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ORIGINAL RESEARCH ARTICLE

Retrospective Study on Condemned Carcass and Organ at Katsina Central Abattoir for a Period of 2013 to 2019

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ABSTRACT

This study is being undertaken to investigate the historical data on condemned carcasses at the central abattoir in Katsina metropolis from 2013 to 2019. Throughout the course of the investigation, 1,518 animals were butchered in total. The primary objective is to investigate how frequently and frequently these organ and carcass condemnation reasons occur. To determine the frequency of carcass and organ condemnation in slaughtered cattle, sheep, goats, and camels, a seven-year retrospective data set from January 2013 to December 2019 was examined. The findings revealed that uterus, lungs, and liver had the largest prevalence of animal parts condemnation over the course of the study at 132 (74.5%), 34 (27.6%), and 36 (17.2%), respectively. Pregnancy (72.6%), pneumonia (12.7%), and fasciolosis (15.6%) were the major causes of the various organs condemned. There is statistically significant ($p > 0.05$) relationship between the number of animals slaughtered, number of animal condemned par ts, and the causes of organ and carcass condemnation across the period studied. To minimize negative effects on public health and financial losses, strategies must be implemented to reduce the rate of animal parts condemnation.

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Goat, Carcass, Prevalence, Condemnation, Liver, Fasciolosis

INTRODUCTION

Parasites and other microbial diseases are considered as one of the major causes of animal parts condemnation which results in huge economic losses in many countries where livestock production is a vital segment of the agricultural practice (Amsayas, 2021; and Desie and Kedir, 2017). In many nations worldwide, the rate of human population growth is increasing constantly whereby multiplication rate of food animals is being affected by some pathologic parameters particularly in underdeveloped areas (Steinfeld *et al.*, 2006). The world's primary source of nutritious food and high-quality protein is meat obtained from food animals (Steinfeld *et al.*, 2006). Cattle, camel, sheep, and goats are the main sources of red meat in most underdeveloped countries; however, parasitic, bacterial, and viral illnesses limit the meat's supply (Fekadu *et al.*, 2012). These infectious agents cause enormous losses, including mortality, weight loss, and increased condemnation of meat at slaughterhouses (Fromsa and Jobre, 2012).

The safety of meat and human health are significantly impacted by the major parasite diseases such as cysticercosis, dicrocoeliasis, hydatidosis, and fascioliasis (Ali *et al.*, 2018). Additionally, food animals can have a lot of dangerous germs that can spread to people during the preparation, processing, and ingestion of contaminated meat as well as when the meat is condemned at the slaughterhouse (Eman and Mohamed, 2020). In some abattoirs, bacterial pathogens such as *Escherichia coli, Moraxella, Micrococcus, Bacillus, Staphylococcus, Corynebacterium, Propionibacterium, Aerococcus, Klebsella, Actinomyces,* and *Pseudomonas* typically also cause meat

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condemnation (Darien and Ali, 2021). Before it is approved for human consumption, meat from animals killed at abattoirs is subjected to both ante- and post-mortem meat inspection (Jaja *et al.*, 2016). Although meat inspection does not eliminate biological dangers, it does serve to remove from the food chain contamination and situations that can lead to animal parts condemnation (Oscar *et al.*, 2018).

Information on causes of organ and carcass condemnation at abattoir is necessary and important so as to know where and how to reduce losses that might be due to abnormalities (lesions/pathology) (Aynalem, 2015). Many studies have been carried-out to know the causes and economic losses associated with various abnormalities. However, more information regarding to major causes of organ and carcass condemnation is needed to assess the magnitude and further alert public health workers to provide drastic preventive measures on the pathological abnormalities through more education on animal welfare slaughter, training of slaughter personnel on standard slaughter operations and enforcement of slaughter policy (Aynalem *et al.*, 2015).

MATERIALS AND METHODS

Study area

The investigation was carried out at the principal abattoir in Katsina, Nigeria's Katsina State. The State has an elevation range of 182.82 to 457 meters above sea level and is situated in the Northwestern region of Nigeria at latitude 13000'N and longitude 07036'E (Saulawa *et al.* 2012).

Data collection and Analysis

Seven years' worth of slaughter records were included and retrieved for this study (2013 to 2019). At the Katsina Central Abattoir, data were collected with the assistance of a skilled team of veterinarians. The number of items that were returned for credit is included in the report as a quality control measure. Works and records that were inaccessible were excluded. Microsoft Excel and SPSS software version 2016 were used to evaluate the data. Chi-square, frequency and percentages were evaluated (Lisa *et al.*, 2020).

RESULTS

The quantity, frequency, and percentage of each of the 1,518 animals used in this investigation are listed in **Table 1** below. The animals with a comparatively high percentage frequency of afflicted sections were sheep and cows. There is a statistical significant ($P > 0.05$) relationship between the number of animals slaughtered and the period (years) of the investigation.

Table 1: Frequency and Percentage of Affected Animals in Katsina Central Abattoir in the year 2013 to 2019.

	Year						
Animals	2013 n=327	2014 n =286	2015 n =243	2016 n =195	2017 n =149	2018 n =173	2019 n =145
	Freq(%)						
Cow	85(26.0%)	64(22.4%)	71(29.2%)	24(12.3%)	17(11.4%)	16(9.2%)	34(23.4%)
Sheep	79(24.2%)	75(26.2%)	54(21.8%)	51(26.2%)	55(36.9%)	68(39.3%)	42(29.0%)
Goat	102(31.2%)	91(31.8%)	73(30.0%)	80(41.0%)	53(35.6%)	55(31.8%)	42(29.0%%)
Camel	61(18.7%)	56(19.6%)	46(18.9%)	40(20.5%)	24(16.1%)	34(19.7%)	27(18.6%)

Table 1 Shows the Number of Animals Slaughtered Over a Period of Seven Years.

The prevalence of organ condemnations is shown overall in **Table 2**. Following the usual post-mortem examination, 1,060 parts were declared defective. Over the years surveyed, the uterus, lungs, liver, and intestine were found to have the highest rate of organ condemnation. There is a statistical significant ($P > 0.05$) relationship between the animals condemned parts and the years of investigation.

Table 2: Frequency and Percentage of Condemned Parts of Animals in Katsina Central Abattoir from 2013 to 2019

	Year						
Condemned Parts	2013 n =209	2014 n= 161	2015 n= 154	2016 n=146	2017 n= 123	2018 n= 165	2019 n= 102
	Freq(%)						
Uterus	126(60.3%)	55(34.2%)	65(42.2%)	91(62.3%)	45(36.6%)	132(74.5%)	52(51.0%)
Lungs	20(9.6%)	37(23.0%)	27(17.5%)	27(18.5%)	34(27.6%)	15(9.1%)	20(19.6%)
Liver	36(17.2%)	24(14.9%)	12(7.8%)	8(5.5%)	15(12.2%)	9(5.1%)	10(9.8%)
Intestine	11(5.3%)	35(21.7%)	38(24.7%)	9(6.2%)	14(11.4%)	6(3.6%)	18(17.6%)
Skin	5(2.4%)	3(1.9%)	4(5.6%)	1(0.7%)	0	0	1(1.0%)
Spleen	5(2.5%)	2(1.2%)	4(5.6%)	4(2.7%)	7(5.7%)	0	0
Heart	0	0	0	1(0.7%)	3(2.4%)	0	0
Kidney	4(1.9%)	5(3.1%)	3(1.9%)	3(2.1%)	1(0.8%)	2(1.2%)	1(1.0%)
Rumen	1(0.5%)	0	1(0.6%)	1(0.7%)	1(0.8%)	1(0.6%)	0
Whole Carcass	1(0.5%)	0	0	1(0.7%)	3(2.4%)	0	0

The causes of organ condemnations during the period under study are shown in **Table 3**. Among other factors, fasciolosis, TB, and pneumonia were shown to be the most common reasons of organ condemnations. There is a statistical significant ($P > 0.05$) relationship between the causes of condemnation and the period of the study.

Table 3: Causes of Condemnation of Animal Parts in Katsina Central Abattoir between 2013-2019.

	Year						
Causes	2013 n =141	2014 n =185	2015 n =157	2016 n =117	2017 n =79	2018 n= 134	2019 n =117
	Freq(%)						
Pneumonia	15(10.6%)	13(7.0%)	10(6.3%)	0	10(12.7%)	0	9(7.7%)
Cyst	8(5.7%)	15(8.1%)	13(8.3%)	12(10.3%)	0	4(3.0%)	7(6.0%)
Hydatid	3(2.1%)	0	0	0	2(2.5%)	1(0.7%)	1(0.9%)
TB	0	0	0	3(2.6%)	1(1.2%)	3(2.2%)	4(3.4%)
Anemia	0	0	0	0	4(5.1%)	0	0
Fasciolosis	22(15.6%)	24(13.0%)	12(7.6%)	2(1.7%)	2(2.5%)	11(8.2%)	9(7.7%)
Septicemia	0	0	1(0.6%)	0	0	0	0
Pregnancy	75(53.2%)	100(54.0%)	79(50.3%)	85(72.6%)	40(50.6%)	102(76.1%)	59(50.4%)
Enteritis	5(3.5%)	19(10.3%)	24(15.3%)	3(2.6%)	5(6.3%)	4(3.0%)	7(6.0%)
Dermatophylosis	1(0.7%)	2(1.1%)	2(1.3%)	1(0.9%)	1(1.3%)	0	0
Mastitis	0	10(5.4%)	3(1.9%)	2(1.7%)	1(1.3%)	0	6(5.6%)
Prolapse	1(0.7%)	0	1(0.6%)	0	2(2.5%)	1(0.7%)	2(1.7%)
Coccidiosis	1(0.7%)	0	2(1.3%)	1(0.8%)	0	1(0.7)	2(1.7%)
Liver Abscess	7(5.0%)	0	4(2.5%)	1(0.8%)	3(3.8%)	1(0.7%)	4(3.4%)
Death	0	0	0	0	2(2.5%)	1(0.7%)	0
Splenomegaly	3(2.1%)	2(1.1%)	1(0.6%)	3(2.6%)	1(1.3)%)	0	0
Urinary Calculii	0	0	0	0	0	1(0.7%)	0
Helminthes	0	0	0	1(0.9%)	0	0	5(4.3%)
Nephritis	0	0	2(1.3%)	1(0.9%)	1(1.3%)	2(1.5%)	1(0.9%)
Rumen Infection	0	0	1(0.6%)	0	0	0	1(0.9%)
Hardware Disesase	0	0	2(1.3%)	2(1.7%)	0	0	0
Bronchitis	0	0	0	0	1(1.3%)	0	0
Bloat	0	0	0	0	1(1.3%)	0	0
Heart Water	0	0	0	0	1(1.3%)	0	0
Lung Abscess	0	0	0	0	1(1.3%)	2(1.5%)	0

DISCUSSION

This study reveals that Pregnancy, pneumonia, and fasciolosis were the major causes of the various organs condemned at Katsina Central Abattoir. This outcome is in line with the findings of (Amsayas, 2021) who showed fasciolosis, hydatid, hepatitis and abscess as the major causes of organs condemnation at Wacha municipal abattoir.

Pregnancy was noted in this study as the highest cause of uterine condemnation which is in line with the work of Mohammed *et al.* (2018) who reported pregnancy as the highest rate of uterine condemnation (0.015%).

In this study, lung condemnation was prevalent with a percentage frequency of (27.6%) which is higher than the findings of Eman and Muhammad (2020) who indicated a lower rate of lung rejection at Alexandria and Quena, abattoirs as 1936 (1.52%), 13 (0.068%), and 1249 (5.6%) due to lung lesions. The anatomy of the lungs and their direct link to the outside environment may be the cause of this. According to the findings of Mohammed *et al.* (2018), TB most commonly affects the uterus, lungs, liver, spleen, and diaphragm, which led to their condemnation.

Out of all the causes of death in this study, pneumonia was found to have the highest prevalence (12.7%). Eman and Muhamed (2020) in their findings recorded a lower prevalence of Pneumonia (0.39%) as the main reason of death..

The prevalence of liver condemnation was found to be (17.2%) in this study which is contrary with the work of Lisa *et al.* (2020) who reported a higher prevalence of liver condemnation as (39.37%).

Fasciolosis had a prevalence of (15.6%) and was the main causes of liver condemnation in the animals involved in this study. Desie and Kedir, (2017) also reported that fasciolosis accounted for 25.6% overall liver condemnation in Elfora abattoir which indicated a higher prevalence when compared. The outcome is also in contrast to the report of Lisa *et al* (2020), who indicated that milk spot, a liver condition caused by *Ascaris suum* larval migration and accounting for 91.79% of liver condemnations, was the primary cause of liver condemnation.

According to Lisa *et al.* (2020), the frequent discovery of this lesion further demonstrated the disease's extensive prevalence and the potential for significant economic losses associated with ascaridosis. Different research locations and a higher prevalence of fasciolosis than milk spot fever in the study area could account for the variations in the causes of liver condemnation.

The prevalence of intestinal condemnation in this study had the highest percentage frequency of (24.7%). Reports of Eman and Muhammad (2020) records a lower prevalence of (0.72%) and (0.09%) intestinal lesions in the Alexandria and Aswan abattoir respectively.

Enteritis was the main causes of intestinal condemnation with a higher percentage prevalence of (15.3%) contrary with the report of Mohammed and Webb (2015) who showed abscesses and parasite infections to be the leading contributors of the gut condemnation.

Skin condemnation accounted for (15.6%) in this study. Mohammed *et al.* (2018) reported a much lower prevalence of (0.10%). Mange and Lumpy Skin Disease (LSD) were the main causes of skin condemnation accounting for the large percentage of cases.

Spleen condemnation in this study amounted to (5.7%). This is consistent with the findings of Berbersa *et al.* (2016) who noted that 36(9.4%) spleen, 137 (35.7%) lung, and 171 (44.5%) liver from killed cattle were condemned as being unfit for human consumption due to anomalies.

Splenomegaly is the most common reason for spleen condemnation (2.6%). This concurs with a study by Berbersa *et al.* (2016) that found splenomegaly and splenitis to be the causes of the spleen's condemnation.

According to Desie and Kedir (2017), the liver, lungs, kidneys, Spleens, hearts, tongues, and skulls are the most condemned animal parts, accounting for 50.3%, 35.6%, 33.7%, 20.0%, 15.7%, 5.0%, and 2.5% respectively.

Anemia and septicemia were shown to be the primary causes of cardiac (2.4%) condemnation in the animals included in this investigation, with anemia having the highest prevalence (5.2%). The report of Meron *et al.* (2016), which showed post-mortem examination for some organs with higher frequency and percentage as; 28(7.3%) hearts, 222 (57.8%) lungs, 171 (44.5%) liver, 29(7.6%) carcass, and 23(5.9%) kidneys, that were condemned due to various causes.

Nephritis and urinary calculi were th e culprits of kidney damnation. According to the work of Meron *et al.* (2016), the kidneys had abnormalities such as

nephritis, atrophy, and calculi. Desie and Kedir (2017) also reported kidney as the third most commonly condemned organ with 33.6% prevalence which was mainly due to nephritis, haemorrhage, and oedema.

Prevalence of Rumen condemnation in this study indicated (0.8%) parts condemned. Mohammed *et al.* (2018), report a lesser rumen condemnation rate of (0.015%) at Tamale Abattoir. Rumen infection was one of the reasons for rumen condemnation.

Carcass constituted 2.4% prevalence rate of condemnations in the outcome of this study. In the Bahir-Dar municipal Abattoir, Meron *et al.* (2016) noted a higher percentage prevalence of condemned complete carcasses as (7.6%). Tuberculosis and death were the main factors in whole carcass condemnation. Although, Mellau *et al.* (2010) report from Arusha, stated that TB had the highest proportion of carcass condemnation (0.1%).

CONCLUSION

In conclusion, the most commonly slaughtered animals in Katsina Central abattoir were cows, sheep, goats, and camels. The uterus, lungs, kidney, and liver are the most condemned organs and carcasses, with Pneumonia, TB, nephritis, and fasciolosis among the major causes of condemnation. These diseases results in a considerable financial loss in the abattoir. Animal health extension work should be revamped to create awareness in proper handling of condemned organs and carcass and also treatment of sick animals. Again, strengthening of meat inspection protocols, standard slaughter procedures are highly recommended at the Katsina Central abattoir. Further studies should be carried out to assess the level of preventive measures taken by public health workers and veterinarians in reducing unnecessary financial losses encountered in the abattoir.

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