

Research Article

Disease Prevalence and Economic Losses by Organ Condemnation in Cattle slaughtered at Hawassa Municipality Abattoir, South Ethiopia.

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Abstract

The collection of data on livestock diseases for subsequent choices about the control and prevention of animal diseases is made simple by ongoing and updated slaughterhouse surveillances at Municipal abattoirs. We conducted a slaughterhouse survey was undertaken from November 2018 to April 2019 on cattle slaughtered at the municipal abattoir in Hawassa to determine the main reasons why organs are rejected as well as the scope of the ensuing financial losses. We surveyed about 384 bovine animals, the majority of which were males. Approximately 165 (42.96%) tested positive and 178 organs were condemned for various parasitic, bacterial, rickettsial, and bleeding issues. Of the condemned organs 112 (29.16%) livers, 49 (12.76%) lungs, 10 (2.6%) hearts, 4 (1.04%) spleens, and 3 (0.78%) tongues. Organs were rejected for different causes including parasitic issues 147 (82.58%), Contagious Bovine Pleura-Pneumonia/Marbled Lung 6 (3.37%), hydrothorax 5 (2.80%), imperfect bleeding 6 (3.37%), hydatidosis (43.25%), fasciolosis 65 (36.51%), cysticercosis 5 (2.80%), and emphysematous lung 8 (4.49%). Concerning the magnitude of disease the prevalence was revealed as Hydatidosis 76 (19.79%) and Fasciolosis (16.92%).

Keywords: Condemnation, financial Loss, Municipal and Slaughter.

1. Introduction

In the abattoir, carcasses and organs were rejected due to infections or pathological conditions. Condemnations cause the livestock industry to incur substantial financial losses, which may be connected to public concerns [1]. The national economy, food security, and livestock keepers' livelihoods are all significantly impacted by the direct and indirect losses brought on by livestock diseases. Due to the prevalence of diseases and insufficient veterinary services for early detection and response, the nation has been denied its rightful share of the market for international livestock and livestock products. Many illnesses have a 30–50% zoonotic potential (Ethiopian Veterinary Association) [2]. Meat inspection based on abattoir surveys is essential to keep an eye on a variety of diseases that harm both humans and animals. One or a few animal organs were the focus of certain surveys, whereas every organ was included by others. It has been found that the frequency of anomalies found in different geographic locations varies substantially. Several factors, such as the degree of veterinarian surveillance and the examiner's critical assessment of irregularities, affect these outcomes [3].

Each year a significant economic loss results from mortality,

poor weight gain, condemnation of edible organs and carcasses at slaughter. Apart from this economic loss, diseases that occur in livestock have public health impact. The final judgment as to be taken with an organ or part of it 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 [4]. The condemnation of edible parts and carcasses in Ethiopia because of parasitic cause's contributed to higher economic loss [5]. However, they were unable to demonstrate the impact of these parasitic and infectious disorders as the root causes of carcass and organ condemnation at abattoirs. To ascertain the economic significance of organs and carcass condemnation in Ethiopia, investigations have been carried out using surveys [6, 7]. Studies on monetary estimating Losses resulting from organ condemnation included 431,907.44 ETB in Addis Ababa abattoir, 468,504 ETB in Luna export, and in same abattoir 2, 587, 807.75 [5, 8].

Studies of abattoirs carried out in various parts of the nation revealed multifactorial causes for organ condemnation, including parasitic, bacterial, rickettsial, viral, operational issues with the slaughterhouse, inadequate transportation practices, and issues with pre- and post-slaughter care. The

parasitic causes were hydatidosis, fasciolosis, cysticercosis and Cirrhosis; bacterial was Contagious Bovine Pleuropneumonia. However, there is still a dearth of accurate information on the disease prevalence and the economic harm they do in the area. Therefore, we aimed to identify the root reasons for organ condemnation in abattoirs and to quantify the financial losses brought on by organ condemnation.

2. Materials and Methods

2.1. Study Area Description

The study was conducted in Hawassa abattoir which is located in Hawassa Town, at 070 63' 66" North latitude and 0380 484' 84" East longitude with 1650 to 1700 m above sea level (masl) whereas the average mini and maxi temperature is 20.1 and 34°C, respectively with mean annual an annual rainfall of 955 mm. Cattle slaughter for home consumption is the abattoir's area of expertise (CSA, 2003).

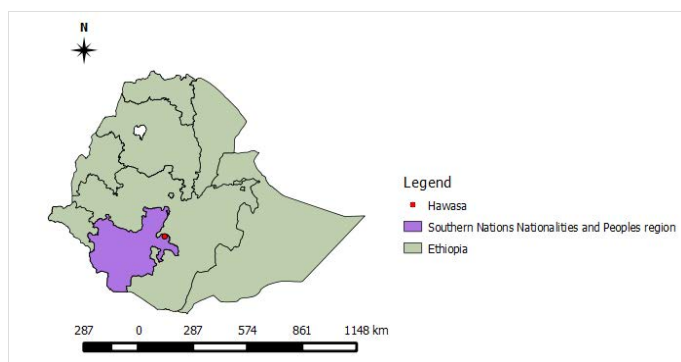


Figure 1: A Map Showing the Study are (Source; QGIS 2.0.1.).

2.2. Study Animals

The indigenous Zebu breed cattle from Shashmane, Kibre-mengist, Arsi Negelle, Tula, Negelle Borena, Yabello, Yir-galem, Leku, Wondogenet, Shebadino, Boricha, Wolaita, and Dodola were included in the study and once more classified according to their place of origin, breed, sex, and physical characteristics. Samples of all animals were examined for any anomalies both before and after the slaughtering.

2.3. Sample Size and Sampling Method

A Census type of sampling method was employed. The total number of cattle for the study was calculated based on the formula given with 95% confidence and at 5% absolute precision [9].

$$N = 1.96^2 (P_{exp}) (1 - P_{exp}) / D^2$$

Where N= sample size required, 1.96 = the value of z at 95 % confidence level, Pexp = expected prevalence, and d = desired absolute precision. Therefore, the required sample size was 384.

2.4. Assessment of Direct Economic Losses

To evaluate the economic losses, only the losses related to organs like liver, lung, heart, kidneys, spleen, and tongue were included and total condemnation of carcass was not analyzed since the whole carcass condemnation is rare. The analysis was based on the annual slaughter capacity of the abattoir considering market demand, average market prices

and the rejection rates of specific organs and carcasses. The annual slaughter rates were estimated from retrospective data recorded in the past years. The economic losses due to condemnation were estimated as follows [10].

$$EL = \sum sr_x \times Coy \times Roz$$

Where:

EL = Annual economic loss estimated due to organ and carcass condemnation from the international market.

$\sum sr_x$ = Annual Cattle slaughter rate of the abattoir,

Coy = Average cost of each liver/ lung/ heart/ kidney/ brain and carcass, and

Roz = Condemnation rates of cattle /liver/lung/heart/kidney/brain and carcass

2.5. Study Design and Methodology

A cross-sectional study was conducted from November 2018 to April 2019 on cattle slaughtered at Hawassa municipal abattoir. Data were collected by ante-mortem inspection and post-mortem examination. Ante-mortem inspection of slaughtered cattle was made by visualization in a collection barn and the cattle were kept in the barn for 24 h to assess any developed clinical signs. Pre-slaughter examinations of bovine cattle were conducted in the lairage by grouping the animals based on age, sex, breed, and body conditions. Ante mortem inspections were conducted on individual animals, while the animals were lairage and after they entered the lairage in mass. Moreover, the general animal behavior, diseases signs and abnormality were registered according to the standard ante-mortem inspection. Following the judgments passed and animals fit for human consumption, animals slaughtered [11].

The Post-mortem examination was made by visualization, palpation, and incision on the respective organs for the presence of cysts, parasites, and any abnormalities. Representative samples of the parasites, cysts, and other pathological lesions were collected and examined. The Liver, lungs, heart, kidney and carcasses were thoroughly examined by visualization, palpation, and making 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. The decisions at postmortem inspection were classified in to approved, conditionally approved, totally condemned, and partially condemned [11].

2.6. Data Management and Statistical Analysis

Data generated from ante- and post mortem inspection was recorded in the Microsoft EXCEL program. The collected data were analyzed using Stata version 13 software was used for statistical analysis of the data (StataCorp LP, College Station, Texas USA). Descriptive statistics were used to determine the level of organs and carcass condemnation rates defined as the proportion of condemned organs and carcasses to the total number examined. Possible variations between rejection rates of specific organs, age, origin, and species, were considered. Chi-square test statistics was used to identify the association between the outcome variables and various potential risks-factors. Possible variations between rejection

rates of specific organs, age, and differences were regarded statistically significant if the 95% confidence interval drawn does not overlap with each other and p-value less than 5%.

3. Results

In epidemiology, prevalence (also known as Prevalence Rate) defines the proportion of a particular population that is affected by a disease, risk factor or other studied outcome. $P(\%) = TC/TP * 100$

- Where P (%) is the prevalence rate (%)
- TC is the total number of cases
- TP is the total population size to calculate prevalence, divide the number of cases by the population size, and then multiply the result by 100 (Calculator Academy Team) [12].

Therefore, the prevalence diseases caused organ condemnation in Hawassa municipal abattoir was;

$$P(\%) = 165/384 * 100 = 42.96$$

Out of the 384 cattle that were killed, 161 (42.96%) were found to have various pathological conditions including 112 (29.16%) livers, 49 (12.76%) lungs, 10 (2.6%) hearts, 4 (1.04%) spleens, and 3 (0.56%) tongues. About 76/384 (19.79%) of the subjects had hydatid cysts, primarily in the liver (46%), the lung (50%), and the spleen (5.26%). However, no hydatid cysts were found in the kidney, peritoneum, or heart. In addition, 65/384 (16.92%) Fasciola in the bile duct, 8/384 (2.08%) with bleeding issues or imperfect bleeding, 6/384 (1.56%) with lung tissue, and 5/384 (1.3%) with *C. bovis*, which was found in 3 (60%) of the patients' tongue muscles and Caudrosis accounts 3/384 (0.78%). The prevalence of parasitic diseases was higher from all abattoir surveys indicating 151/176 (85.79%) (*Fasciola*, Hydatid cyst, *C. bovis*) and other cases by Contagious Bovine Pleuro-Pneumonia, hydrothorax, calcification due to various conditions in the liver, and lung emphysema takes the re-remaining parts of the study prevalence, 25 (14.2%).

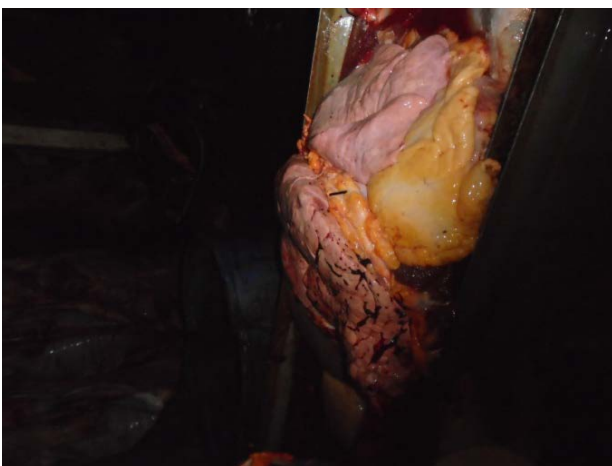


Figure 2: Marbling of Lung Tissue (left).



Figure 3: Lung Emphysema Poor/Imperfect Bleeding (Right).

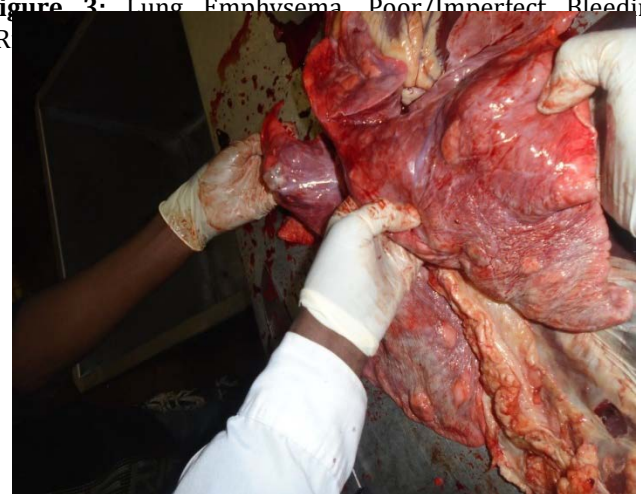


Figure 4: Yellowish Fluid Accumulation in Pericardial Sac/Hydrothorax (Right).



Figure 5: Yellowish Fluid Accumulation in Pericardial Sac/Hydrothorax (Right).

Information on the mean current price of visceral organs in Hawassa town was gathered from hotel owners, consumers, butchers, residents or households, and meat inspectors. The prices for the liver, lung, heart, spleen, and tongue were 100, 55, 40, 50, and 35 ETB, respectively. The average number of cattle slaughtered annually between 2018 and 2019 was 22,531 although the average for the previous four years was

18,031. Based on the abattoir's yearly slaughter capacity, the current price of organs that were condemned due to various circumstances, and the percentages of organs that were rejected annually, Hawassa's abattoir's economic loss throughout the study was 1,639,401.56 ETB (Table 4).

Post-mortem rejections of various organs were compared to age and body condition risk variables, it was shown that there was a statistically ($P < 0.05$) significant difference in the prevalence of organ condemnation related to body condition ($P = 0.004$). The age groupings of cattle, however, showed no statistically significant difference. About 112 (29.16%) of the 384 animals that were killed had livers that were condemned due to various abnormalities or grounds for condemnation. 55 (14.32%) Fasciolosis, 35 (9.11%) hydatidosis, 6 (1.56%) calcifications caused by various para-

sitological and pathological circumstances; and 18 (4.68%) mixed parasite infection of Fasciolosis + Hydatidosis caused the remaining liver portions to be rejected. There was no discernible difference in the age of the animals, but it was statistical significance between body condition scores. ($p = 0.04$) (Table 2) and from the total cattle *Cysticercus bovis* was discovered in five (1.3%), of which three (60%) had tongue muscles and 2 (40%) had hearts. Due to various defects or causes of condemnation, 49 (12.76%) lungs were completely rejected. The reason for 38 (9.89%) of the condemnations was hydatidosis, followed by CBPP 6 (1.56%) and emphysema 5 (1.3%). Because of various defects or causes of condemnation, 10 (1.3%) hearts were completely condemned. Blood coagulation in the pericardial sac from the condemned hydropericardium was 5 (1.3%), 3 (0.78%), and 2 (0.52%) for *C. bovis* (Table 3).

Table 1: Major Abnormalities Encountered During the Anti-Mortem Examination.

Abnormalities/Disease Conditions	Number of Cases	Ante-Mortem Prevalence Rate (%)	Anti-Mortem Judgment
Lameness	5	1.3 %	Judgment was passed for slaughter but they need special attention during PME
Depression	5	1.3 %	
Tick infestations	20	5.2 %	
Skin problems	10	2.6 %	
Nasal discharge	6	1.56 %	
Poor hair coats	7	1.82 %	
Lacrimation	5	1.3 %	
All cases	58	15.10%	

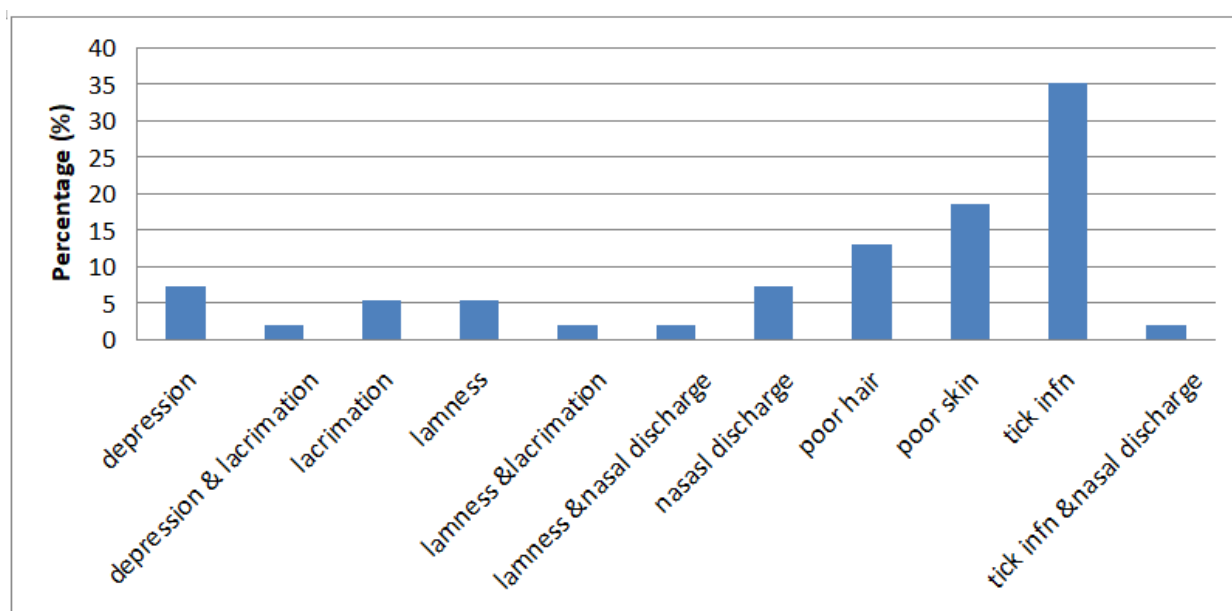


Figure 6: Frequency the of ante-mortem findings.

Table 2: Association of Animal Age and Body Condition with Abattoir Diseases

Variables	Examined Animals	Positive Animals (%)	95% CI	X ²	p-value
Age					
Young	156	66 (42.30)	54.44-64.30	0.015	0.901
Adult	228	95 (41.66)			
Body condition					
Poor	51	32 (62.74)			
Medium	158	65 (41.13)	125-139	11.179	0.004
Good	175	64 (36.57)			
Overall	384	161 (41.9)	36.9-46.9		

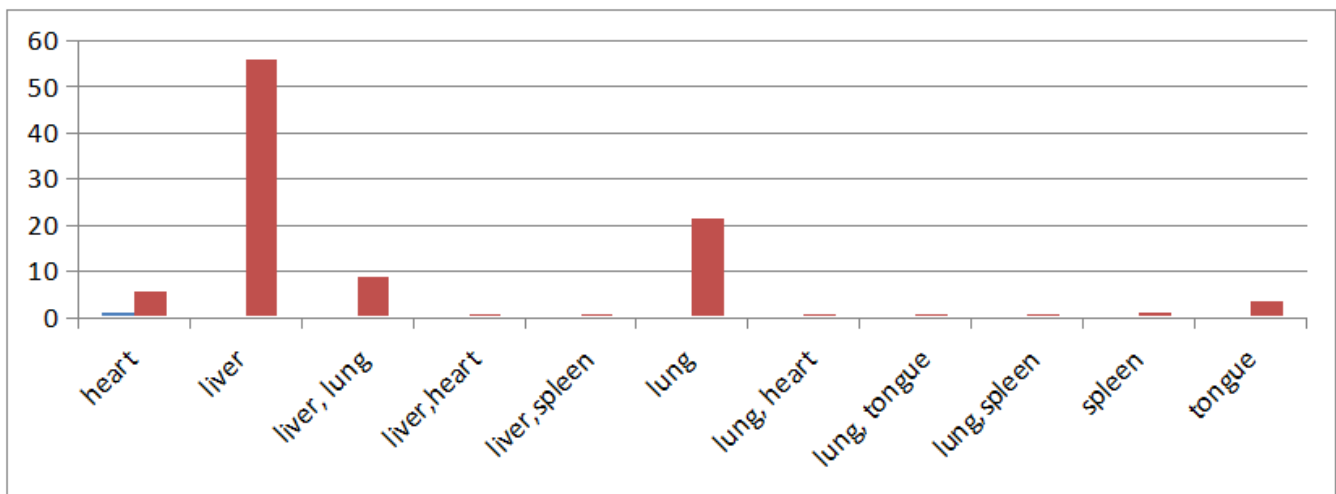


Figure 7: Frequency of Organ Condemnation Rate.

Table 3: Proportion of Postmortem Findings in Organs with Their Rejection Rate.

Condemned Organ	Number of Organs	Disease Condition	Condemnation Rate (%)	Proportion (%)
Liver	71	Fasciolosis	18.49	44.1
	35	Hydatidosis	9.11	21.74
	6	Calcification	1.56	3.72
Lung	38	Hydatidosis	9.9	23.6
	6	Marbling lesions	1.56	3.72
	5	Imperfect bleeding/ Emphysema	1.3	3.1
Heart	5	Hydropericardium	1.3	3.1
	3	Coagulation of blood	0.78	1.86
	2	C.bovis	0.52	1.24
Spleen	4	Hydatidosis	1.04	2.49
Tongue	3	C.bovis	0.78	1.86
Total	178		100	100

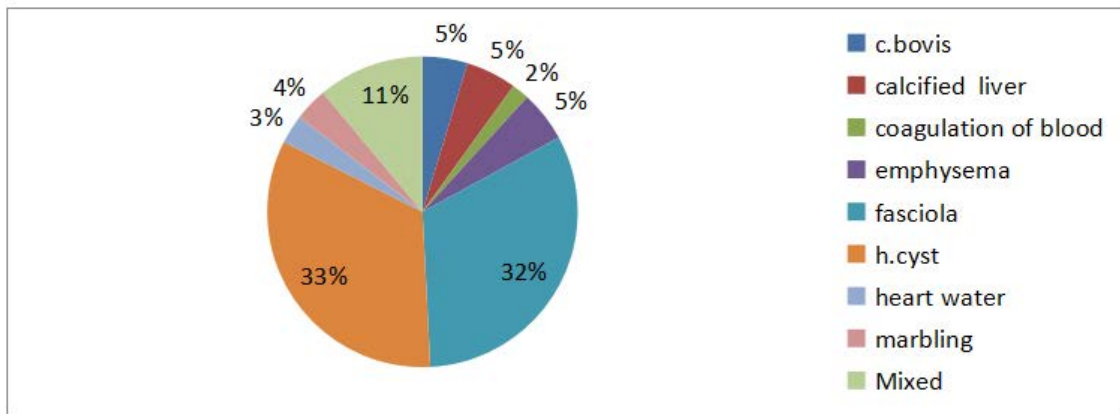


Figure 8: Frequency Distribution of Abattoir Diseases and Prevalence Rate.

Assessment of Direct Economic (Financial) Loss Due to Condemnation of Organs and Whole Carcass.

Significance economic losses are associated with the prevalence of hydatidosis, fasciolosis, cysticercosis, caudrosis, calcification, and bleeding. Economic losses due to organ condemnation only liver, lung, heart, spleen, kidney, and tongues were considered but monetary losses by carcass were not included. The economic significance of abattoir diseases was calculated based on the annual slaughter capacity of the abattoir, the average market prices of each organ, and the rejection rates of specific organs on international standards. The annual slaughter capacity of the given abattoir was estimat-

ed from retrospective data recorded in the past 3 to 4 years. The current economic loss from Hawassa Domestic abattoir due to organ condemnation alone was estimated following (Ogunrinade and Ogunrinade, 1980) [10].

$$EL = \Sigma sr_x \times Coy \times Roz$$

Where:

- EL = Annual economic loss estimated due to organ and carcass condemnation from the international market,
- Σsr_x = Annual Cattle slaughter rate of the abattoir,
- Coy = Average cost of each liver/ lung/ heart/ kidney/ brain and carcass, and
- Roz = Condemnation rates of cattle /liver/lung/heart/kidney/brain and carcass

Table 4: The Rejection Rate of Individual Organs and The Average Price of Organs Condemned From.

Condemned Organs	Condemnation Rate (%)	Average Annual Slaughtered Animals from Retrospective Data	The Average Price of the Organ (ETB)	Annual Loss Estimation (ETB)
Liver	69.56		100	1,254,232.36
Lung	30.43		55	301,775.8315
Heart	6.31	18,031	40	45,510.244
Spleen	2.9		50	26,144.95
Tongue	1.86		35	11,738.181
Total				1,639,401.56 birr

Therefore, the total estimated annual loss due to condemnation of offal's (lung, liver, spleen, heart, kidney and tongue) at the abattoirs of Hawassa, due to Fasciolosis, Hydatidosis, Cyticercosis, CBPP, Caudrosis, calcifications and bleeding problems were; =1,639,401.56 birr from Hawassa Municipality Abattoir.

4. Discussion

Both methods of meat inspection were used during the study to stop the entry of unhealthy cattle into the slaughterhouse during the ante- and post-mortem assessment. A total of 384 cattle were physically evaluated as part of an ante-mortem examination, and 58 (15.10%) of the cattle were determined to have various abnormalities. Major observations before slaughter were lameness (5.1%), sadness (5.1%), tick in-

festation (20.2%), skin issues (10.6%), lacrimation (5.1%), nasal discharge (6.1%), and poor hair coat (7.18%). The responsible abattoir meat inspector, however, decided to allow these animals to be slaughtered without a postmortem investigation and with extreme caution.

Fasciolosis, hydatid cyst, cysticercosis, hydrothorax, emphysema, coagulation, and calcification recorded in the current study are of great concern for production loss in the livestock industry, public health concern and associated economic losses by lowering the productivity of cattle and condemnation of edible organs [13]. Among abattoir Diseases for organ rejection Hydatidosis was a major cause in Ethiopia, also; fasciolosis, cysticercosis, and other causes of organ condemnation [4, 14]. Country-wise abattoir surveillance, Studies

conducted in different abattoirs of Ethiopia had displayed that parasitic, bacterial, Viral, Rickettial, and other related tick-borne diseases causing liver fasciolosis, hydatidosis in different organs mainly lung and liver, cysticercosis of (heart and tongue), cirrhosis and fibrosis of liver tissue, lungs (pneumonia Emphysema), heart pericarditis and kidney pyelonephritis, hydrothorax, are the major cause of organs condemnation [15].

The overall prevalence caused significant financial loss due to organ condemnation, with a considerable number of public health-importance slaughter-house bovine animal diseases was (41.92%) which is higher than the previous reports or findings from Gondar Elfora Abattoir 24.7%, but is lower than the work of the Nekemte municipal abattoir where the total prevalence was 47.94% [16, 17]. However, the prevalence of hydatidosis was 19.79% which is higher when compared with Adigrat Municipal Abattoir at 18.61% (Alembrhan and Haylegebriel, 2012) and Southern Wollo abattoir at 17.4% [18, 19]. These differences within the country are attributed mainly to variations in the ecological and climatic conditions such as altitude, rainfall, and temperature, the livestock management system and the inspector's ability to detect the infection [20].

This research work in the Hawassa abattoir revealed that lung condemnation which is the most important organ rejected during the study and 12.76% much lower than 46.22% of the report from the Jimma municipal abattoir, but the finding was lower than that 29.5% from Assela Abattoir [21, 4]. The prevalence of bovine hydatidosis in slaughtered cattle 20% is higher than the 17.4% prevalence report in southern the Wollo abattoir [19]. The finding is relatively lower than 22.4% in Jimma and abroad countries of Morocco 23.0% and Kenya Turkana 19.4% [22 -24]. The variation of the prevalence of hydatidosis among different geographical locations could be associated with the strain difference of *Echinococcus granulosus* that exist in different geographical locations, the availability of stray dogs, different livestock management systems, age of the animals, the deworming strategy of the given country, and socio-economic activities [25].

Lung hydatidosis which is the major factor for lung rejection takes a higher proportion (23.6%) was lower than the reports revealing a prevalence of 52.9% from Jimma Municipal Abattoir [26]. However, the current finding is higher than the report of 19.1% of Dalomana in Southeastern Ethiopia and 13.5% of Bahirdar Municipal abattoirs [20]. The lung is more affected by a hydatid cyst than other organ is that due to its size, blood supply, and availability of oxygen supply [27]. In comparison to other lung rejections emphysema alone caused condemnation with a rate of 3.1%, which is higher than the 1.22% reported from by the Wolaita Sodo Municipal abattoir and lower than the 9.57% reported from by Kombolcha Elfora Abattoir [28, 1].

Emphysema of the lung caused 1.3% of total condemnation which is lower than the 4.4% from Bahirdar and Marbling of lung tissue 1.56% due to CBPP was much lower compared to 17.2% from Arbaminch municipal abattoir and 28.5% from

Ghana [25, 29, 30]. About 1.3% of hydro-pericardium was observed in this study but it could be because of *Amblyoma* tick infestation. Variations in the rejection rate of organs may be probably due to differences in agro-ecological conditions of animal origin that could be favorable to the parasites, livestock management system, and improper disposal of condemned organs that were eaten by stray dogs (final host of hydatid cyst). Differences in the rejection rate of organs with different causes may also be due to differences in the diseases' prevalence and variations in animal management systems. There was a greater contact of hyenas and contaminated offal's with hydatidosis, as some hyenas found in the surrounding areas are fully dependent on condemned and discarded offal's contributing to increased exposure of hyenas for infection by the larval stage of *Echinococcus granulosus*, and the problem would be more hazardous for the local human population living around the abattoir due to attack by these hyenas. The minimization of the conditions could be carried out via effective prevention and control measures and the ultimate reduction of improper disposal of the infected offal's.

The study indicated that liver condemnation (29.16%) is higher than the reports of 23.7% from the Bahirdar municipal abattoir [25]. However, it is similar to 31.1% of the Gondar Elfora Abattoir and the 33.7% of the Nekemte municipality abattoir but it is lower than that of 38.8%, 40.49% and 39.68% rejection rate from abattoirs of Assella, Dessie, and Wolaita sodo municipality respectively [16, 17, 31, 15, 32]. Out of the total rejected livers, a high number were condemned due to Fasciolosis (44.1%), followed by hydatidosis (21.74%) and the least by calcification (3.72%).

The prevalence of bovine fasciolosis (18.5%) observed in this study is relatively lower than the reported prevalence of 24.4% at Jimma by and 28% from Kombolcha Industrial municipality abattoirs of Ethiopia [33, 34]. However, it is much lower than that of 53.48% at Jimma and abattoirs from Zambia and Zimbabwe with a prevalence of 53.9% and 31.7%, respectively [35-37]. A lower prevalence of fasciolosis has been observed in slaughtered cattle and the difference in prevalence among geographical locations is attributed mainly to climatic variations and ecological conditions such as altitude, rainfall, and temperature. *Fasciola* spp. prevalence has been reported to vary over the years mainly due to variations in the amount and pattern of rainfall [38].

In line with the current finding, others indicated that fasciolosis was the leading cause of liver condemnation [15]. Comparable *Fasciola* prevalence (24.24%) was reported from the Wolaita Sodo Municipal Abattoir [28]. A lower prevalence of (2.39%) was reported from the Bolgatanga Municipal Abattoir of Ghana [39]. The report from Hashim Nur's Export Abattoir showed a prevalence of 39.8% which is higher than the present finding [40]. Such variation among the different reports could be derived from the difference in ecology, management, husbandry system, and veterinary health service. Moreover, calcification of the liver (1.56%) recorded in the present study was lower than 4.6% reported from Assella [31]. but is higher than 0.98% from the Wolaita Sodo abattoir [28].

About 2.6% of heart was condemned due to *Cysticercus bovis* (1.24%), coagulation of blood (1.86%) and yellowish fluid accumulation in the pericardial sac (3.1%), higher than that of 1.2% [31]. From Assella municipality abattoir and lower than, the 3.71% in Mekelle and the 4.09% by in Wolaita sodo municipal abattoir but it is much higher than 0.76% (Lati et al., 2105) from Nekemte municipality abattoir and the 0.27% from Adigrat municipality abattoir [41, 17, 18]. In the present study, 0.52 of % the heart condemnation is by *C. bovis* and 0.78% of tongue muscle was condemned by *C. bovis* similar finding of 0.78% from Wolaita sodo municipal abattoir [42].

In the present study, 1.04% of the spleen was condemned by hydatid cyst, and all spleen rejected by hydatid disease (1.04%) thus the study is related to who reported 0.94% hydatidosis from Wolaita soddo abattoir and is much lower than the 20% rejection rate from Kombolcha Elfora Abattoir. Overall tongues condemned during the study period were 1.3%. The results were higher than that of 0.9% (Shegaw et al., 2009) and 0.78% (Yalew et al., 2016) from Mekelle and Dessie municipality abattoirs respectively [41, 15].

Total annual financial loss as a result of the organs' condemnation of cattle was estimated about at 1,639,401.56 ETB annually. Therefore, the total annual financial loss due to major abattoir diseases and related conditions is the summation of losses from organ condemnation only, while the carcass condemnation annual financial loss is not included in this study. This finding is lower than the 2.7 million ETB loss, from Debre-Zeit Helmix abattoir and 2,535,022.42 ETB loss, in the same study area and it is higher than 1,011,020.20 ETB loss, from Nekemte municipality abattoir but it is much higher than 464, 201.588, 233,501.94, and 200,880 ETB, at Luna Export Abattoir, Adigrat, and Assela municipality abattoir municipal slaughterhouses, respectively from Assela municipality abattoir municipal slaughterhouses, respectively [17, 7, 41, 31]. This is probably due to the ecological and climatic difference between those localities and the annual slaughter capacity, the prevalence of animal diseases in the abattoir and the cost of organs vary from one area to another, and raw meat consumption and the total annual slaughter capacity of the present study area higher than other parts of Ethiopia [43- 49].

5. Conclusion

The determination of the prevalence of each disease has some practical implications for further measures which will undertake for control or prevention measures. It should be noted, however, that hydatidosis and fasciolosis are multiple hosts and the objectives of this study could be addressed by the application of conventional observational studies. This study has demonstrated that hydatidosis and fasciolosis are endemic in the study area and in the areas where cattle originated to be slaughtered. The disease also causes considerable economic losses as a result of offal condemnations besides we conclude that certain socioeconomic and epidemiological conditions that are favorable for the existence of hydatidosis and fasciolosis. Region-wise prevalence studies would be desirable to effectively map out epidemiology and

the spread of these diseases. Concerning hydatidosis, a specific study in dogs could help in knowing the prevalence in the definitive host. Furthermore, studies on small ruminants such as sheep and goats may improve epidemiological understanding of the disease in the study areas.

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