Original Research Article

"STUDY ON MAJOR CAUSES OF ORGAN CONDEMNATION AND ECONOMICSIGNIFICANCE IN CAMELS SLAUGHTERED AT JIGJIGA MUNICIPAL ABATTOIR, ETHIOPIA.

ABSTRACT

AcrosssectionalstudywasconductedbetweenMarchtoAugust2021withtheaimofdetermining the prevalence of causes of organ condemnation with associatedpotentialriskfactors and estimating the magnitude of the direct economic losses from rejected organs. Atotalof432camelsslaughteredatJigjigaMunicipalAbattoirabattoirwererondomlyselected; 180(59%) male, 103(81%) female, and In age 102(60.7%) young, 181(68.6%) adult,and in body condition score; poor 41(97.6%), medium 98(81.6%), and good 144(53.3%).Based on origin of the animal, 16(22.2%), 20(34.5%), 3(23.1%), 19(29.7%), 29(19.7%),16(20.5%) from Jigjiga, Dahagbur, Kabridahar, Fik, Babile, Shinile were detectedone ormore pathological signs respectively. During antemortem examination 140(32.36%) camelsshowedvariousabnormalities.Includinglocalizedlesions52(12.03%),localswelling18(4.16%),lacrimation17(3.93%),nasaldischarge15(3.47%),roughhaircoat13(3.00%), lamness12(2.77%),depression8(1.85%)andblindness5(3.57%).Uponpostmorteminspection, the overallprevalence was 504(29.1%); 254(58.7%) lungs,203(46.9%) liver,40(9.25%)heart,7(1.6%)kidneyswerecondemned.Someofthemajorcauseoflungcondemned were due to 103(23.8%) hydatid cyst, 68(15.7%) emphysema, and 48(11.1%)pneumonia.Lvierrejectionweredueto77(17.8%)hydatidcyst,25(5.8%)calcification,82(19.0%)cirrhosis.Heartcondemnationweredueto9(2.1%)calcifiedcyst,4(0.9%)pericaditis,13(3.0%)hydatidcyst.Kidneyrejectionratewerecausedby3(0.7%)hydatidcyst,4(4.0%)hydronephritis.There wasstatistically significantbetweenbody condtionscore, and sex of the animal with the rate of organ condemnation ($P<0.05$). While, age andoriginoftheanimalwerenotstatisticallysignificantwiththeprevelanceoforgancondemnation ($P>0.05$). In lung hydatid cyst with the aspect of age and body condition scorewere statistically significant ($P<0.05$). While sex and origin of animal were not statisticallysignificant ($P>0.05$) with the rate of lung condemnation. Lung and liver were most commonlycondemned organs followed by heart and kidney in camel slaughtered at Jigjiga MunicipalAbattoir. The financial loss due to edible organs condemned in this study was estimated to158,236.78 ETB/ 3,425.038 USD. Therefore, appropriate strategies should be established forprevention,andcontrolof thislevelof condemnationrate of

organsandtosustainthemassive monetoryloss causedbythe rate oforgans condemnedin thestudied area.

Keywords:*Antemortem,Camel,economicloss,Ethiopia,Jigjiga,Rejectionrate*

1. INTRODUCTION

World camel population number estimated to be 35 million heads(FAO, 2019), most ofwhich are in Ethiopia, Somalia, Niger, Kenya, Chad, , Mali, Mauritania and Pakistan. Fivebordering countries-Somalia, Ethiopia, Kenya, Sudan, and Djibouti hold 84% of African andmore than half of the world's camel population (Mwinyikione *et al.*, 2016). EthiopiaisanagrariancountrywithhugelivestockpopulationinAfricapossessingover4.5millionheadsof*Camelusdromedarius*,basedonseveralmorereliable and recentsurveysfortheAfar,Somali andBorenaregions inthecountry(Shapiro*et al.*,2017).

Meat is the main source of protein for man it should be clean and free from diseases ofparticular importance to the public such as tuberculosis (TB), hydatidosis, cysticercosis andfasciolosis(Sirak, 1991).Meatiscondemned at Municipal Abattoirto break the chainofsome zoonoses which are not transmitted to man directly via meat like hydatidosis and otherimportantdiseasesof animalssuchas fasciolosis(Arbabi*et al.*,2006;Fufa*etal.*,2010).

Meatinspectionattheabattoirisacrucialneedforfoodsafetyanddiseasecontrol.Itisoneof the most widely implemented and longest- running systems of surveillance that involvesthe screening of animals and meat for wholesomeness for human consumption (Stärk, 2014).Similarly, abattoir meat inspection is esential to remove gross abnormalities from meant anditsproductstopreventdistributionofcontaminatedmeatandtoassistdetectinganderadicationofa certainlivestock diseases(Alemayehu*etal.*, 2013).

TheresultsofmeatinspectionatMunicipalAbattoirswithappropriatetrendsindicatepossible risks due to unsafe meat obtained from camel carcasses at the Municipal Abattoirs.Such risks are eliminated by strict veterinary inspection of animals prior to slaughter as wellasofmeatandparenchymatousorgansafterslaughter.MunicipalAbattoirsprovideanexcellent opportunity for detecting pathological lesions of both economic and public healthimportance(Ahmed *et al.*, 2013).

Despite, safetyandhygieneofmeatanditsproductshasbecomethemostimportantconcernof the

consumers and producers. Some microbial pathogens have been causingsevere complications inanimals as well as in humans. Therefore, comprehensive inspectionat ante mortem in the lairageas well as at post-mortem examination, carcass and offals inMunicipalAbattoirshadbeenconsidered veryimportant (BoughattasandSalehi,2014).

Abattoir data is an excellent option for detecting diseases of both economic and public healthimportance. Major parasitic diseases such as distomatosis, hydatidosis, calcification, bovinecysticercosisandotherconditionssuch asabscessationandcirrhosiscause a significanteconomic loss by lowering the productivity of cattle and condemnation of edible organs (BiuandAdindu, 2004; Fekadu*et al.,* 2012; Equar*et al.,* 2012).

Animaldiseasesareconsideredasamajorhealthproblemandcauseasignificanteconomiclossincountrieswherelivestockproductionisanimportantsegmentoftheagricultural practice (Amene, 2012). For instance, diseases in camels cause considerableeconomiclossesduetothecondemnationofedibleorgans/decreasedmeatandmilkproduction (Romazanvoc, 2001) The main causes of organ condemnation duringpostmorteminspection are diseases originated byparasites, bacteria and viruses. Flukes in liver andhydatidcyst in lung, liver and kidney, aremainlyinvolved(Mezegebu, 2003).

Echinococcosisisamajorpublichealthproblemin some countries and it may beemerging or re-emerging insomeareas.Approximately2to3millionhuman cases arethoughttooccurworldwide(CFSPH,2011).CystsorlesionsofEchinococcosismultilocularis occurprimarilyintheliverandgrowslowlybutwith eventual seriousliver pathology and high risk of mortalityifuntreated.Aswell,thecystsoccasionallyruptureandcause severeallergicreactions inhumans(OIE,2004).

For calcified cysts it has a gritty sound uponincision with knife and when observed grosslythe cyst is white or grey and irregularly rounded and frequently honey combed. Hydatid cystcontainssemisolidmaterialonwhichthere may be depositionofcalciumsaltstoformcalcified cyst. Hydatidosis caused by the metacestode of Echinococcus granulosus is a widelyspread parasitic zoonosis that had caused public health problems in many countries (M.Ansari-Lari,2005; Mellau, 2010).

Most of the studies conducted in JigjigaMunicipal Abattoir have focused only on specificdiseasessuchasfasciolosisandhydatidosis.Asaresultofthis,thereisnocompleteinformationaboutcausesoforgancondemnationatJigjiga Municipal Abattoir

.Inlinewiththis,itwouldbeessentialtohavecomprehensiveinformationonoccurrenceofvarious diseases and causes of organ rejection and their financial loss to establish appropriatestrategyforprevention and controls.

1.1. Objectives

1.1.1. GeneralObjective

- Todeterminetheoverallprevalenceandcausesoforgancondemnationwithrespecttoassociated factorsin camels slaughteredat JigjigaMunicipalAbattoir.

1.1.2. SpecificObjectives

- To identifythedifferentcauses oforgancondemnationincamelslaughteredatJigjigaMunicipalAbattoir.
- Toassessand estimatetheannual financialimpactofthecondemnedorgans.

2. MATERIALSANDMETHODS

2.1. StudyAreaandperiod

The study were conducted on Jigjiga town. Jigjiga is the capital city of the Somali RegionalState which is found on the Eastern part of Ethiopia (Figure 1) about 630 km and 105 kmaway from Addis Ababa and Harar towns respectively. Human population size of Jigjiga isestimated about 763,509. Jigjiga is situated at an altitude ranging from 1,660 to 1,710 meterabove the sea level at geographic coordinates of approximately $9^0$20’ North latitude and$45^0$56’ East longitude. The climate of Jigjiga is semi-arid type which is characterized by hightemperature and low rainfall. The mean annual temperature and mean annual rainfall is about22^0C and 543mm respectively. Farming system of the area includes mixed crop livestockproduction.Thevegetationoftheareaincludesdifferentplantswheresorghum,maize,barley,wheat, and bean arethe most important agriculturalcrops(CSA, 2012).

Figure1: Mapofstudyarea Jigjiga, Eastern Ethiopia

Source:(ThemeGrill, 2021)

2.2. StudyPopulation

The study population was *Camel dromedary* slaughtered at Jigjiga Municipal Abattoir fromdifferentsourceswere includedJigjiga,Degahbur,Kabridahar,Fik,Babile,andShinile.Slaughtered animals were both male and female. Simple rondom sampling methed was usedas a sampling technique. All camels presented for slaughtered during the investigation periodweresampledforthisepidemiologicalstudy.Mostly,extensivemanagementcarewaspracticedtocamelsslaughteredbutsometimesspecialcarewasgivenforfatteningpurpose.

2.3. Studydesign

Across-sectionalstudywasconductedfromMarchtoAugust2021todeterminetheprevalence of major couses of organ condemnationand economic signifcance in camelsslaughtered at Jigjiga Municipal Abattoir. During the period of study, four visits per weekwere made purposively out of 7 slaughter days in a week. Camels were selected by simplerondom sampling per visit 9 animals were recorded at a day. The first animals were selectedrandomly and the rest with equal intervals and were subjected for both antemortem anddetailedpostmortem inspections.

2.4. SamplingMethodandSamplesizeDetermination

By using simple random sampling methods and 95% confidence interval with required 5%precision,the samplesizewasdetermined bytheformulaof Thrusfield,and Christley(2018).

$$n=\frac{1.96^2 Pexp\ (1-Pexp)}{d^2}$$

Where;n= required sample sizePexp=expected prevalenced=required precision

Theexpectedprevalenceis50%withtherequiredprecision(d)of5%(0.05).Bysubstitutingthevalue in the aboveformula, we get thesamplesize:

$$n=\frac{1.96^2 x0.5(1-0.5)}{}$$

$$\frac{(0.05)^2}{=384}$$

Therefore the calculated sample size was 384 camels, but 48 samples were added with theintentionofmaximizingtheaccuracy,andincreasingpercisionlevelandthecalculatedsamplesizewas 432 camels.

2.5. StudyMethodology

2.5.1. AntemortemExamination

Pre slaughter examnimations of camel were conducted in the lairage by grouping the animalsbased on their age body condtion score and place of origin. Antermortem inspections wereconducted on individual animals while the animals entering into the lairage and after theyentered into the lairage in mass. Both sides of the animals were inspected at rest and inmotion. Moreover, the general behavior of the animals, nutritional status, cleanliness and signof diseases or abnormalities were recorded according to the procedures by (Gracey, 1999).Pathologicallesionswerediffer entiatedandjudgedaccordingtotheguidlingofmeatinspection for developing countries (FAO, 1994). The age, sex and body condition of eachindividual animal was identified and recorded. The body condition scoring for camels wasconducted based on theguidelines given by (Faye *et al.*, 2001). The scoring was conductedby looking at the back and flank and then classified as poor (0 and 1), medium (2 and 3) andgood(4and 5).

2.5.2. PormortemExamination

Postmortem Examination were conducted based on the guidelines set on manual on meatinspection for developing countries (FAO, 1994). Accordingly, the liver, lung, heart,andkidneywereexaminedthroughvisualization,palpationandsystematicincisionforanypathologicallesion(s).

2.6. EconomicLossAnalysis

Toanalyzefinanciallossduetoorgancondemnation,theaverageannualslaughtercapacity of theabattoir, the average market price of eachorganin Jigjigacity andtherejectionrateof eachorganwereused.Theaveragemarketpricewasalsodeterminedby interviewing different butchers. The financial loss due to the condemnation of organs wasestimatedbytheformulagiven byOgunrinade(1980)as follows;

EL= Σsrx* Coy*Roz

Where EL = Annual economic loss estimated due to organ condemnation.Σsrx=Annual camelslaughter rate of theabattoir.

Coy=Averagecostofeachcamel liver/lung/heart/kidney.

Roz =Condemnationrateofeachcamelliver/lung/heart/kidney.

2.7. DataManagementandAnalysis

The data collected were entered into the Microsoft excel 2010 spreadsheet and analysed byusing the SPSS version 20.The data were summarized as a table and Chi-square (X^2) testwere used to compare prevalence among sex, age, and body condition, and origin.In allcases,95%confidenceintervalsand(P<0.05)weretobeconsideredasstatisticallysignificance.

3. RESULTS

Out of the 432 camels inspected at antemortem 140(32.4%) camels were found to haveabnormalities (Table 1). Age wise the selected animals were divided into young (168) of lessthan 7 years and adult (264) of 7 or above years. Slaughtered animals were male (305) andFemale(127).Inbodycondtionscoreofanimalsitwereclassifiedintopoor(42),Medium (120) and Good (270). All slaughtered animals were marked for indentification purpose andcodewasgiven.Themostcommonabnormalitiesencounteredduringantemortemexamination; localized lesions 52(12.03%), local swelling 18(4.16%), lacrimation 17(3.93%),nasaldischarge15(3.47%),roughhaircoat13(3.00%),lamness12(2.77%),depression8 (1.85%) and blindness 5(3.57%). All these abnormalites were considered mild and approvedforslaughterpurpose.

Table1:Abnormalconditionsencounteredduringantemorteminspection

v

Abnormalconditions	**No.animalsof Affected**	No.ofPositivecamels%	**Proportion**
Localizedlesions	52	12.03	40.62
Localizedswelling	18	4.16	14.00
Lacrimation	17	3.93	13.28
Nasaldischarge	15	3.47	11.70
Roughhaircoat	13	3.00	10.15
Lamness	12	2.77	9.37
Depression	8	1.85	6.25

Blindless	5	1.15	3.90
Total	**140**	**32.4%**	**100%**

3.1. Overallprevalence

The postmortem examination were performed for all slaughtered camels (n=432) with overallprevalence of (29.1%). From the total organs examined 254(58.78%) lungs, 203(46.97%)liver, 40(9.24%) heart and 7(1.88%) kidneys were rejected as unfit for human consumptionbasedontheirgrosspathologicalfindings(Table2).Slaughteredanimalswerebothmal
e
(305) and Female (127). Out of the 432 inspected lungs a total of (254) were rejacted forhavinggrossabnormalities;hydatidcyst(23.84%),emphysema(15.74%),pneumonia(11.11%), calcifiedcyst(5.32%),andabscess(2.77%).Similarlyatotalnumberof
(203) livers were condemned for having different abnormalities; cirrhosis(18.98%), Hydatidcyst(17.82%),calcification(5.78%),anddiscoloration(4.39%).Formthetotalcamelsslaug
htered(40)heartswererejectedforvariousabnormalconditions;adhering(3.24%),hydatid
cyst(3.00%), calcified cyst(2.08%), and pericarditis(0.92%). In case of kidney (7)were not approved for finding gross pathological signs; hydronephritis(0.92%), and hydatidcyst(0.69%).

Table2: CausesofOrgancondemnationandtheirpercentage%

Organ	**Causes**	**Numbercondemned**	**Percent(%)**
Lung	Hydatidcyst	103	23.8
	Emphysema	68	15.7
	Pneumonia	48	11.1
	Abscess	12	2.8
	Calcifiedcyst	23	5.3
Liver	Hydatidcyst	77	17.8
	Calcification	25	5.8
	Discoloration	19	4.4
	Cirrhosis	82	19.0
Heart	Calcifiedcyst	9	2.1
	Pericarditis	4	0.9
	Hydatidcyst	13	3.0
	Adhesion	14	3.2

Kidney	Hydatidcyst	3	0.7
	Hydronephritis	4	0.9
Total		**504**	**116.6**

3.2. RiskFactorsandRateof Prevalenceof OrganCondemnation inCamels

3.2.1. Prevalenceofeachorgancondemnationinrelationwithagevariable

From the total of 432 head of camel examined, 283(65.5%) animals had one or more than onetypeofpathologicalconditionsthatledtovisceralorgancondemnation.Outofwhich211(48.8%) lungs, 152(35.2%) livers, 40(9.3%) hearts and 7(1.6%) kidneys were condemnedorrejected as unft for human consumptionaccordingto age.

Table3: Distributionofnumberandageofcamelslaughteredand organrejectionrates

Agecategory	**Camel slaughtered**	**Number(%)oforgancondemned**			
		Lung	**Liver**	**Heart**	**Kidney**
Young	168	75(44.6%)	50(29.8%)	13(7.7%)	1(0.6%)
Adult	264	136(51.5%)	102(38.6%)	27(10.2%)	6(2.3%)
Total	**432**	**211 (48.8%)**	**152(35.2%)**	**40(9.3%)**	**7(1.6%)**

3.2.2. Prevalenceoforgan condemnationinrelation withsexvariable

Cause of organ condemnation with the respect to sex revealed that higher prevalence infemale 103(81%) than male 180(59%) camels but highly statistically significant different wasrecorded(P<0.05)(Table4).

Table4: Distributionofnumberandsex ofcamelslaughteredandorganrejectionrates

Variable	**Category**	**No.Rejectionraten(%)**		**X^2**	**P-value**
		inspected			
Sex	Male	305	180(59)	19.36	0.000*
	Female	127	103(81)		
Total		**432**	**283(65.5)**		

3.2.3. Prevalenceofagevariablewithrejection rateinrelation

Regarding the age of animals higher prevalence was recorded in adults 181(68.6%) thanyoung 102(60.7%) animals but no statistically significant between age and cause of organcondemnationrate(P>0.05)(Table 5).

Table5: Prevalenceofrejection rateinrelationtoage

Variable	Category	No. inspected	Rejectionraten(%)	X^2	P-value
Age	Young	168	102(60.7%)	2.79	0.094
	Adult	264	181(68.6%)		
Total		**432**	**283(65.5)**		

3.2.4. PrevalenceofBodyconditionscorewithrejectionrate

Related to body condition the highest prevalence was in poor with the percentage 41(97.6%)followed by medium 98(81.6%) and good 144(53.3%) body condition scores. There wasstatisticallysignficantbetweenrejectionrateandthebodyconditionscoreofanimals.(P<0.05).

Table6: Prevalanceofrejectionrate with therespectof Bodyconditionscore

Variable	Category	No.observed	Rejectionraten(%)	X^2	P-value
BodyConditionPoor	42	41(97.6)	50.75	0.000*	
Medium	120	98(81.6)			
Good	270	144(53.3)			
Total		**432**	**283(65.5)**		

3.2.5. Prevalenceofrejectionrateinrelationtoorigin

Based on origin of the animal the highest prevalence is under 20(34.5%) Dagahbur, followedby19(29.7%)Fik,3(23.1%)Kabridaher,16(22.2%)Jigjiga,16(20.5%)Shinile,then29(19.7%)Babile. There wasno statisticallysignificant(P>0.05)(Table 7).

Table7: Prevalenceofrejectionratewithaspect ofanimalOrigin

Variable	Category	No.observed	Rejection raten(%)	X^2	P-value
Origin	Jigjiga	72	16(22.2)		
	D/hbur	58	20(34.5)		
	Kebridaher	13	3(23.1)	6.77	0.238
	Fik	64	19(29.7)		
	Babile	147	29(19.7)		
	Shinile	78	16(20.5)		
Total		**432**	**103(23.8)**		

3.2.6. Prevalence of hydatid cyst on lung of camels slaughtered at Jigjiga Abattoir in relationto riskfactors

In context of age, sex, body condition score, and origin to prevalence of hydatid cyst on lungsthe adults 82(31.1%) had highest prevalence than the the young 21(12.5%) animals and therewas statistically significant (P<0.05). And in sex aspect Female 27(21.3%) animals had lowerprevalence than male 76(24.9%) animals and there was no statistically significant (P>0.05).And in body condition score Poor 17(40.5%) animals had highest prevalence followed byMedium 34(28.3%) and Good 52(19.3%) animals and statistically significant (P<0.05). Andalso in animal origin Babile 29(19.7%) has lowest prevalence followed by Shinile 16(20.5%),Jigjiga 16(22.2%), Kabridahar 3(23.1%), Fik 19(29.7%), and Degahbur 20(34.5%) and thereisno statisticallysignificant(P>0.05).

Table8: Distribution ofhydatidcystwith theaspecton age,sexand bodycondition

Variable	Category	observation	Rejectionraten (%)	χ2	P-value
Age	Young	168	21(12.5)	19.4	0.000*
	Adult	264	82(31.1)		
Sex	Male	305	76(24.9)	0.66	0.416
	Female	127	27(21.3)		
BCS	Poor	42	17(40.5)	10.85	0.004*

	Medium	120	34(28.3)		
	Good	270	52(19.3)		
Origin	Jigjiga	72	16(22.2)		
	D/habur	58	20(34.5)	6.77	0.238
	K/Dehar	13	3(23.1)		
	Fik	64	19(29.7)		
	Babille	147	29(19.7)		
	Shinille	78	16(20.5)		
Total		**1728**	**412(23.8)**		

**Significancedifferencewereobserved*

3.3. EstimationofDirectannualEconomiclosses

The average mean annual camel slaughtered at JigjigaMunicipal Abattoir was estimated tobe 9,125 heads; rate of condemnation of the current study were 254(58.7%), 203(46.9%),40(9.25%), 7(1.6%) lung, liver, kidney and heart respectively. The total annual loss wascalculated158,236.78 ETB/ 3,425.038 USD (1USD=46.20 ETB).

Table9: Estimateddirectanuualfinancialloss

Organs

Total Condemned	**No. of Organs Condemnation**	**Rejection rate%**	**AANCS**	**Average price ETB**	**Financial lost in ETB**
Lung	254	58.7%	9,125	140	**16,231.439**
Liver	203	46.9%	9,125	1,500	**138,948.863**
Heart	40	9.25%	9,125	150	**2,740.462**
Kidney	7	1.6%	9,125	100	**316.017**
Total	**504**	**116.6%**			**158,236.78ETB**

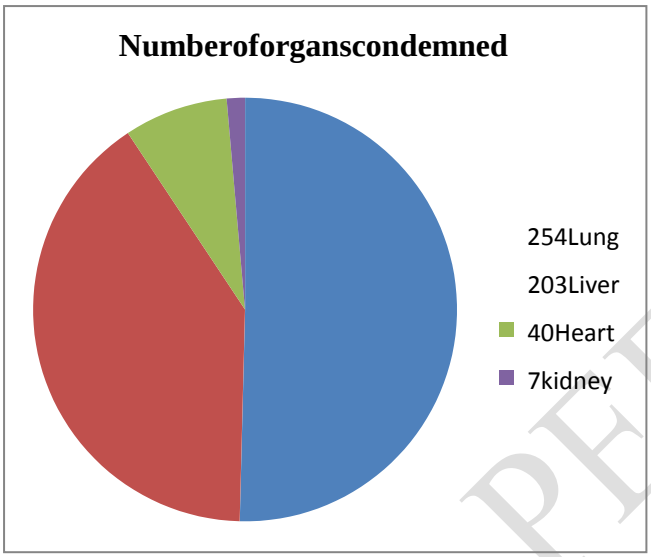

Figure2:Total Number oforgans condemned Duringstudyperiod inJigjigaSlaughter House (n=432).

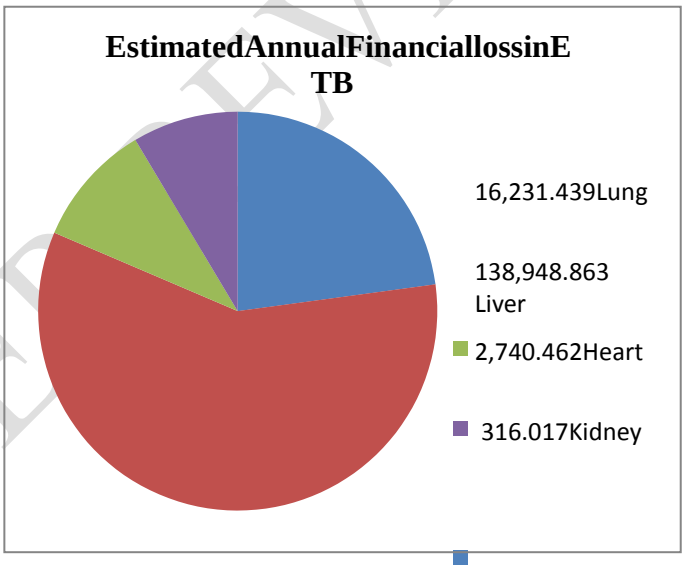

Figure3: Estimatedannuallossin 158,236.78ETB Jigjiga Municipal Abattoir with annualslaughter capacity.

4. DISCUSSION

Thepresentstudy,themostlycommonlyencounteredabnormalitiesduringantemorteminspectionwereLocalizedlesions52(12.03%),Localswelling18(4.16%),Lacrimation17(3.93%), Nasal discharge 15(3.47%), Rough hair coat 13(3.00%), Lamness 12(2.77%),Depression 8(1.85%) and Blindness 5(3.57%). With an overall prevalence of 140(32.4%).Localized lesion was the highest in prevalence than the others and blindless was the leastvariableduringassessment of antemortem examination.

In this study, out of 432 inspected camels 504 organs were condemned with the

overallprevalence 504(29.1%). This finding is relatively very closer than the findings of 28.6%,28.3% Nejash and Walkite, (2018), Shitaye *et al.*,(2016) in Dire dawa municipal abattoir,and Hawassa municipal abattoir respectively. This result is much lower than 55.21% whoreported by Teddy *et al.,* (2018) from Arba Minch municipal abattoir.However, this findingis considered relatively higher than the findings of 23.3%, 24.9%, 20.7%, T enaw *et al.*,(2015), Jemalo *et al.,* (2018), Wale *et al.,* (2017) in Akaki Abattoir Addis Ababa, Assellamunicipal abattoir, Jimma municipal abattoir respectively. Moreover this output had muchhigher than the findings of 17%, 17.5%, 14.7%, 14.% 13.85%, 13.5%, 12.3%, 4.7%, Shitaye*et al.,* (2016), Shitahun *et al.,* (2018), Fufa and Debele (2013), Amare *et al.*, (2017), Yalew *etal.*,(2015),Jatenie,*etal.*,(2014),Wondemagegnehu*etal.*,(2017),AlembrhanandHaylegebriel (2013) in Addis Ababa municipal abattoir, Hawassa municipal abattior, WolaitaSoddomunicipalabattoir,Gondarmunicipalabattoir,Dessiemunicipalabattoir,Adamamunicipalabattoir,WolaitaSoddomunicipalabattoir,Adigratmunicipalabattoirrespectively. This variation in prevalence of could be dueto differencesin animal husbandrysystem, backyard slaughteringofanimals, lack of proper disposal of infected carcass andthe presenceof straydogsandtheirrelationswithanimalsMesele*etal.*,(2013).

Sex-related distribution of organ condemnation and rejection rate in this study stated thathigherprevalenceinfemale103(81%)thanmale180(59%)camels.Thisfindinginagreement with reports showed female has higher prevalence (63.95%) than male (41.05%)Male 84 (21.81%) female 301 (78.18%) Nejash and Walkite, (2018), Tenaw, *et al.,* (2015),from Dire dawa municipal abattoir, and Akaki abattoir respectively. On contrary, this resultwasindisgreementwiththefindingsofShitahun,*etal.*,(2018)thosereportedMale249(57.3%) animalshadhigherprevalencethantheFemale9(2.1%)inAddisAbabaabattoir Enterprise.Similarly,reportfromTeddy*etal.*,(2018)statedthereisslightlyhigherprevalenceinmales206(55.5%)thaninfemalecattle6 (46.1%). Sex was statisticallysignificant different with prevalence of organ condemnation rate ($P<0.05$) This variation inprevalence rate might be due to physiological and hormonal effect among animals Mokhtaria*etal.*, (2018).

In context of age this current study revealed that low prevalence was recorded in young102(60.7%) than in adult 181(68.6%) animals. This result agreed with the findings of Assefa*etal.*,(2017)whoreportedyoung51(4.9%)animalshadlowerprevalencethanadults211(19.6

%) from Addis Ababa abattoir Enterprise. Similarly a report of Teddy *et al.,* (2018)was statedslightlyhigher prevalenceinmales206(55.5%)thaninfemale 6(46.1%)from Jimma Municipal Abattoir. There was no statistically significant different (P>0.05). Thehighest infection rate in adult animals than younger ones might be due to the decreasedimmunityin olderanimals thanyounger onesBhaskararao,(2003).

In this study the prevalence of organcomdemnation with aspect of body condition score oftheanimalhigherprevalencewasrecordedinpoor41(97.6%),followedbymedium98(81.6%),and good144(53.3%).Thisfindingisinlinewiththereportof Asmare*etal.*,(2012)whichwasexpressedth athigherprevelanceinpoor47(29.7%),Medium67(38.3%), and good 15(29.4%) from Bahir dar municipal abattoir.This result is similar alsoto the report of Wondemagegnehu *et al.,* (2017) Poor 48(39.34), medium 50(24.87), good16(18.82)fromWolaitaSoddomunicipalabattoir.However,thisdisagreedwiththeobservatio ns of Shitahun*et al.,* (2018) who referred higher prevalencein good247(56.9),than medium 8(1.8), than poor 3(0.69) from Addis Ababa municipal abattoir. Body conditionscore was statistically significant with rate of organ condemnation (P<0.05). This variationmaybeduetowhenanimalssuffershortageorscarcityofnutrition,theirimmunitycomprom ised. Hence, posibily this can be accounted for the higher prevalence in poor bodyconditionedanimalsMekuria *et al*., (2013).

In the current study prevalence of organ rejection rate with repect of animal origin wasrelativelyhigherfromDagahbur20(34.5%)followedbyFik19(29.7%),Kabridaher3(23.1%), Jigjiga 16(22.2%), Shinile 16(20.5%), then Babile 29(19.7%). This finding is indisagreementwith thereport of Nejashand Walkite, (2018).

This finding agreed with the report of lowland has higher prevalence than midland andhighland Alemayehu *et al.,* (2013) in Luna Export abattoir. While, This result disagreed withthe report of Yalew *et al.,* (2015) high prevalence rate for highland than midland and lowlandfrom Dessie municipal abattoir. For origin there was no statatistically significant different(P>0.05). The difference in the prevalence of different places in this study may be due to thedifferenceinmanagementpractice,environmentfactorsandclimatevariationandhusbundaryact ion.

In the present study disease encountered during postmortem examination were hydatid cyst,emphysema, pneumonia, abscess, and calcified cyst in lungs with prevalence rate (58.7%).hydatid cyst, calcification, discoloration, and cirrhosis in liver with the rate of(46.9%).Calcified cyst, pericarditis, hydatid cyst, and adhesion in heart (9.25%). Hydatid cyst, andhydronephritisinkidneys(1.6%)amongallthesethemostpathologicalfindingsinslaughteredcamelsattheabattoirwerelunglesionswithtotalnumberof(254)lungsfollowedby(203)liver,(40)heat, and(7)kidneys.

The overall prevalence of this study of hydatid cyst in lungs (23.8%) and in liver (17.8%).This finding is relatively closed with reports of (18.7%), (16.62%), (18.86%) of Dawit *et al.*,(2018), Tenaw *et al.,* (2015) Moges*etal.*,(2001) respectively.Thisresultwas lower thanthe report of (28.6%) lung (28.2%) that followed by liver (21.2%) by(Mersha*etal.*,2014)Jemalo *et al.,* (2018) inDireDawa, and Assella municipal abattoir respectively. This resultmuch lower than with the report ofHaimanot *et al.,* (2015) (73.75%) liver, (14.34%) lungs.Similarly, lower than the report (35.25%) by(Ahmadi*etal.*,2005)inIranand(32.85%)by(Mohamed*et al.*,2010)inSaudiArabiainlung on other hand, this finding hadhigher prevalenceofcamelhydatidosisreported (4.5%)by (Woubet*et al.,* 1987) in Hararmunicipal abattoir, Ethiopia. And.Hydatid cyst was most frequently reported abnormalitieswith precent in this study dueto itssize,bloodsupplyandavailabilityofoxygensupply(Urquhart*et al.,* 1996).

On this study the prevalence rate of pneumonia and emphysema were 48(11.11%), 68(15.7%)respectively. This findings agreed with the report of (16.88%) Pneumonia and init wasdisagreed (5.63%) for the Emphysema by Haimanot *et al.,* (2015) from Dire dawa municipalabattoir.Similarly,theresultwasdisagreedwiththereportof(6.77%)EmphysemabyAmene*etal.*,(2012)fromJimmamunicipalabattoir.However,thisoutcomemuchlowerthan the report of (43.75%)Emphysema by Seboka, (2008) from Addis Ababa Abattoir. Thisresulthigherthan(3.33%),(6.0%)pneumoniabyJemalo*etal.*,(2018),CasdamusandAdeskan, (2009) from Asselle municipal abattoir, and from Nigeria. Thevariationsoftheinfectionrates couldbedueto the variations in the temperature,environmental conditionsand the nature of the pasture and the way of rising and grazing oftheseanimals. Theprevalencemayhowever vary from country to country or even withinacountry. Generallythe variationinprevalencerateamong different

geographicallocationscouldbeascribedtothestraindifferencesof*Echinococcus granulosus* thatexistsin differentgeographicallocationsand differentspeciesoflivestock McManus *etal.,* (2006).

For liver condemnation rate of this study revealed 203(46.9%); 77(17.8%) hydatid cyst,25(5.8%) calcification, 19(4.4%) discoloration, 82(19.0%) this study is indicated that hydatidcystwasthemostpathologicallesioncauseofliver condemnationwhereasthewholefrequency of liver condemnation is similar to the report of 46.2% Asmare *et al.,* (2012) inJimma municipal abatoir and its closely related to the report 43.95% by (Nigatu et al., 2015)in Addis Ababa abattoir. This finding also higher than the reports of (29.7%)report ofAsmare *et al.,* (2012) in Bahir dar minicipal abattoir and (8.83%) by Tenaw *et al.,* (2015) inAkaki Abattoir, (31.1%) Denberga *et al.* (2011) in Gondar ELFORA abattoir (31.1%) Yifat*et al.* (2011) in Gondar ELFORA abattoir and(17.58%) AlembrhanandHaylegebriel(2013)inAdigrat abattoir. And also (40.9%) Jemalo *et al.,* (2018) in Assella Municipal Abattoir.AndFufa and Debele (2013), Ojo (1996) in which they reported 39.68% 20.28%in Nigeriaand Wolaita Soddo municipal abattoirrespectively. These findings are much lowerthan thereports of (66.55%) Nurit *et al,.* (2012) fromKombolcha MunicipalAbattoir and 61.1%Genet *et al*., (2012) from Gondar municipal abattoir. 59.37%, of Bedaso *et al.,*(2020) inAdama municipal abattoir. These differences within the country areattributed mainly tovariationsintheecologicalandclimaticconditionssuchasaltitude,rainfall,andtemperature, although differences in livestock management system and the ability of theinspectorto detect theinfection mayplayapartAmare*et al.,* (2017).

Therateofheartcondemnationofthisfindingwere40(9.25%);14(3.2%)Adhesion,13(3.0%) hydatid cyst, 9(2.1%) calcified cyst, 4(0.7%) pericarditis. This result is similar withthe report of 8%, 7.86% by Ahmed *et al.,* (2013), % by Nigusu *et al.*,(2015) in IsmailiaAbattoir, and Addis Ababa abattoir respectively. This finding is higher than reports of 1.55%,4.43% , 3.71% 1.0%, 0.44%, Bosenu *et al.,* (2015), Yalew *et al.,* (2015) Shegaw *et al.,* (2009)Yifat *et al.,* (2011), Amene *et al.,* (2012) from Addis ababa Akaki abattoir, Dessie municipalabattoir, Mekelle municipal abattoir, Gondar municipal abattoir, Jimma municipal abattoirrespectively. This finding is closely related to the report of3.1% on hydatidcystHoweveron ther hand is higher than 4.9% on pericarditis Wale *et al.,* (2017) in Jimma municipalabattoir. And also This result in line with the report of 2.3% hydatid cyst and in higher than

in2.2%pericarditisbyJemalo*etal.*,(2018)fromAssellamunicipalabattoir.Oncontrary,higher prevalence were reported 11%by Amene *et al.,* (2012) in Jimma Municipal Abattoir.This result disagreed with the report of 10.67%, hydatid cyst 4.2% pericarditis Haimanot *etal.*,(2015)fromDiredawamunicipalabattoir.Thisfindingmuchhigherreportswererecorded 36% in pericarditis by Kambarage *et al.,* (2000) from Gondar ELFORA Abattoir.Differencesintherejectionrate oforganswithdifferentcausesmayalso be due todifferences in the prevalence of the diseases and variationsinanimalmanagementsystemsJatenie*et al.,* (2014).

In this present study the prevalence rate of condemnation in kidneys 7(1.66%); hydatid cyst3(0.7) and hydronephritis 4(0.9%). This finding is closer than the report of 1.8% Nejash andWalkite, (2016) from Dire dawa municipal abattoir. This findings higherthanthe report of0%Bosenu*et al.,* (2015)inAddis Ababa Akaki. However, this result lower than the reportof 6.5%, by Shitaye *et al.,* (2016) from Hawassa municipal abattoir. This result was seem tobe close than the report of 0.1% hydatid cyst by Jatenia *et al.,* (2014) from Adama municipalabattoir.Thisfindingsmuchlowerthanwiththereportof21.43%hydronephritisbyHaima not *et al.,* (2015) from Dire dawa municipal abattoir. Variationintheproportionoforgans condemned due to gross pathologicalchangesmay be due to differences in agro-ecological condition oftheanimalenvironmentthatcouldbefavorabletothecausativeagent, livestock management system andimproper disposal of condemned organs Shitaye *etal.*,(2016).

Thefinanciallossesincurredthisstudyestimatedasresultoforganrejectionwas158,236.78ETB/3,425.038USD.Thisresultwasinline withthe reportsof 3,535,937.50ETB/ 153,736.41 USD Bedaso *et al.,* (2020) from Adama municipal abattoir. This finding ofthe current study was lower than the reports of 1,839,760.00 ETB/99,446.49USD, 182,448.9ETB/8365.38USDbyBiressawandDeneke(2017),Jemalo*etal.*,(2018),Diredawamunicipal abattoir, and Assella municipal abattoir respectively. On contrary this finding washigher than the reports of 122,617.70 ETB/6,288.08 USD,80,470.37 ETB/3,688.988 USD,Yalew *et al.,* (2016), Nejash and Walkite (2018) from Dire dawa municipal abattoir, andfromDissiemunicipalabattoir.Variationsintheamountofeconomiclostindifferentabattoirs probably duetothedifferencesintheprevalenceofdiseases, rejectionrateoforgans, slaughtering capacityofthe abattoirs, local market price of organs and management,ofanimalsAlembrhanand Haylegebriel(2013).

5. CONCLUSIONANDRECOMMENDATIONS

The current study deals with diseases caused by organ condemnation and their extensivefinancial impact. This study revealed an overall prevalence 29.1%. Lung was the mostlycondemned organ in this study with the reason of hydatid cyst, emphysema, pneumonia,abscess and calcified cyst. The second organ was liver by cirrhosis hydatid cyst, calcification,and discoloration. In heart it was rejected by hydatidcyst, adhesion, calcified cyst, andpericarditis. In kidney it was condemned by hydatid cyst and hydronephritis.Thus, propermeat inspectionsareessentialtoremovegrossabnormalitiesfrom meat and its productsin order to prevent thedistribution of contaminated meat to the public and Affected meatwere condemnedandrendered as unpassed for human consumption. Lack of knowledgeabout the diseases caused by organs to condemn and economic impact. Inappropiate disposalof abattoir materials were sustainedthe occurance of the disease in the study area. Onlypathognomic lesion were used as diagnose. Lack of well trained inspectors at abattoir andcommunity awarness for the meat borne diseases. Pets were not restricted for the entrance ofabattoir.there is no direct estimation on economic loss caused by rejection rate of organs inthisslaughterhause.Basedontheseconclusionthefollowingrecommendationareforwarded:

- Propermeatinspectionwasrecommendedfordeterminingthediseasesandreducepublichazards.
- Publicawarenessshouldbegiventoavoideatingofrawmeat/organshenceforeffectivediseascontrol.
- Immediate,safeandcontrolledeliminationofallcondemnedabattoirmaterialsandthesale ofcontaminated offalaspet'sfeed should be prohibited bylaw.
- Onfarmanimalhealth managementcouldreducefinanciallossandincreaseeconomicreturn from thesector.

6. REFERENCES

Yifat D., Gedefaw D., and Desie S., (2011): Major Causes of Organ Condemnation andFinancialSignificanceofCattleSlaughteredatGondarElforaAbattoir,NorthernEthiopia.*Global Veterinarian* **7**(5): 487-490.

Yalew T., Zewdu M., and Wedajo M., (2015): Major causes and abnormalities of organcondemnation and financial loss in cattle slaughtered at Dessiemunicipal abattiorNorth Eastern Ethiopia,*Journal of Veterinary Medicine and Animal Health,*Vol.**8**(7),pp. 56-63.

WoubetM.(1987):Apreliminarystudyofechinococcosis/hydatidosisinHarargheregionand the efficacy of Glinhslotoidus seeds against Echinococcus granulosus in pupsinfected experimentally with hydatid material. DVM thesis, Addis Ababa University,FacultyofVeterinaryMedicine, Debrezeit, Ethiopia.

Wondemagegnehu S., Shimelis A., and Teferi M., (2017): A Study on the Major Causes ofOrgan and Carcass Condemnation in Cattle Slaughtered at Wolaita Sodo MunicipalityAbattoir,Food Scienceand QualityManagement.

Wale T., Tirfayehu M., and Assefa A., (2017): Majorcausesoforgancondemnationandfinancialsignificanceincattleslaughteredat Jimma MunicipalAbattoir,SouthwesternEthiopia. *International Journal of Advanced Research in BiologicalSciences***4**(2): 32-39.

UrquhartG.,ArmmousJ.,DunnA.,andJennings,F.,(1996):Veterinaryparasitology,2nded.UKOxfordLongmanscientificand technical press, 100-109.

Thrusfield M. and Christley R., (2018): Veterinary epidemiology,4thed.,JohnWiley&SonsLtd.,Oxford, UK,pp: 275-276.

ThemeGrill,(2021):WhereisJijigaLocated?WhatCountryisJijigain?JijigaMap,

Tenaw M., Feyera T., and Abera B., (2015): Major causes of organ condemnation in camelsslaughteredatAkakiAbattoir,AddisAbaba,Ethiopia.*Journal.AnimalHealthProduction***3**(1): 14-20.

Teddy D., Berhe M., Habtom K., and Beyenech G., (2018): Major Causes of Condemnationof Diseased Organs and its Economic Importance in Cattle Slaughtered at Arba MinchMunicipal Abattoir, Southern Ethiopia, *Ethiopian Journal of Veterinary Science andAnimalProduction (EJVSAP)***2**(1): 1-11.

Steinfeld H., Gerber P., Wassenaar T., Castel V., Rosales M.,and de Haan C., (2006):Livestock'slongshadow: environmentalissuesandoptions. Rome, Italy:FAO.

Stärk K., Alonso S., Dadios N., Dupuy C., Ellerbroek L., Georgiev M., Hardstaff J., HuneauSalaün A., Laugier C., and Mateus A., (2014): Strengths and weaknesses of meatinspection as a contribution to animal health and welfare surveillance. *Food Control*;**39**:154–62.

Sirak A. (1991): Causes of organ condemnation in Bahir Dar abattoir proceeding of the 4thnational live stock improvement conference. Addis Ababa: Institute of AgriculturalResearch.

Shitaye M., Tilaye Sh., and Fanos T., (2016): Major causes of organ condemnation andassociatedfinanciallossincattleslaughteredatHawassaMunicipalAbattoir,Ethiopia,*J*

ournal ofVeterinary MedicineandAnimal Health, Vol.**8**(10), pp. 150-156.

Shitahun A.,Tesfu K., andYomiyu M., (2018): Major Causes of Organs Condemnation ofCattleSlaughteredatAddisAbabaAbattoirEnterpriseandtheirEconomicImportance*European Journal of BiologicalSciences***10**(3): 72-79.

ShegawS.,AshwaniK.,and KassawA.,(2009):Organcondemnationandeconomiclossat Mekellemunicipitalabattoir, Ethiopia.*Global Veterinarian*.**48**:17-22.

Shapiro B., Getachew G., Solomon D.,Asfaw N., Kidus N., Gezahegn A.and Henok M.,(2017): Ethiopia livestock sector analysis,ILRI Project Report, Nairobi,Kenya:*InternationalLivestockResearchInstitute* (ILRI), pp: 8.

SebokaF.,(2008):AstudyoncommonLunggrossabnormalitiesatAddisAbebaabattoir.

Romazanvoc F., (2001): Cestode zoonosis: Echnococcosis and Cysticercosis an emergent andglobalproblem.*IOS Press,* Netherlands. Pp. 34-57.

Ojo A., (1996): A survey of pathological conditions in slaughtered goats a Zaria MunicipalAbattoirs:In:Lebble,S.H.BKagwini,E.(eds),SmallRuminantResearchandDevelopment in Africa. Proceeding of the 3 Biennial Coference of the Africa SmallRuminant Research Network, UICC, Kampala, Uganda, 5-9 *Inernational LivestockResearch*Nairobi,Kenya.

OIE (2004): Manual of Diagnostic Tests and Vaccines for Terrestrial Animal. Available at:www.oie.int/en/internationalstandardsetting/terrestrial-manual/access-online.

OgunrinadeA., (1980):Economicimportanceofbovine fasiolosis in Nigeria. *TropicalAnimalHealthProduction.* **12**:155-160.

Nurit M., Zerihun H., and Serkalem M., (2012): Major Cause of Liver Condemnation andAssociated Financial Loss at Kombolcha Elmore Abattoir, South Wollo, Ethiopia.*EuropeanJournal of Applied Sciences***4**(4): 140-145.

Nigusu B., Melaku T., Berhanu S., and Nigatu K., (2015): Pathological Causes and FinancialLossof Camel Organ and Carcass Condemnationat Addis Ababa Abattoirs Enterprise,Ethiopia*European Journal of Biological Sciences***7**(2): 78-84.

NejashA.,andWalkiteF., (2018):MajorCausesofOrganCondemnationandTheirEconomicLossin CamelsSlaughteredatDireDawaMunicipalAbattoir.*AcademiaArena* **10**(4):44-52.

Mwinyikione M., and Mekonnen H., (2016): Preview of Camel (Camelus dromedarius) hidesmarketing and challenges in Eastern Africa. *Journal of Africa Leather and LeatherProductsAdvances* **3**(1):2410-0838.

Mokhtaria K., Fadela S., Ammar M., Becacem T., Ammar A., Ameur S., and Abdelkader B.,(2018):CystertcusteunicollisinsmallruminantsofAlgeria:abattoirsurvey,biochemical and morphological characterization. *Bulgarian Journal of AgriculturalScience***24**(4): 698-703.

Mohamed M., (2010): Study of cystic echinococcosis in slaughtered animals in AI Baharegion. Saudi Arabia: Interaction between some biotic factors. *Acta Tropica* **113**, 26 –33.

MogesW.,IssaA.,MersicA.andPotgieter L.,(2001):Investigationofparasiticdisease of one-humped camel (Camelus dromedarius) in eastern Ethiopia. *Journal ofCamelPracticeand Research*, **8**: 77-81.

MezegebuY.,(2003):MajorcauseoforgancondemnationinruminantsslaughteredatGonderAbattoir,NorthWesternEthiopia.DVMthesis,FacultyofVeterinaryMedicine,Addis AbabaUniversity, Debre-Zeit, Ethiopia.

Mesele A., Solomon T., and Desie S., (2013): Cystic Echinococcosis of Cattle in JimmaMunicipalAbattoir, SouthWest Ethiopia.*GlobalVeterinarian* **11**(6):771-775.

MershaCh.,AbdiselamM.,andIsmailW.,(2014):UniversityofGondar,FacultyofVeterinaryMedicine,DepartmentofParaclinicalStudies,,Gondar,EthiopiaDireDawaAnimalHealth InvestigationsandDiagnosis Laboratory, DireDawa, Ethiopia.

Mellau L., Nonga H., and Karimuribo E., (2010): slaughterhouse survey of lung lesions inslaughtered stocks at Arusha, Tanzania. *Preventive Veterinary Medicine* ; **97**(2):77–82.

Mekuria E., Shimelis S., Bekele J., and Sheferaw D., (2013): Sheep and Goat Cyticercusstenuicollis Prevalence and associated risk factors. *African Journal of AgriculturalResearch***8**(24): 3121-3125.

McManus D., (2006): Molecular epidemiology of cystic echinococcosis. Parasitology, 127Supplement, S37-51.

M. Ansari-Lari (2005): A retrospective survey of hydatidosis in livestock in Shiraz, Iran,based on abattoir data during 1999-2004," Veterinary Parasitology, vol.**133**, no. 1,pp. 119–123.

KambarageD.,KimeraS.,KazwalaR.,andMafwereB.,(2000):Diseaseconditionsresponsibleforcondemnationofcarcassandorganinshorthorn ZebuCattleslaughteredinTanzania*Journalof Health Research***22**:249-255.

JemaloA.,HaileG.,andFurgasaW.(2018):MajorCausesofOrganCondemnationandTheirEconomicLossinBeefCattleSlaughteredatAssellaMunicipalAbattoir.*Journalof Veterinary*

*Science&Animal Husbandry***6**(2): 208.

Jatenie J., Mahendra P., and Tanvir R., (2014): Investigation Into Major Causes Of OrgansCondemnationInBovineSlaughteredAtAdamaMunicipalAbattoirAndTheirEconomic Importance,*Haryana Veterinary***53**(2), 139-143.

Haimanot D., Munera A., Hawi J., Tilahun Z., and Girma K., (2015): Major Causes of OrganCondemnation and Its Financial Losses in Cattle Slaughtered at Dire Dawa MunicipalAbattoir,Eastern Ethiopia, *AcademicJournal ofAnimal Diseases***4**(3):118-123.

GraceyJ.,CollinsD.,andHueyR.,(1999):Kenya.MeatHygiene,3editions.W.B.SaundersCompanyLtd.,pp: 669-678.

Genet M., Guadu T., Basaznew C., and Mersha B., (2012): Pathological Conditions CausingOrgan and Carcass Condemnation and Their Financial Losses in Cattle Slaughtered inGondar,NorthwestEthiopia,**4**(6): 200-208.

Fufa A., Loma A., Bekele M., and Alemayehu R., (2010): Bovine fasciolosis: coprological,abattoir survey and its economic impact due to liver condemnation at SodoMunicipalabattoir, Southern Ethiopia. *Journal of Veterinary Medicine and Animal Health* **42**:289-292.

Fufa A., and Debele H., (2013): Major Causes of Organ Condemnation for Cattle and itsFinancial Impact at Wolaita Soddo Municipality Abattoir, Southern Ethiopia, *GlobalVeterinarian***11**(6):730-734.

Food and Agriculture Organization (FAO) (1994). Manual of meat inspection for developingcountries.

FOA(2020):Camels,llamas andalpaca.http://www.fao.org/3/t0690e/t0690e09.htm.

Fekadu A., Legesse E., Tesfaye D., Amene F., Eskindir L., and Dawit T., (2012): The cause,rate and economic implication of organ condemnation of cattle slaughtered at Jimmamunicipalabattoir, SouthwesternEthiopia.*GlobalVeterinarian***9**: 396-400.

Faye, B.(2014):TheCamel today:assets andpotentials.*Anthropozoologica***49**(2):167-176.

FayeB.,BenoumiM.,CleradinA.,TabaruniA.,ChilliardY.,(2001):Bodyconditionscorein dromedary camel: A tool for management of reproduction. Emirgence. Journal ofAgriculturalScience.13:1-6.

FAO (2019): Camel population and http://www.fao.org/corp/statistics/en/ FAO (2019). R.Italy.FAOSTAT.

FAO (1994): Diseases of domestic animals caused by flukes, Epidemiology, diagnosis andcontrol ofFasciola, ParamphistomeDicrocoelium,Eurytrema and

Schistosomeinfections of ruminants developing countries, FAO/UN, Viale delle Terme di 18.Caracalla,Rome,Italy,pp: 49.

FacultyofVeterinaryMedicine, Jimma University,DVM thesis.

Equar Y., Geshaw A., Pal M., and Girmay G., (2012): Prevalence of bovine fasciolosis,amplitude of liver condemnation and its economic impact in municipal abattoir ofMekele,Ethiopia.International.*JournalLivestockResearch***2**: 196-205.

Denbarga Y., Demewez G., and Sheferaw D., (2011): Major Causes of Organ Condemnationand Financial Significance of Cattle Slaughtered at Gondar Elfora Abattoir, Northern,Ethiopia.*Global Veterinarian*. **7**(5): 487-490.

DawitG.,AkliluF.,GetachewT., and Matios L., (2013): Infection rates, risk factorsandcystfertilityofhydatidcystdiseasein camelsinAyssaitadistrict,NortheasternEthiopia.*Global Veterinarian*, **11**: 465-471.

ColorMag WhereisMap.Allrightsreserved.

Central Statistical Agency (CSA): Federal Democratic Republic of Ethiopia. AgriculturalSample Survey Report on Livestock and Livestock Characteristics, Addis Ababa,Ethiopia.

Center for Food Security and Public Health (CFSPH) (2011): Echinococcosis. Lowa State ofUniversity,Collegeof VeterinaryMedicine,Lowapp pp. 1-14.

Casdamus and adeskan A., (2009): Cause of implication of Bovine organ/offal condemnationinsomeabattoirdinwesternNigeria*Tropical AnimalHealthProduction***41**:1455–63.

BoughattasS.,andSalehiR.,(2014):Molecularapproachesfordetectionandidentificationoffoodborn epathogens.*Journalof Food Quality andHazards Control;***1**;1-6.

Bosenu A., Mekuanenttena, and Teka F., (2015): College of Veterinary Medicine; College ofDrylandAgriculture, JigjigaUniversity, Ethiopia.

Biu A., and Adindu, J., (2004): The prevalence of bovine hydatidosis in Maiduguri, *AnimalResearchInternational.* **6**: 360-362.

Biressaw S., and Deneke T., (2017): Major Causes of Organs and Carcass Condemnation andFinancial Loss in Animals Slaughtered at Dire Dawa Municipal Abattoir, EasternEthiopia: Retrospective Data from 2010-2015, *European Journal of Applied Sciences***9**(6): 296-301.

Bhaskararao T., Varaprasad, V., and Hafeez D., (2003): Prevalence of Cysticercus tenucollisinfectioninslaughteredsheepandgoatsatKakinada,Andhrapradesh.*AssiutVeterinaryMedical Journal***27**(2): 126-127.

Behnke R., (2010): The contribution of livestock to the economies of IGAD member: Studyfindings, application of the methodology in Ethiopia and recommendations for furtherwork.*IGADLivestockPolicyInitiative WorkingPaper*No.02–10.

Bedaso K., Mekdes A., and Teshome G., (2020): Major Causes of Organs and CarcassCondemnationandFinancialLossesinCattleSlaughteredatAdamaMunicipalAbattoir,Adama,Ethiopia.*InternationalJournalofEconomicBehaviorandOrganization*.

Assefa D., Gezaheng E., Abera B., and Eticha E. (2017): Major Cause of Organ and CarcassCondemnation in Apparently Healthy Small Ruminant Slaughtered at Addis AbabaAbattoirEnterprise, Ethiopia.*Journal ofVeterinary Science&Technology***8**:419.

AsmareA.,BiniyamA.,andMershaC.,(2012):MajorCausesofLungandLiverCondemnationandFinancialImpactinCattleSlaughteratBahirDarMunicpialAbattior.*African Journal ofBasic&AppliedSciences*.**4**(5): 165-171.

Arbabi M., and Hooshyr H., (2006): Survey of Regions might have accounted forvariation oftheEchinococcosisandHydatidosisinKashanRegion,Prevalenceindifferentareasofacountryof Central Iran.*IranJournalPublicHealth* **35**: 75-81.

Amene, F., Eskindir, L., and Dawit T., (2012): Cause, of Organ Condemnation of CattleSlaughteredatJimmaMunicipalAbattoir,SouthwesternEthiopia.*GlobalVeterinarian*,**9**(4): 396-400.

Amare A., Yosef D., and Nuraddis I. (2017): Major causes of organ condemnation and itsfinancial loss in cattle in Gondar ELFORA abattoir, *Ethiopia. Researcher*; **9**(10):31-38.

AlembrhanA.,andHaylegebrielT.,(2013):Majorcausesoforgancondemnationandeconomic loss in cattle slaughtered at Adigrat municipal abattoir, northern Ethiopia,*Veterinary World***6**(10):734-738.

AlemayehuR.,NebyouM.,BekeleM.,DestaB.,DessieS.,EtanaD.,FufaA.,andEysteinS., (2013): Major causes of organs and carcass condemnation in small ruminantsslaughtered at Luna Export Abattoir, Oromia Regional State, Ethiopia. *PreventiveVeterinaeyMedicine*. **110**(2): 139– 148.

Ahmed A.,Ismail S., and Dessouki A., (2013): Pathological lesions survey and economicloss for male cattle slaughtered atIsmailia abattoir.*International Food ResearchJournal***20**(2): 857-863.

Ahmadi,N.A.,(2005):Hydatidosisincamels(Camelus dromedarius) and their potentialrole in the epidemiologyofE.granulosusinIran.*JournalofHelminthology*, **79**:119-125.