Major Causes of Organ Condemnation and Their Economic Loss in Camels Slaughtered at Dire Dawa Municipal Abattoir

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Abstract: Diseases in camels cause considerable economic losses due to condemnation of edible organs and decreased meat/milk production. A cross-sectional study was conducted from November 2015 to April 2016 to determine the major causes of organ condemnation in camels slaughtered at Dire Dawa municipal Abattoir. An attempt was also made to estimate the direct economic loss due to condemnation of edible organs during meat inspection. A total of 500 camels were slaughtered at Dire Dawa municipal abattoir in the period of six months from November 2015 to April 2016. Out of 500 slaughtered camels 183(36.6%) branding, 70(14%) poor body condition, 62(12.4%) localized lesion, 23(4.6%) localized swelling, 12(2.4%) lameness, 4(0.8%) hernia and 3(0.6%) blindness were observed during antemort examination. Of the 500 total camels slaughtered, 298(59.6%) lung, 229(45.8%) liver, 36(7.2%) heart and 9(1.8%) kidneys were totally condemned. From the total number of camels slaughtered, 138(27.6%), 54(10.8%) and 78 (15.6%), 15(3%), 13(2.6%) lungs were condemned due to hydatid cyst, pneumonia, emphysema heamorrhage and abscess respectively and cirrhosis, hydatid cyst, fatty change, calcification and abscess 87(17.4%), 83 (16.6%), 23(4.6%), 28(5.6%) and 8(1.6%) respectively were causes condemnation of camel liver during the study period. Hydatidosis, cirrhosis, pneumonia and emphysema are major causes for organs condemnation in camel during the present study. Hydatidosis is one of the most disease responsible for these organ condemnation (48.1%). The economic loss in present study period was 39,455 Ethiopian birr or 1,834.524$US, rendering them unfit for local market on esthetic reason and considering their zoonotic risks to humans. The present study clearly revealed that considerable number of rejection of edible organs from camel slaughtered at Dire Dawa municipal Abattoir mainly due to different pathological abnormalities on different organs and a significant financial loss. Therefore appropriate animal health strategies and prevention method should be practiced.

Key words: Abattoir, Camel, Dire Dawa, Financial loss, Organ condemnation

1. Introduction

The camel is an even-toed ungulate within the family Camelidae and genus Camelus, bearing distinctive fatty deposits known as humps on its back. The family Camelidae is divided into two genera; the old world camels (genus Camelus) and the new world camels (genus Lama). Two domesticated species of old world camels exist, the *dromedary* or one humped camel (*Camelus dromedariu*s), known as Arabic camel, that has its distribution in the hot deserts of Africa and Asia and the Bactrian or two-humped camel (Camelus bactrianus) that can be found in the cold deserts and dry steppes of Asia (Schwartz and Dioli, 1992).

The Camel today finds its distribution in the arid and semiarid desert and steppe regions of the world. Camels can live in areas that are inhospitable to other domestic animals and are an important factor in the capacity of humans to survive in and make use of these drier region. It is most numerous in the arid areas of Africa, particularly in the arid lowlands of Eastern Africa namely, Somalia, Sudan, Ethiopia, Kenya and Djibouti. According to (FAO, 2009), there are about 22 million camels in the World. Of this, 19.58 million are believed to be one-humped dromedary camels (Camelus dromedarius) while the remaining 2.42 million are two-humped bacterian camels (Camelus bactrianus). More than 60% of the dromedary camel population is concentrated in the four North East African countries viz. Somalia, Sudan, Ethiopia and Kenya (FAO, 2004). Other areas of distribution of the humped camels are the Middle East, parts of Central Asia, and Australia. Ethiopia has an estimated camel population of 2.3 million and ranks third in Africa next to Somalia and Sudan (FAO, 2008). In Ethiopia the one-humped camel is an important versatile animal that largely distributed in the Southern, Eastern and Northeast pastoral areas, Afar, Somali and Borena areas (Workneh, 2002).

The camel represents a rich culture and heritage for more than 100 countries around the world. Camels play an important socio-economic role within the pastoral and agricultural system in dry and semi dry zones of Asia and Africa. The camel possesses unique qualities which make it superior to other domesticated

animals in the hot and arid desert ecosystems (Schwartz and

Dioli, 1992). Camels provide milk, meat, wool, hides and skin and their dung is used for fires. They are used for riding and transport, investment and long-term savings, source of prestige for their owners and large market for trade in live camels. Sales of surplus milk, livestock or livestock products are sources of cash income for pastoral families. Camels are slaughtered for consumption and during ritual occasions.

Diseases in camels cause considerable economic losses due to condemnation of edible organs and decreased meat/milk production (Romazanvoc, 2001). Camels meat is one of the components of diet for the pastoralist and residences of Somali ethnic groups in Ethiopia (Muskin *et al*., 2011). Currently, camels have become one of the national export animals for Ethiopians. Despite its role in the livelihoods of pastoral communities and national economy, little attention has been given to camel production and health care in Ethiopia. The major constraints for camels rearing are prevalent disease and challenging environments.

In developing countries, abattoir plays a major role in providing and serving as sources of information and reference centre for disease prevalence. Meat inspection is commonly perceived as the sanitary and safety control of slaughter animals and meat. The purpose of meat inspection is to protect public health and to provide safe and wholesome meat for human consumption and screening animal products with abnormal pathological lesions that are unattractive and unsafe for human consumption (Nurit *et al*., 2012). Meat inspection assists to detect certain diseases of livestock and prevent the distribution of infected meat that could give rise to disease in animal and human being and to insure competitiveness of products in the local market (Hinton and Green, 1993). Abattoir meat inspection is essential to remove gross abnormalities from meat and its products, to prevent distribution of contaminated meat and to assist detecting and eradication of certain livestock diseases. The responsibility for achieving this objective lies primarily with the relevant public health authorities who are represented by veterinarians and meat inspectors at the abattoir stage (Alemayehu *et al*., 2013).

Monitoring and other conditions at slaughterhouse have been recognized as one way of assessing the disease status of camel and abattoirs played an important role in screening animal products with various abnormalities and diseases that are not fit for human consumption (Alembrhan and Haylegebriel, 2013). The results of meat inspection at slaughter houses with appropriate trends

indicate possible risks due to unsafe meat obtained from camel carcasses at the slaughterhouses. Such risks are eliminated by strict veterinary inspection of animals prior to slaughter as well as of meat and parenchymatous organs after slaughter. Slaughter houses provide an excellent opportunity for detecting pathological lesions of both economic and public health importance (Ahmed *et al*., 2013).

In Ethiopia, there is gap of information on causes of carcass condemnation and the status of camel diseases that put the public at risk of acquiring zoonotic food borne diseases. In this regards, as Ethiopian dromedaries are primarily reared by pastoralists, abnormalities of carcass and edible organs could have significant economic and public health consequences in the regions. However, abattoir based epidemiological studies are needed to show the real picture of abnormalities and lesions resulting in carcass and organ condemnation in camels so that this would suggest impact on economy and public health.

Therefore, the objectives of the present study were:

To identify the different causes of organ condemnation in camel slaughtered at Dire Dawa Abattoir.

To estimate the direct economic losses arises from organ condemnation.

2. Material and method
2.1 Study Area

The study was conducted from November 2015 to April 2016 at Dire Dawa Municipal abattoir. It is the only municipal abattoir giving service for the community in and around the city. Dire Dawa Administration Council (DDAC) is situated in the eastern part of Ethiopia at about 515km) of Addis Ababa. The area is located between 9° 27" and 9°49" N latitudes and 41°38" and 42° 19"E longitude. The most rain fall pattern of the area is characterized by short rainy season from February to May and long rainy season from July to September. The dry season extends from October to January. The mean annual rain fall in the study area varies from 550 mm in the lowland northern part to above 850 mm in the southern mountain. The monthly mean maximum and minimum temperature ranges from 34.6°C to 14.5°C respectively. The entire territory of DDAC rests on an elevation ranging between 950 m.a.s.l. in the north east to 2260 m.a.s.l. in south west. Using the 1500 m contour as a line of separation, two agroecological zones, the kola (below 1500 m) and Woina Dega (above 1500 m) have been recognized (DDAC, 2014).

2.2. Study Animals

A total of 500 camels apparently healthy one-humped camels (Camelus dromedarius) were slaughtered at the Dire Dawa municipal abattoir from

November 2015 to April 2016. Out of the total of camels slaughtered were 405 females and 95 males. The camels slaughtered at the abattoir were transported on trucks and foot from their origin to the abattoir and kept at the liarage for 8-10 hours. Identification number was given to each camel during antemortem inspection and transferred to different organs during postmortem examination

2.3. Study Design

A cross-sectional survey was conducted and each week five days (except weekend days was left) visit was made for ante mortem inspection and post mortem examination of slaughtered camels. Three to four camels were slaughtered every day and all camels slaughtered on each

visit day were included. Individual camels were carefully identified and the sex, age, origin and body condition score (BCS) of every individual camel were recorded. Age category was estimated by using the dental eruptions and wears as described by (Moretti, 2008) and categorized into age groups of <5 years, 5-10 years and age >10 year. BCS was categorized into three groups: poor (0 and 1), medium (2 and 3) and good (4 and 5) which is determined by observation of the anatomical features (back and flank) of the camel based on the guidelines given by (Faye *et al*., 2007). Animal origin was also recorded as Babile, Gara Mulata, Dire Dawa, Hurso and Shinile by requesting information from the farmers or traders.

2.4 Sampling Methods and Determination of Sample Size

The total of 500 camels were selected by simple random sampling method of infinite population. The total number of camel required study was calculated based on sample size determination method for simple random sampling of infinite populations. Since there is no similar research conducted in the area, expected prevalence of 50% was assumed. The required sample size of the study animal was determined by the formula given in (Thrusfield, 2005) with 95% of confidence interval and 5% desired precision as shown below.

$$N = \frac{(1.96)^2 \times Pexp\,(1- Pexp)}{d^2}$$

where: N = Number of sample size
Pexp= Expected prevalence = 50%
d^2 = Absolute precision = 5%
CI = Confidence interval (95%)

Therefore the calculated sample size was 384 camels, but 500 camels were included in the study, with the intention of maximizing the accuracy.

3.4.1 Abattoir Survey

Antemortem Examination:

The ante mortem examination was carried out on individual animal in motion and at rest in the lairage. Inspection of the animals was made by while at rest or

in motion for any obvious sign of disease following the (FAO, 2008) guidelines. Moreover, the general behavior of the animals,

body condition and sign of disease and abnormality of any type were recorded according to the standard antemortem examination procedure (Gracey, 1986). Animals with no observable-ill health and abnormalities were passed for slaughter. Animals were identified based on enumerated marks on its body surface before slaughter using ink.

Postmortem Examination:

After slaughtering the animals, careful gross examination of the organs and the carcass was carried out. Before conducting the postmortem examination the identification markings done in the ante mortem examination were transferred to all organs that are going to be examined by postmortem examination. Postmortem inspection of carcasses and visceral organs; lung, heart, liver and kidneys and other organs were made by visual inspection, palpation and incision methods for the presence of any abnormalities (Taiwo, 2005; Getachuw *et al*., 2008). All abnormalities observed were recorded. Judgments on pathological lesions were given based on (FAO, 1994) guidelines on meat inspection for developing countries.

2.5. Direct Financial Losses:

The direct financial loss from organ rejection was calculated by considering the overall average weight of organs. Market price of organs was obtained from the abattoir workers and camel butcher houses. An estimated financial loss due to condemnation of organs was calculated according to (Ogunrinade and Ogunrinade, 1980) as follows:

EL = srx X Coy X Roz

where: EL = Annual economic loss estimated due to organ condemnation

srx = Annual number of camel slaughtered at the abattoir.

Coy = Average cost of each liver/lung/heart/kidney

Roz = Condemnation rate of each liver/ lung/heart/ kidney

2.6 Data Analysis

Raw data obtained was entered and stored in a Microsoft excel 2010 spread sheet computer program and summarized. The data was analyzed by using SPSS version 20 software of the computer programmed for the statistical analysis. A 95% confidence interval and 5% absolute precision was used to determine whether there was significance difference among hypothesized risk factors like sex, age, origin, body condition and organ affected. P values < 0.05 was considered as statistically significant in all cases.

3. Results

3.1 Antemortem Examination

Out of the total 500 camels were examined during antemortem inspection, camels were found to have one or more abnormalities. The most commonly encountered abnormalities during antemortem inspection, in the present study, were branding, localized swelling, poor body condition, lameness, hernia and blindness. The most commonly encountered abnormalities during ante-mortem inspection and overall prevalence of abnormalities were shown in the following table 1.

Table1: The summary of abnormal conditions encountered on slaughtered camels during antemortem examination.

Abnormalities on slaughtered camel		No. positive camels	prevalence
Branding	183	36.6%	
Poor body condition	70	14%	
Localised lesion	62	12.4%	
Localised swelling	23	4.6%	
Lameness	12	2.4%	
Hernia	4	0.8%	
Blindness	3	0.6%	

3.2 Postmortem Inspection:

Out of the total organs examined 229 livers, 298 lungs, 36 hearts and 9 kidneys were condemned. The most recorded pathological findings in the slaughtered camels at the abattoir were the lung abnormalities and followed by liver. The heart and kidney have approximately less contribution for the condemnation of the organs. The overall proportion of organ condemnation rate and prevalence due to various pathological conditions and it causes shown in following table 2.

Table 2: Major causes of organs condemnation, frequency, prevalence and its proportion (%) of organ condemnation

Organs	Causes	No.organ condemnation	prevalence	Rate of condemnation
Lung:	Hydatid cyst	138	27.6%	46.31%
	Pneumonia	54	10.8%	18.12%
	Emphsema	78	15.6%	26. 17%
	Heamorrhage	15	3%	5.03%
	Abscess	13	2.6%	4.36%
	Total	**298**	**59.6%**	**100%**
Liver	Cirrhosi	87	17.4%	37.99%
	Hydatid cyst	83	16.6%	36.24%
	Fatty change	23	4.6%	10.04%
	Calcification	28	5.6%	12.23%
	Abscess	8	1.6%	3.49%
	Total	**229**	**45.8%**	**100%**
Heart	Hydatid cyst	17	3.4%	47.22%
	Adhering	16	3.2%	44.44%
	Pericardititis	3	0.6%	8.33%
Total	36	8.8%	100%	
Kidney	Hydronephretus 6	1.2%	66.67%	
	Hydatid cyst	3	0.6%	33.33%
	Total	**9**	**1.8%**	**100%**

The present study displayed the overall proportion of organ condemnation rate due to various pathological conditions such as hydatid cyst (lung and liver), cirrhosis (liver), emphysema (lung) and pneumonia (lung) were differentially distributed in relation to body condition, sex and age of animals.

Table 3. Summary of lung and liver condemnation, its prevalence relative to sex, age, body condition and origin of slaughtered camel at Dire Dawa municipal abattoir

Age No.		lung condemned prevalence	P Value	No. liver condemned		prevalence
<5	9	28.13%	0.000	3		9.38%
5-10	84	58.74%	0.015	71		49.65%
>10	205	63.08%		155		47.69%
BCS						
Poor	48	68.57	0.000	33		47.14%
Medium	185	54.57	0.007	148	43.66%	
Good	65	71.43		48		51.75%
SEX:						
Male	39	41.05%	0.001	28		29.47%
Female	259	63.95%	0.010	201	49.63%	
ORIGIN						
Babile	112	55.72	0.427	103	51.24%	
Gara Mulata	86	62.32	0.123	56		40.58%
Dire Dawa	12	42.88		13		46.43%
Hurso	36	63.16		25		43.86%
Shinile	52	68.42		32		42.11%

The present study displayed the overall proportion of organ condemnation rate due to various pathological conditions in relation to body condition, sex and age of animals. Higher prevalence lung was detected in female (63.95%) than male (41.05%); and camels with good (71.43%) body condition score were found to bear considerably higher in their lung as against those having poor (68.57%) and medium (54.57%) body condition score Whereas for the liver, both male (29.47%) and female (49.63%) were infested more in female and good body condition camels (51.75%) had higher prevalence of liver infestation than poor (47.14%) and medium body condition camels (43.66%). There was significant difference in the prevalence of hydatidosis, cirrhosis emphysema, pneumonia and fatty change on the lung and liver between sexes, age and body condition of camels. The camels having good body condition, older age and female highly affected by hydatidosis and poor body condition score was found to be highly affected (p<0.05) by pneumonia, emphysema and cirrhosis as compared to those with medium and good body condition score.

Table 4: Summary of total number of organ condemnation, its condemnation rates and financial losses of slaughtered camels at Dire Dawa municipal abattoir.

Organ condemned	No. organ condemned	percent of condemnation	Money lost (ETB)
Lung	298	52.098%	18,130.104
Liver	229	40.035%	58,050.75
Heart	36	6.294%	2920.42
Kidney	9	1.573%	912.34
Total	**572**	**100%**	**80,470.37**

4. Discussion

Meat inspection is an important function to assists 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 (Gracey *et al.*, 1999). In the present study, routine antemortem and postmortem inspection was conducted to detect any abnormalities encountered in Dire Dawa municipal abattoirs. During antemortem inspection different abnormalities were found however, no camel was condemned due to these abnormalities all over the study period and the only

one camel was rejected for slaughtering due to dullness, depression, diarrhea, dehydration, recumbent and very emaciated. Localized swelling was found on the back and near to the shoulder and pus was evacuated during dressing of the carcass. This could be most probably due to infectious causes following mechanical damage (Nigatu *et al.*, 2015).

In the present study the pathological abnormalities encountered on slaughtered camels were 59.6% lungs, liver 45.8%, heart 7.2%, and kidney 1.8%. The most recorded pathological findings in the slaughtered camels at the abattoir were the lung abnormalities and a total of 298 lungs were found with

abnormalities. Particularly hydatidosis were more frequently found in lung due to its size, blood supply and availability of oxygen supply (Urquhart *et al*., 1996) and camel that slaughtered are at older age, during which period the liver capillaries are dilated and most onchospheres pass directly to the lung (Regassa *et al*., 2010). The present study revealed that the encountered abnormalities during post-mortem inspection were hydatid cyst, cirrhosis, pneumonia, emphysema, fatty change heamorrhage, abscess, adhering, pericarditis and hydronephritis. Major causes of organ condemnation among the disease conditions encountered during the post mortem examination, were hydatid cyst, pneumonia and emphsema were the major causes of lung condemnation, while cirrhosis, hydatid cyst and fatty change were the major cause of liver condemnation. However, the disease condition or abnormalities detected in the heart and kidney have approximately less contribution for the condemnation of the organs. From the total number of camels slaughtered, 138(27.6%), 54(10.8%) and 78 (15.6%), 15(3%), 13(2.6%) lungs were condemned due to hydatid cyst, pneumonia, emphysema heamorrhage and abscess respectively and cirrhosis, hydatid cyst, fatty change, calcification and abscess

87(17.4%), 83 (16.6%), 23(4.6%), 28(5.6%) and 8(1.6%) respectively were causes condemnation of camel liver during the study period. The overall prevalence of hydatidosis at Dire Dawa municipal abattoir was 29% that found in all organs that predominantly found in lung (27.6%) and followed by liver (16.6%). This result agree with previous report 28.6% by (Mersha *et al*., 2014) in Dire Dawa and higher than the prevalence of camel hydatidosis has been reported 4.5% by (Woubet *et al*., 1987) in Harar Ethiopia.

The prevance of hydatidosis in lung and liver were 27.6% and 16.6% respectively. The result agree with the report 30.8% by (Bekeke *et al*., 2008) in eastern Ethiopia, 30.22% by (Nigatu *et al*., 2015), in lung and 18.44% by (Mersha *et al*., 2014) in liver and higher than the report 16.65% in lung and 3.9% in liver by (Bosenu *et al*., 2015) and 10.81% in liver by (Nigatu *et al*., 2015). Lower than the report 35.25% by (Ahmadi *et al*., 2013) in Iran and 32.85% by (Mohamed *et al*., 2010) in Saudi Arabia in lung and 33.33% by (Miheret *et al*., 2013) in Dire Dawa of cattle and 31.7% by (Zelalem *et al*., 2012) in Addis Ababa in liver. The variations of the infection rates could be due to the variations in the temperature, environmental conditions and the nature of the pasture and the way of rising and grazing of these animals. The prevalence may however vary from country to country or even within a country. Generally the variation in prevalence rate among different

geographical locations could be ascribed to the strain differences of *Echinococcus granulosus* that exists in different geographical locations and different species of livestock). Additionally, variability could be related with age factors. Other factors like different in culture, social activities and attitudes to dogs indifferent region and animal food and watering may contribute to variation (McManus *et al*., 2006). The overall prevalence of abscess at Dire Dawa municipal abattoir was 4.6% that found in lung and liver. Prevalence of pneumonia was 10.8% at Dire Dawa in present study and agree with the report 11.17% by (Bosenu *et al*., 2015) in Addis Ababa Akakia, 11.54% by (Nigatu *et al.,* 2015) in Addis Ababa and 10.2% reported by (Al-Tarazi *et al.,* 2001) in Jordan. Lower than the report 19.1% in Tamboul and 31.4% in Nyala by (Tigani *et al*., 2007) in Sudan. The prevalence of emphysema was 15.6% in present study. The result agree with report 16.6% by (Bosenu *et al*., 2015) in Addis Ababa Akakia and higher than the report 7.37% by (Aklilu *et al*., 2015) in Addis Ababa. The variation may be due to climatic changes and the management system. The rate of lung condemnation at Dire Dawa municipal abattoir in the present study from total of 500 slaughtered camels was 59.6%, this result agree with the report 59.7% (Bosenu *et al*., 2015) in Akakia Addis Ababa and 57.74% by (Aklilu *et al*., 2015) in Addis Ababa and higher than the report 48.58% by (Ahmadi *et al.,* 2013). The current study revealed that the overall prevalence of camel hydatidosis that cause condemnation rate of lung at Dire Dawa municipal abattoir was found to be 46.31%. This result was agreamant with the previous report 45.06% by (Mersha *et al*., 2014) in Dire Dawa and closely related to 52.54% report in Addis Ababa by (Nigatu *et al*., 2015). The result was higher than the report 18.6% by (Ahmed *et al*., 2013), 22.6% by (Muskin *et al*., 2011) and lower than report 62.3% by (Fufa *et al*., 2013). The condemnation rate of lung due to pneumonia in present study was 18.12%. This study agree with the 20% report by (Nigatu *et al*., 2015) in Addis Ababa, (Nourani and Rohani, 2009) in Iran. It is higher than 1.8% by (Marta *et al*., 2010) in Sebeta abattoirs, 3.33% by (Kambarage *et al*., 2000) in Tanzania and 11.11% by (Amene *et al*., 2012) in Jimma abattoir.

The condemnation rate of lung due to emphysema was 26.17% and agree with report 27.83% by (Bosenu *et al*., 2015) in Addis Ababa Akakia in camel. It was higher than report of 16.88% by (Munera *et al*., 2015) in Dire Dawa, 12.76% by (Nigatu *et al*., 2015) in Addis Ababa in camel and 1.5% by (Demberga *et al*., 2011) in Gondar. It is lower than reported 43.75% by (Seboka *et al*., 2008) in Addis Ababa Municipal Abattoir. This variation is due different environment condition, animal husbandary and stress factors such as changes in the hygiene,

environmental and climatic condition play an important role in the onset of pneumonia. Such factors would lower the resistance of the lung tissue (Zubair, *et al*., 2004). The condemnation rate of lung due to heamorrhage and abscess were 5.03% and 4.36% respectively. The result was agree with the report 3.82% of abscess by (Nigatu *et al*., 2015) in Addis Ababa. Liver condemnation rate was 45.8% at Dire Dawa during study period and the result was agree with the report 44.72% by (Nigatu *et al*., 2015) in Addis Ababa. the condemnation rate due to hydatid cyst in the present study was 36.24%. agree whith the report 33.33% by (Miheret *et al*.,2013) in Dire Dawa and 33% by (Al-Hadi and Saad, 2012) in Sudan. Higher than report from Addis Ababa Akaki abattoir by 16.6% by (Bosenu *et al*., 2015), 16.5% by (Moallin *et al*., 2009) in central Somalia, 24.17% by (Nigatu *et al.,* 2015) in Addis Ababa, 25% by Muskin et al., 2011) in Ethiopia, 1.2% by (Yi- fat *et al.,* 2011) in Gondar ELFORA abattoir, 3.62% by (Alembrhan and Haylegebriel *et al*., 2013) in Adigrat abattoir and lower than 51.23% by (Mersha *et al*., 2014) in Dire Dawa.

The condemnation rate of liver due to cirrhosis was 37.99%. It closely related to the report

43.95% by (Nigatu *et al*., 2015) in Addis Ababa. This finding was higher than reported 15% by (Al-Hadi and Saad, 2012) in Sudan. In the present study fatty change was found to be 10.04%. This result closely related with reports of 8.71% by (Nigatu *et al*., 2015) in Addis Ababa, lower than the report 47.7% by (Salem and Hassen, 2011). In this study liver calcification was found to be 12.23% which slightly higher than 7.14% by (Nigatu et al., 2015) and higher than 3% reported by (Al-Hadi and Saad, 2012). In this study abscess was found to be 3.49% which agree with 3.29% report by (Aklilu *et al*., 2015).

The rate of heart condemnation in this study was 7.2% which agree with the report 7.86% by (Nigusu *et al*., 2015) from Addis Ababa and 8% by (Ahmed *et al*., 2013). The result higher than report 1.55% by (Bosenu *et al*., 2015) in Addis Ababa Akakia and 0.44% by (Amene *et al*., 2012) in Jimma abattoir. The condemnation rate due to hydatidosis was 47.22% which agree with report 50% by (Nigusu *et al*., 2015) from Addis Ababa. The condemnation rate due to adhering was 44.44% wich very similar with report 47.75% by (Nigatu *et al*., 2015) and due to pericarditis was 8.23% agree with the report 6.25% by (Nigusu *et al*., 2015) from Addis Ababa and lower than 36.0% by (Kambarage *et al*., 2000) from cattle slaughtered in Tanzania. The condemnation rate of kidney in present study was 1.8% which nearly similar with report 0.98% by (Nigatu *et al*., 2015) in Addis Ababa and higher than the report 0% by (Bosenu *et al*., 2015) in Addis Ababa Akakia. The condemnation rate due to

hydatidosis was 33.33% and due to hydronephretis was 66.67%. lower than report 100% by (Nigusu *et al*., 2015)

The total financial loss calculated in this study, due only to offal organs (Liver, lungs, heart and kidneys) condemnation was 80,470.37 Ethiopian Birr/year or 3688.988 $US annually which is lower than the report of (Nigatu *et al*. 2015) from 320,760 Ethiopian Birr/year. In current study, only hydatidosis is the main causes of economic loss in all organ that account 35,600.4 Ethiopian Birr/year or 1631.983 $US annually. Variation in the amount of economic lossess in different parts of the country abattoir is probably due to the differences in the prevalence of disease, rejection rates of organ, slaughtering capacity of the country abattoir, local market prices of the organ and management ways of the animal.

5. Conclussion and recommendations

In the present study area the most common abnormalities during antemortem inspection were branding, poor body condition and localized lesion. A considerable number of organs were condemned from camels slaughtered at Dire Dawa municipal abattoir mainly due to different pathological lesions on different organs such as hydatid cyst, cirrhosis, pneumonia and emphysema are the most and major causes for organs condemnation in camel during the present study. Affected meat were condemned and rendered unfit for human consumption and this results extensive financial loss. Some of the limitations, however, encountered in this study including the use of only gross pathology in the diagnosis of the diseases, thus only those diseases with gross pathological lesions that are pathognomonic were likely to be diagnosed. Taken as a whole, the public health implication of the quality of infected organs condemned at this abattoir on the customers and the role which post-mortem inspection plays in safeguarding the health of the public cannot be overemphasized. Therefore; based on the above conclusion the following recommendation are forwarded: Concerned body should give attention to build abattoirs with good facilities and adequate meat inspection by strict veterinary inspection in the abattoirs in order to identify diseases and providing information about disease conditions that have public health hazard, aesthetic value, financial importance, control back yard slaughtering and minimize associated risk; and Epidemiology and economic losses due to parasitic and pathological condition has to be studied in detail and subsequently control measures should be in place at all levels.

Conflict of Interests

The authors declare that they have no competing interests.

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