undertaken to identify the major causes of organs condemnation and the direct economic loss attributed to the condemned organs of cattle slaughtered at Hawassa municipal abattoir.

Therefore, the objectives of the study were;

- ❖ To identify the major causes of organs condemnation and
- ❖ To estimate the direct financial loss attributed to the condemned organs in Cattle slaughtered at Hawassa municipal abattoir, Southern Ethiopia.

## Materials and Methods

### Study Area

The study was conducted from November 2014 to April 2015 at Hawassa municipal abattoir in Hawassa city. Hawassa is the capital city of SNNP region, which is located at 275 Km from Addis Ababa in southern direction, which lies between 4°27' and 8°30'N latitude and 34°21' and 39°1'E longitude at an altitude of 1790 m.a.s.l. It covers 50km<sup>2</sup> area. The average annual rain fall ranges from 800-1000mm. There are two rainy seasons and one long dry season. The long rainy season extends from June to

September; whereas short rainy season extends from February up to April; the remaining months October to February known by their dry period. The mean minimum and maximum, temperature of the area was 20.1°C and 30°C, respectively and mean relative humidity was 51.8% [17].

### Study Animals

The study included a total of 1000 indigenous male Cattle of different age groups, origin and body condition that were destined for slaughter at Hawassa municipal abattoir and inspection at ante mortem and postmortem started from November 2014 to April 2015. Each animal were given an identification mark, body condition score during ante mortem inspection and the respective abnormalities found during ante mortem and postmortem examinations were recorded. On average 65 cattle were slaughtered at the abattoir per day. Animals were of different age groups. Based on their dental eruption patterns, two conventional age groups were formed as young-adult (2 to 6 years) and adult (>6 years) [18].

### Study Design and Sampling

A cross-sectional study design was employed from November 2014 to April 2015. Before slaughter, the study animals were examined for any abnormalities. The body condition scores of the animals were determined according to [19] poor, medium and good. Since poor body condition animals were not allowed to introduce the abattoir (passed for slaughter) only medium and good body condition animals were considered in the study.

At postmortem also study design was employed for estimating the prevalence of fasciolosis, hydatidosis, and other visceral abnormalities like Calcification, Abscessation, Cirrhosis, Congestion, Emphysema etc. In each week, three days visit was made for ante mortem and postmortem examination of slaughtered animals. Following slaughter the visceral organs including liver, lung, kidney, and heart were carefully examined by inspection, palpation and incision for the presence of fasciola, hydatid cyst, *Cysticercus bovis*, and other abnormalities.

### Active abattoir surveys

Thorough meat inspection procedure involving both ante mortem and postmortem inspection was performed.

### ***Antemortem inspection***

Ante mortem inspection was conducted on the cattle during and after they entered into lairage within 24 hours of arrival at the slaughter house. During examination each of study animal was identified based on the enumerate marks on their body marked before slaughter and their general behavior, signs of disease, nutritional status, cleanliness and any type of abnormalities were recorded [20].

### ***Postmortem inspection***

During each visit to the abattoir, all visceral organs particularly liver, kidney, heart and lung were examined thoroughly and systematically by visual inspection followed by palpation and a single or multiple incisions. Then pathological conditions encountered in the organ were recorded according to age, sex and origin of cattle slaughtered. The judgment for condemnation or fit for human consumption was also recorded during postmortem inspection.

Postmortem examination was conducted through visualization inspection, palpation and systematic incision of each visceral organ particularly the liver, lung, heart and kidney for the presence of cysts, various adult parasites and other abnormalities. Pathological lesions were differentiated and judged according to guidelines on meat inspection for developing [10].

### **Sample Size**

The sample size was calculated using the formula given by Thrusfield [21] for simple random sampling with 50% expected prevalence, 95% confidence interval and 5% desired absolute precision. Accordingly, the sample size was determined to be 384. However, large numbers of animals were slaughtered at the abattoir and thus, the sample size was maximized to be 1000 cattle to increase precision.

### **Assessment of direct economic loss**

The analysis was based on annual slaughter capacity of the abattoir considering the market demand, average market price of each organ in Hawassa city and rejection rate of each organ. Average market price was determined by interviewing personnel of the abattoir and butchers.

The economic loss due to condemnation was estimated by the formula set by Ogunrinade [22] as follows:

$$EL = \text{srk} \times \text{oy} \times \text{Roz}$$

Where

EL = Annual economic loss estimated due to organ from local market.

srk = Annual cattle slaughter rate of the abattoir  
oy = Average cost of each liver/ lung/ heart/ kidney/  
Roz = Condemnation rates of each/liver/lung/heart/kidney

### **Data management and analysis**

The data was entered and managed in a Microsoft Excel spreadsheet and analyzed using Statistical Package for Social Sciences version 20. The prevalence of causes for organ condemnation was determined as a proportion of affected animals out of the total animal were examined. The differences or association between different risk factors such as animal origin, age, and body condition with disease condition will analyzed by using  $\chi^2$  (Chi-square) technique and value of  $p < 0.05$  considered as significant.

## **Results**

**Ante-Mortem Examination:** Of the total 1000 cattle's examined at ante-mortem, 54 (5.4%) cattle's were found to have the abnormalities listed below (Table 1). The most common abnormalities encountered during ante mortem inspection were lameness (24.07%) and coughing (29.63%).

Table 1: Proportion of abnormal conditions encountered during ante mortem inspection

Abnormal conditions	No of animal affected	Abnormality percentage
Skin diseases	2	0.2%
Local swelling	6	0.6%
Lameness	13	1.3%
Tick infestation	3	0.3%
Coughing	16	1.6%
Nasal discharge	6	0.6%
Blindness	8	0.8%
Total	54	5.4%

**Post-Mortem Examination:** All animals that had been examined by ante mortem inspection were subjected to postmortem examination. From the total organs examined, 419(41.9%) livers, 453(45.3%) lungs, 19(1.9%) hearts, 14(1.4%) kidneys, were totally condemned due to gross abnormalities as unfit for human consumption.

**Liver Condemnation:** From the total 1000 examined cattle at slaughter, 419 (41.9%) livers were totally condemned as unfit for human consumption because

of various abnormalities. Of these condemned livers, fasciolosis was responsible for 291 (69.45%) liver condemnation followed by hydatidosis 59(14.08%) and calcification 42(10.02%). There were statistically significant difference ( $\chi^2=39.000$ ; p-value =0.000) between the two age categories and frequencies of liver condemned. However, condemnation rate variation were not statistically significant between animal origin( $\chi^2=12.511$ ; p-value =0.186) and body condition score( $\chi^2=8.185$ ; p-value =0.389) of the animal.

Table 2: Proportion of causes of liver condemnation based on animal origin, age and body condition score categories

Diseases/conditions	Animal origin				Age		Body
	Highland (%)	Lowland (%)	Young (%)	Adult (%)	Medium (%)	Good (%)	
Fasciolosis	98(9.8)	163(16.3)	82(8.2)	179(17.9)	124 (12.4)	137(13.7)	
Calcification	17(1.7)	25(2.5)	7(0.7)	35(3.5)	22(2.2)	20(2.0)	
Abscessation	3(0.3)	2(0.2)	0(0.0)	5(0.5)	4(0.4)	1(0.1)	
Hepatitis	4(0.4)	11(1.1)	4(0.4)	11(1.1)	6(0.6)	9(0.9)	
Hydatidosis	9(0.9)	20((2.0)	5(0.5)	24(2.4)	14(1.4)	15(1.5)	
Cirrhosis	12(1.2)	10(1.0)	3(0.3)	19(1.9)	9(0.9)	13(1.3)	
Cysticerus bovis	2(0.2)	1(0.1)	0(0.0)	3(0.3)	0(0.0)	3(0.3)	
Congestion	3(0.3)	9(0.9)	9(0.9)	3(0.3)	4(0.4)	8(0.8)	
Fasciolosis and hydatidosis	10(1.0)	20(2.0)	10(1.0)	20(2.0)	17(1.7)	13(1.3)	
Total	158	261	120	299	200	219	

**Kidney Condemnation:** Hydronephrosis, atrophy and calcification were found to be the major principal causes for kidney condemnation, accounting 8(57.14%), 3(21.43%) and 2(14.29%) respectively. There was statistically significant difference

( $\chi^2=10.676$ ; p-value = 0.030) between the two age categories and frequencies of kidney condemned. But, There was no statistically significant difference between animal origin( $\chi^2=4.307$ ; p-value =0.366), body condition score( $\chi^2=1.344$ ; p-value =0.854) of the animal and frequencies of kidney condemned.

**Table 3:** Proportion of causes of kidney condemnation based on animal origin, age and body condition score categories

Diseases/conditions condition score	Animal origin		Age		Body	
	Highland (%) Good (%)	Lowland (%)	Young (%)	Adult (%)		
Hydatidosis	1(0.1)	0(0.0)	0(0.0)	1(0.1)	0(0.0)	1(0.1)
Calcification	2(0.2)	0(0.0)	2(0.2)	0(0.0)	1(0.1)	1(0.1)
Atrophy	1(0.1)	2(0.2)	2(0.2)	1(0.1)	2(0.2)	1(0.1)
Hydronephrosis	3(0.3)	5(0.5)	6(0.6)	2(0.2)	4(0.4)	4(0.4)
<b>Total</b>	<b>7</b>	<b>7</b>	<b>10</b>	<b>4</b>	<b>7</b>	<b>7</b>

**Heart Condemnation:** The causes of heart condemnation were Hydropericarditis, Cystercus bovis, hydatidosis and fibrosis. Of these, the major pathological lesion encountered were Cystercosis account (57.89%). There was statistically significant difference ( $\chi^2=10.142$ ; p-value = 0.038) between the

two age categories and frequencies of heart condemned. But, There was no statistically significant difference between animal origin( $\chi^2=2.308$ ; p-value =0.679), body condition score( $\chi^2=4.301$ ; p-value =0.367) of the animal and frequencies of heart condemned.

**Table 3:** Proportion of causes of heart condemnation based on animal origin, age and body condition score categories

Diseases/conditions condition score	Animal origin		Age		Body	
	Highland (%) Good (%)	Lowland (%)	Young (%)	Adult (%)		
Hydatidosis	0(0.0)	1(0.1)	1(0.1)	0(0.0)	1(0.1)	0(0.0)
Cystercus bovis	3(0.3)	8(0.8)	4(0.4)	7(0.7)	3(0.3)	8(0.8)
Fibrosis	1(0.1)	2(0.2)	2(0.2)	1(0.1)	1(0.1)	2(0.2)
Hydropericarditis	1(0.1)	3(0.3)	4(0.4)	0(0.0)	1(0.1)	3(0.3)
<b>Total</b>	<b>5</b>	<b>14</b>	<b>11</b>	<b>8</b>	<b>6</b>	<b>13</b>

**Lung Condemnation:** The major gross pathological conditions observed in lung were hydatid cyst and emphysema accounting for 51.66% and 15.67%, respectively from the total lungs rejected. There was statistically significant difference ( $\chi^2=64.731$ ; p-value = 0.000) between the two age categories, body

condition score( $\chi^2=18.855$ ; p-value =0.042) of the animal and frequencies of lung condemned. But, There was no statistically significant difference between animal origin( $\chi^2=7.543$ ; p-value =0.673) and frequencies of lung condemned

**Table 5:** Proportion of causes of lung condemnation based on animal origin, age and body condition score categories

Diseases/conditions condition score	Animal origin		Age		Body	
	Highland (%) Good (%)	Lowland (%)	Young (%)	Adult (%)		
Hydatidosis	108(10.8)	126(12.6)	81(8.1)	153(15.3)	106(10.6)	128(12.8)
Calcification	9(0.9)	15(1.5)	19(1.9)	5(0.5)	17(1.7)	7(0.7)
Abscessation	4(0.4)	6(0.6)	6(0.6)	4(0.4)	9(0.9)	1(0.1)
Emphysema	23(2.3)	34(3.4)	15(1.5)	42(4.2)	24(2.4)	33(3.3)
Pneumonia	14(1.4)	14(1.4)	13(1.3)	15(1.5)	14(1.4)	14(1.4)
Heamorrhage	11(1.1)	10(1.0)	11(1.1)	10(1.0)	11(1.1)	10(1.0)
Congestion	10(1.0)	12(1.2)	6(0.6)	16(1.6)	11(1.1)	11(1.1)
Marbling	14(1.4)	13(1.3)	13(1.3)	14(1.4)	13(1.3)	14(1.4)
Edema	5(0.5)	11(1.1)	13(1.3)	3(0.3)	8(0.8)	8(0.8)
Emphysema and Marbling	7(0.7)	7(0.7)	12(1.2)	2(0.2)	11(1.1)	3(0.3)
<b>Total</b>	<b>205</b>	<b>248</b>	<b>189</b>	<b>264</b>	<b>224</b>	<b>229</b>

**Assessment of direct economic loss**

The annual slaughter of the abattoir was estimated to be 17160 cattle. This was based on the average slaughtering capacity of the abattoir which was 65

cattle at a night and five times per a week. Hence, the direct annual economic loss due to rejection of organs was calculated depend on the average current market price per organ at the study area.

**Table 6:** Current average price of organs in Hawassa City

Item	Current average price of organs in Hawassa City
Liver	80
Kidney	30
Heart	35
Lung	4

Using all the necessary information and the formula given by Ogunrinade and Ogunrinade (1980), the annual direct economic loss due to rejection of organs

at Hawassa Municipality abattoir was calculated to be 624,915.72(ETB).

**Table 7:** Current price calculation of organs lost using average annual slaughter rate (17160 cattle).

Type of organs	Rejection rate of organs (%)	Average price of organs at local market (ETB)	Annual loss estimation (ETB)
Liver	41.9	80	575203.20
Kidney	1.4	30	7207.20
Heart	1.9	35	11411.40
Lung	45.3	4	31093.92
<b>Total Estimated Loss (ETB)</b>			<b>624,915.72</b>

## Discussion

Meat inspection is conducted in the abattoir for the purpose of screening and removing animals with abnormal pathological lesions unsafe for human consumption and having poor aesthetic value. An important function of meat inspection is to assist in monitoring diseases in the national herd and flock by providing feedback information to the veterinary service to control or eradicate disease and to produce wholesome products and to protect the public from zoonotic hazards [11].

The most commonly encountered abnormalities during ante mortem inspection were nasal discharge, blindness, skin disease, tick infestation, coughing, lameness and localized swelling. Lameness and localized swelling might be due to trauma while being driven to market places and during transportation to the abattoir by inappropriate vehicles. The nasal discharge and coughing were most probably due to stress, immune suppression, overcrowding in the holding pens of the abattoir, during transportation and respiratory diseases.

The present findings indicated that a high number of livers were condemned due to various abnormalities. Of these, fasciolosis and hydatidosis were found to be the major causes for liver rejection from local market. Losses from liver condemnation were assumed to occur since hepatic pathology is associated to infection that might have public health importance and aesthetic value [23 & 24]. Previous studies have indicated a higher economic loss resulting from condemnation of edible organs due to parasitic causes by [25, 26] in different abattoirs in the country.

In the current abattoir survey, 29.1% of the animals' liver abnormalities were found to be caused by fascioliasis. This finding is comparable with the value reported by Denberga [27] with a prevalence of 31.1% in Gondar Elfora abattoir. However, this result was higher than the value reported by Okoli *et al.* [28], Kithuka *et al.* [29], Swai and Ulicky [30], and Abunna *et al.*, [31] with a prevalence of 8% and 8.2 %, 14% and 14.04 % from Nigeria, Kenya, Hai, Tanzania and Wolaita Sodo, Ethiopia, municipal abattoirs, respectively. On the other hand, this result was lower than reports of Phiri [16], Abdulhakim and Addis [32], Tadlele and Worku [33], and Berhe *et al.* [34] as 37%, 39.8% 46 % and 46.2% from Kafue in Zambia, Hashim Nur's export abattoir in Debre Zeit Jimma municipal and Mekelle abattoirs in Ethiopia,

respectively. These differences can be attributed to the difference in agro-ecological condition and strategic control of internal parasites in the areas. Apart from its veterinary and economic importance throughout the world, fasciolosis has recently been shown to be a re-emerging and widespread zoonosis affecting a number of human populations [35 & 36].

Hydatidosis was another leading disease which was recorded at the abattoir. It affected most of the visceral organs such as lungs, liver, heart and kidney. The overall prevalence of hydatidosis was 29.5% which occurred predominantly in the lungs (23.4 %) followed by liver (5.9%). This finding is higher than that reported by Jobre *et al.* [37] and Kebede *et al.* [38] from South Omo (25.7%) and Tigray (22.1%) respectively. Although this finding is higher than the report of Regassa *et al.* [39] from Wolaita Sodo abattoir (15.4%). In another way, this finding is lower than that reported by Kebede *et al.* [38], Getaw *et al.* [40] and Berhe *et al.* [34] with a prevalence of 32.1%, 46.8% and 48.5% Mekelle, Debre-Markos and Adama respectively. From the total lung rejected, hydatid cyst accounts for 51.7% as a principal cause of lung condemnation. Emphysema and pneumonia were next important conditions for lung condemnation in this abattoir during the study period.

In the present study, emphysema was observed at a rate of 5.7% which is higher than the report by Fasil [41] with 1.2% rate of rejection but lower than report by Kamarage *et al.* [42] with 22% in Tanzania and Abayneh, 1999 [43] who reported 16.53% in cattle slaughtered from Assela Municipal Abattoir. The prevalence of pneumonia was (2.8%). This finding is lower than rejection rate (8.8%) that was reported by Raji *et al.* [44] in cattle slaughtered at Zaria and it was higher than that reported (0.14%) in cattle slaughtered at Zango abattoir [45]. A number of factors may explain the high prevalence of pneumonic lungs, including stress factors such as exposure to dust from the environment or exhaustion during long treks of pastoral livestock in search of pasture and water and when animals are taken to livestock markets or abattoirs and parasitism. It may be observed that animals that were transported on foot might suffer from transportation stress and lack of feed and water on the way to the abattoirs. Suffocation at the lairages (due to overcrowding) and short resting time before slaughter is the probable cause for pneumonia and emphysema. Pneumonia might be also a result of endemic diseases of cattle such as pasteurellosis, which is triggered by stress, contagious bovine

pleuropneumonia. Lung congestion is associated with improper stunning and bleeding and it is a common finding in abattoirs.

In this study the heart condemnation rate (1.9%) was higher compared to the rejection rate of study by Mezgebu [46] (0.6%) and Amene *et al.* [47] (1.22%) from Gonder and Jimma abattoirs and lower than the study at Mekelle and Adema which were 3.55% and 2.7% by Shegaw *et al.*[48]and by Shiferaw [49], respectively.

The total financial loss calculated in this study, due to organs condemnation was 624,915.72 ETB/year, similarly economic loss analysis by Fasil [41] showed annual economic loss of 150,048.98 ETB at Gondar Municipal abattoir. Another report in cattle slaughtered at Mekele municipal abattoir revealed an estimated annual economic loss of 222,884.58 ETB. According to Regassa *et al.* [39] losses due to hydatidosis was estimated to be 1,791,625.89 ETB annually. Similarly the annual economic loss in Ambo and Sodo Municipal Abattoir was estimated to be 160,032.23 and 4000 USD as reported by Zewdu *et al.* [50] and Abunna *et al.* [31]. The financial loss encountered due to organ condemnation in this study is higher than the reports from different parts of the country. The difference in the financial loss estimated in various abattoir and/or parts of Ethiopia would be due to the variations in the prevalence of disease, mean annual number of cattle slaughtered in the different abattoirs and also the variation in the retail market price of organs.

## Conclusion and Recommendations

The results of the present study revealed that fasciolosis, hydatidosis, cirrhosis, calcification, pneumonia, emphysema, abscessation, cysticercosis, hydronephrosis and atrophy were the major causes of total condemnation of organs in cattle in the surveyed abattoir resulting in considerable financial loss in cattle production which remain the most important diseases warranting serious attention for prevention and control actions. In addition, success fullness in the treatment requires strong association among veterinarian and public to cut parasitic life cycle that goes down between intermediate and final host. Hence, the current study may be valuable locally and nationally by providing data for monitoring disease conditions and management practices of animals that have public health hazard and aesthetic value.

Based on above conclusion the following recommendations are forwarded.

- ✓ In order to keep the public from diseases arising from consumption of animal products, awareness creation to the society should be made to avoid from raw products intake.
- ✓ Livestock disease control strategies should be intensified, if necessary, revised so that animals supplied for slaughter are free from diseases, so that the economic loss as a result of organ condemnation is reduced.
- ✓ Strategic treatment must be implemented at appropriate time and restriction of dogs from uninspected condemned organs.
- ✓ Elimination of stray dogs should be enhanced since they promote the transmission of the parasites.

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