

Review Article

Major Causes of Organ Condemnation at Yabello Municipal Abattoir

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Introduction

The overall cattle population for Ethiopia is estimated to be roughly 70 million. Out of this entire cattle population, the female cattle represent roughly 56 percent and the remaining 44 percent are male cattle [4].

Abattoirs have vital function in surveillance, control, and eradication of illnesses of animal health concern, as well as control, reduction, and prevention of foodborne risks of public health relevance [15]. Abattoirs give information on the epidemiology of illnesses on animals, to measure to what degree the community is exposed to different zoonotic diseases and quantify the financial losses sustained by condemnation of contaminated parts and carcasses [10]. Parasitic infections are seen as a serious health concern and create a large economic loss in nations where cattle production is an important element of the agricultural activity [1].

Before slaughtering, all animals are scrutinized during ante-mortem examination to make sure that they are suitable for human consumption. Signs of infectious or zoonotic illnesses are found as well as indicators of animal welfare being affected. The official veterinarian at the slaughterhouse is responsible for executing the inspection [12]. Monitoring and other fac-

Abstract

A cross sectional study was conducted from December 2022 up to March 2023 to identify the major causes of organ condemnation in cattle slaughtered at Yabello municipal abattoir. A total of 384 animals were examined for ante mortem and post mortem examination of which 231 (60.15%) animals were found to have different kinds of ante mortem abnormalities. Depression 67 (17.45%), lameness 29 (7.55%), emaciation 23 (5.99%), coughing 22 (5.73%), swelling 19 (4.95%) and respiratory distress 16 (4.17%) were found to be the most common abnormalities encountered in the ante mortem examination of the animals. In post mortem examination liver 157 (40.8%), lung 86 (22.4%), carcass 63 (16.5%), heart 34 (8.8%), Kidney 29 (7.5%) and tongue 15 (3.9%) were condemned due to different post-mortem abnormalities. A significant difference was noticed in the condemnation rate of heart with body condition score, carcass condemnation with ante mortem abnormality and tongue condemnation with ante mortem abnormality with (P-value < 0.05). It could be concluded that the greater condemnation rate of edible parts like liver, kidney, tongue and the carcass cause financial loss. It indirectly influences the food sufficiency or availability. Prevention strategies include frequent deworming to decrease condemnation due to parasite infections should be performed.

Keywords: Ante-mortem abnormalities; Cattle; Organ condemnation; Post-mortem abnormalities

tors at slaughter house have been regarded as one technique of determining the disease status of cattle [13]. Ante-mortem inspection usually takes place within 24 hours of arrival at the slaughter house and less than 24 hours before slaughter, or at any other time when the official veterinarian requires it [12].

Post-mortem examination involved visual inspection, palpation and making systemic incision check on organs abnormalities and pathological lesions are differentiated and judged [9].

Each year a large economic loss arises from mortality, condemnation of edible organs and corpses at slaughter. This productivity loss in the cattle business is estimated at more than 900 million USD yearly countrywide [7]. Determination of the cause and magnitude of organ and carcass condemnation in abattoirs and proper evaluation of associated economic loss are needed where economic realities often determine the type and scope of preventive measures to be used [10].

Proper care of animals is not just a question of welfare but also an issue of meat quality. Improper care of animals generates poor meat quality; and bad meat quality result in poor processing characteristics, functional and eating qualities and

is less likely to be accepted by consumers [6]. Hazard Analysis Critical Control Points (HACCP) should be established in all abattoirs to maintain welfare of animals, maximum efficiency and quality of beef [20].

It is necessary to have clear information on major causes of organs and carcass condemnation at the abattoir. This is important in providing information on where and how to reduce the losses that may be caused by the various abnormalities (lesions/pathology).

There for the objective of this research were

- To access the major causes of organ condemnation in abattoir
- To access abattoir-based prevalence of major causes of organ condemnation

Materials and Methods

Study Area

The study was conducted at Yabello municipal abattoir which is located in Borena zone, Ethiopia, from December 2022 to March 2023. Yabello city is located at 580km south of the capital city Addis Ababa. The city is located at 4°53' N and 38°5' E at 1857masl. The area gets 88.3mm of average annual rainfall. The elevation spans from 943 to 2,400 meters above sea level with average yearly rain fall of 400 to 1100 mm demonstrating a bimodal rainfall (long and short rainy seasons). The lengthy rainy season spans from March to May while the short rainy season comes from mid-September to the mid-November. The yearly temperature fluctuates from 19 to 42°C. The pastoralists frequently travel with their livestock depending on the availability of fodder and water [3].

Study Population

The study populations were cattle brought for slaughter and study was conducted on 384 randomly selected cattle destined for slaughter at Yabello municipal abattoir mainly coming from Borena, Konso and neighboring local areas.

Study Design

A cross-sectional research design was utilized to investigate the principal reasons of organ condemnation discovered in Yabello municipal abattoir by careful assessment of organs at the time of slaughter. Animals were categorized based on their origin, age, and body condition score. All cattle were inspected during ante mortem and post mortem examination and data was entered in a format devised for this purpose.

Sample Size Determination

The sample size for this study was determined based on 50% expected prevalence, 5% precision and 95% confidence level according to Thrusfield, (2005).

Table 2: Causes and percentage of organ condemnation.

Liver*	Frequency (%)	Kidney*	Frequency(%)	Heart*	Frequency (%)	Lung*	Frequency(%)	Carcass *	Frequency (%)	Tongue*	Frequency (%)
Hydatid cyst	107 (68.15%)	Hydatid cyst	23 (79.31%)	Hydatid cyst	22 (64.71%)	Hydatid cyst	52 (60.47%)	Bruising	47 (74.60%)	C. bovis	10 (66.67%)
Calcification	38 (24.20%)	Calcification	6 (20.69%)	Congestion	12 (35.29%)	Calcification	24 (27.91%)	Injection site injury	16 (25.40%)	Trauma	5 (33.33%)
Fasciola	12 (7.64%)					Marbling	10 (11.63%)				

$$n = \frac{1.96^2 (P_{ex} (1 - P_{exp}))}{d^2}$$

Where n is the required sample size, Pexp is the expected prevalence and d is the desired absolute precision.

Using 50% expected prevalence, 95% confidence interval and 5% desired absolute precision the sample size calculated was 384 cattle.

Method of Data Collection

Data collection format was designed to gather data from the slaughterhouse on the key reasons of organ condemnation. A simple random sample strategy was utilized to incorporate live-stock into examination. The post-mortem data was gathered on the animals previously chosen randomly for antemortem by visualization, probing and incision on organs and carcass for any flaws and abnormalities and if any defect or abnormality was discovered then was documented on the predefined data collecting forms.

Data Analysis

All the data collected from ante mortem and post mortem inspection were inserted into Microsoft excel 2019 program. Analysis was done using Stata version 14 data analysis software. Descriptive statistics was used to assess the rate of organ condemnation and its connection with the primary parameters including body condition score [5], age and ante mortem anomalies. The connection between condemnation rate, ante mortem anomalies and body condition score were analyzed by Pearson's chi-square test.

Result

Ante Mortem Inspection

Out of 384 animals inspected at ante mortem examination a total of 231(60.15%) animals were found with different abnormalities encountered during antemortem examination.

Table 1: Abnormalities encountered during antemortem examination.

Ante mortem abnormality	Number of animals affected	Percent
Depression	67	17.45
Lameness	29	7.55
Emaciation	23	5.99
Coughing	22	5.73
Swelling	19	4.95
Respiratory distress	16	4.17
Dehydration	14	3.65
Skin lesion	11	2.86
Nasal discharge	10	2.60
Mouth lesion	7	1.82
Bruising	5	1.30
Mouth bleeding	3	0.78
Frothing	3	0.78
Nasal bleeding	1	0.26
Weakness	1	0.26
Total	231	60.15

Key: *Causes of condemnation

Table 3: Association between organ condemned and body condition score.

Organ condemned	Body condition score		χ^2	P-value
	Good	Poor		
Liver	49	108	1.3231	0.516
Kidney	10	19	0.516	0.369
Heart	10	24	7.7273	0.005
Lung	33	53	0.4067	0.816
Carcass	39	24	0.0032	0.955
Tongue	4	11	2.7273	0.099

Table 4: Association between organ condemned and age.

Organ condemned	Age		χ^2	P-value
	Adult	Young		
Liver	149	8	0.7045	0.703
Kidney	25	4	2.4293	0.119
Heart	32	2	1.1591	0.282
Lung	77	9	1.4141	0.493
Carcass	62	1	2.9849	0.084
Tongue	14	1	0.5357	0.464

Table 5: Association between liver condemnation and ante mortem abnormality.

Ante mortem abnormality	Liver condemnation	χ^2	P-value
Dehydration	5		
Depression	43	4.6098	0.330
Emaciation	17		

Table 6: Association between kidney condemnation and ante mortem abnormality.

Ante mortem Abnormality	Kidney condemnation	χ^2	P-value
Dehydration	3		
Depression	3	1.5556	0.459
Lameness	1		

Table 7: Association between heart condemnation and ante mortem abnormality.

Ante mortem abnormality	Heart condemnation	χ^2	P-value
Dehydration	3		
Depression	5	3.06	0.217
Weakness	1		

Table 8: Association between lung condemnation and ante mortem abnormality.

Ante mortem abnormality	Lung condemnation	χ^2	P-value
Coughing	22		
Dehydration	3		
Depression	16	3.6000	0.964
Emaciation	5		
Nasal discharge	10		
Respiratory distress	16		

Table 9: Association between carcass condemnation and ante mortem abnormality.

Ante mortem abnormality	Carcass condemnation	χ^2	P-value
Bruising	5		
Lameness	28	41.2434	0.000
Skin lesion	11		
Swelling	19		

Table 10: Association between tongue condemnation and ante mortem abnormality.

Ante mortem abnormality	Tongue condemnation	χ^2	P-value
Emaciation	1		
Mouth bleeding	3		
Frothing	3	12.0000	0.017
Mouth lesion	7		
Nasal bleeding	1		

temortem abnormalities. The major abnormalities seen were depression (17.45%), lameness (7.55%), emaciation (5.99%) and coughing (5.73%). Details of abnormalities found in the ante mortem examination were summarized in the tables below.

Post Mortem Examination

All the animals that were examined for ante mortem examination were also subjected to post mortem examination. From total of 384 animals that were examined in post mortem examination 157 (40.8%) liver, 29 (7.6%) kidney, 34 (8.8%) heart, 86 (22.4%) lung, 63 (16.5%) carcass and 15 (3.9%) tongue were condemned for human consumption based on major abnormalities grossly seen by visualization, palpation and incision.

Discussion

In the present study a total of 384 animals were examined for any abnormalities in ante mortem and post mortem examination and a total of 231(60.15%) animals were found to have different ante mortem abnormalities. This finding is higher as compared to the findings in a study done at Wolaita municipal abattoir which reported 44.8% [8]. The finding is also higher than the report in Adama municipal abattoir which was reported to be 16.38% [11]. This study's result is also higher than reported at Gondar Elfora abattoir at 16.2% [2]. The difference may be due to animal handling and management practice while transporting or at farm or it may also due to epidemiological variation on causes of diseases.

The major ante mortem abnormalities observed in this study were depression and lameness. Alemu *et al.* (2017) reported branding and nasal discharge as a major ante mortem abnormality and Yalew *et al.* (2016) reported that the major abnormalities found in ante mortem were ectoparasites and lacrimation which is different from this study but Kebede *et al.* (2020) reported depression as the major abnormality found in the ante mortem abnormality which was similar to this study.

In the post mortem examination, the major organs condemned were liver, lung, carcass, heart, kidney and tongue. The major causes of liver condemnation were hydatid cyst, calcification and Fasciola in the order mentioned. Unlike this study [19] reported fasciolosis, cirrhosis and hepatitis in decreasing order as major causes of liver condemnation. Similarly, Alemu *et al.* (2017) also reported fasciolosis, calcification and hydatid cyst as the major causes of liver condemnation. The main difference for this variation is probably the epidemiology of fasciolosis in the origin from where the animal at the abattoir were.

The major postmortem abnormalities found for the condemnation of lung were hydatid cyst, calcification and marbling. In a study performed at Gondar Elfora abattoir the main cause of lung condemnation was hydatid cyst followed by emphysema and calcification [2] which are similar to this study. Hydatidosis and pneumonia were reported as main cause of lung condemnation in Dessie municipal abattoir [19] which is also similar to this study but in this study, there was no pneumonia reported.

In case of carcass condemnation, the major abnormalities were Bruising 47 (74.60%) and injection site injury 16 (25.40%). Bruising, hemorrhage and abscess were mentioned as the major causes of carcass condemnation in Wolayita sodo municipal abattoir by [8]. In a study conducted by [14] at Nekemte municipal abattoir bruising and abscess were reported as major causes of carcass condemnation which is comparative to this study.

The major abnormalities leading for the condemnation of

heart were hydatid cyst 22 (64.71%) and congestion (12%). [11] reported that the major causes of heart condemnation are pericarditis, hemorrhage and edema which is different from the findings of this study. It is also reported that hemorrhage and *C. bovis* as major causes of heart condemnation on a study done at Wolayita sodo municipal abattoir by [8].

The major postmortem abnormalities leading for the condemnation of kidney were hydatid cyst 23 (79.31%) and calcification 6 (20.69%). Nephritis, hemorrhage and infraction were the major causes of kidney condemnation in study conducted by [17] at Hawassa municipal abattoir. In a study done at Gondar Elfora abattoir, the major causes of kidney condemnation were calculi, hemorrhage and hydatid cyst [2].

The two post mortem abnormalities leading for the condemnation of tongue were *C. bovis* 10 (66.67%) and trauma 5 (33.33%). In a study done at Nekemte municipal abattoir by [14] the major post mortem abnormality for the condemnation of tongue is *C. bovis* which is similar to this study except the fact that this study have also found trauma. This study is also different to the study done at Hawassa municipal abattoir who reported abscess and *C. bovis* as the major causes of tongue condemnation in the abattoir [17].

Conclusion and Recommendation

- Organ condemnations cause big economic losses in the cattle industry. In this study there were highest rate to edible offals like liver, heart, kidney and tongue and also to carcass. This would affect the owners financially and also interfere on food sufficiency. Therefore, based on the above conclusion the following recommendations are fRegular deworming of animals should be practiced in order to prevent some parasitic diseases that leads to organ damages.

- Awareness should be established for the animal producers, attendants, animal transporters,

To protect the public from zoonosis there should be strict post-mortem inspection.

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