Prevalence and Economic Implication of Liver Fluke Infestation On Sheep, Goats and Cattle (A Case Study of Damaturu Modern Abattoir)

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ABSTRACT

A preliminary estimate of liver condemnation due to liver fluke infestation in sheep, goats and cattle was made between January, 2024 to December, 2024 in Yobe State. The study was to determine the prevalence and implication of the loss on the state economy in particular and the national economy in general. Fecal samples were collected from the rectum of slaughtered sheep, goats and cattle and analyzed by direct smear methods for the prevalence of liver flucke infestation. A monthly record of actual slaughter at the Yobe modern abattoir in Damaturu the state capital revealed a total of 143, 118 heads of cattle, 116, 304 sheep and 210,991 goats were slaughtered during the period under review. An estimate ₦5,396,795.00 was lost to liver fluke during the period of study. Of this estimate loss, cattle accounted for ₦4,932,000.00 (92.3%), sheep accounted for ₦247,000.00 (65%) and goats accounted for ₦167,195.00 (3.1%) were lost recorded during slaughtered, particularly during festival and ceremonies, or during seasonal migration, the above estimate is grossly low as compared to the prevalence of the liver flucke infestation.

Keywords: *Prevalence, Infestation, Implication, Liver Fluke, Rectum.*

INTRODUCTION

Fascioliasis is a disease caused by liver fluke it affect primarily ruminants and some other animal species such as buffaloes, antelope, giraffe and even humans all over the world (Soulsby, 1982). Of importance are two main species: *Fasciola gigantica* which occur in the tropic and *Fasciola hepatica* which in the temperate regions (Hall, 2018). The epizootiology of the infection depends on a large extent, on the grazing pattern of the animals. For instance, during the onset of the dry season, the nomads concentrate their grazing on harvested farmlands where animals feed on crops residue (Galina, 2022). However, as the intensity of the dry season set in, crop residue become scarce, consequently, animals are forced to graze on lowlands, fadamas and pond where available fresh grasses are often infested with metacercaria the infective stage of the fluke (Blood *et al*.,2019), the disease is principally responsible for liver condemnation in the whole world (Soulsby, 1982) Further observed million are condemned annually to this parasites. In Nigeria, the incidence on parasitological examination in cattle was 23% with a mortality rate of 1% and liver condemnation rate of 22% (Ogunrinado and Bangboye, 1999). Similarly, Aliyara (2009) in a survey of abattoirs in and around Yola on the economics loss due to carcass and liver condemnation the economics loss due to carcass and liver condemnation repeated that 3.72% of all the cattle liver and 4.27%, sheep liver were condemnation mainly due to liver flukes.

Akerojala, (2020) also diagnosed 462 clinical cases in sheep around Zaria, his findings revealed that helminthiasis was the most prevalent condition responsible for 22% of the case with liver fluke accounting for 19% of it. Working in the Eastern Nigeria, Okolo (2015) similarly surveyed disease prevalence in goats killed at slaughtered houses in Nsukka between June and November, 2023. After examining 550 goats, he found helminthiasis as the commonest with liver fluke accounting for 8.36% of the incidences.

Aim and Objectives of the Research

The aim of this research work is to determine the prevalence and economic implication of liver fluke infestation among sheep, goats and cattle in Damaturu Abattoir.

The Objectives of this research work is to:

1. To determine the prevalence of liver fluke among sheep, goat and cattle.

2. To estimate the economic loss due to liver fluke infestation.

3. To recommend possible ways of preventive or controlling the disease among sheep, goat and cattle.

Economic Significant of the Infection

Alonge and Fasami (2020) in a study carried out in Northern Nigeria reported that the incidence of the disease in cattle slaughtered in Bauchi between 2015-2019 was as high as 31.7% with a condemnation of 1,248 liver. They further observed that in Nigeria as a whole, an estimate 500tons of meat including the liver valued at ₦1.25million naira are condemned annually.

The Place of Livestock Industry in the Nigerian Economy.

Various estimates have reported the livestock population of Nigeria to have consist of 8-14million heads of cattle, 14-22.1millions sheep, 9-34.5million goats, 13-3.4million pigs and about 102.8million indigenous poultry (Bincan, 2022, Osinova, 2019; Dim, 2003). Ninety seven percent (97%) of these are found in traditional rearing system which is for the most part rearing on native pastures (Okori, 2022). This is particularly so in Yobe State since it is traditionally livestock based.

These animals supply meat and milk for human consumption, hide and skin for both local industries and export, dung for manure, fuel and bones for industry (Bincan, 2022). Most

importantly, the livestock sub-sector provides employment to a large number of Nigerians who are actively involved in the production and marketing of livestock commodities.

Presently the agriculture sector is contributing about 31.29% of the Gross Domestic Production (GDP) with the livestock sub-sector accounting for about 16.55% of it or 5.17% the national GDP (F.O.S. 2018). Despite this contribution, the national herd has drastically reduced from earlier figure to only 5,044million herd of cattle, 12.215 sheep, 25,310 goats, 106 pigs and 65,621 poultry.

It was this glaring evidence of decline in the National Livestock population resulting from numerous factors (Liver fluke inclusive) vis-a-visa its tremendous contribution to the national economy that prompted this research in Yobe State.

METHODOLOGY

The Study Area

This study was conducted at Yobe State Modern abattoir, Damaturu. It is located in the Damaturu Local Government Area, five Kilometer away from Damaturu, along Potiskum Road. Damaturu is located on latitude 9^0 14N and Longitudes $12^0$3E altitude of 185 meters (Yobe State Diary 1994) the climate condition is marked with two distinct seasons wet season (April to late October) and Dry season (November to late March). It has annual rainfall of 75%mm with the wettest month being July-September the inhabitant are tradition herdsman, farmers, blacksmith, fishermen and rearing of animals.

Source and Data Collection

Data for the study were drive from both primary and secondary sources. Primary data were obtained through a weekly visit to the abattoir and on the spot inspection of slaughtered animals (Cattle, sheep and goats) to assess the incidence of damage caused by the fluke. A market survey of the prices of liver of the different species of the animals was conducted in Damaturu main market. New market to ascertain the cost of the damaged organs. The secondary data on the other hand were obtained from the monthly and yearly meat inspection report of Damaturu modern abattoir (2011-2015) provided by the livestock department, Federal Ministry of Agriculture Damaturu.

Analytical Techniques

Descriptive statistics and estimated economy loss model (Alonge and Ayanwale, 2024) where employed in the analysis. The model is specified thus,

EL= ND (PAxBW) + Co+ Cw+ Nc+ Mc

EL= Estimated annually economy loss due to the incidence of the disease

ND= Number of animals that died due to the disease

PA= Average market price of 1 kg of meat

BW= Average weight of the Nigeria Species of Animals

Co= Means cost of organs at slaughtered

Cw= Means cost of whole carcass condemned at slaughter

Nc= Lost due to chronic effect

Mc= Miscellaneous cost

RESULT

Table 1: Annual Slaughter of Cattle, Sheep and Goats at the Damaturu Modern Abattoir and Incidence of Fascioliasis (2015-2019)

Annual	Year	Total Slaughter	Cases Observed	Partially Condemned	Totally Condemned	% incidence
Cattle	2015	20,505	3399	1965	1434	16.5%
	2016	33,304	2720	1355	1365	8.2%
	2017	23,660	2997	1645	1352	12.7%
	2018	31,403	4465	2473	1992	14.2%
	2019	34,246	3721	2253	1468	10.9%
Total		**143,118**	**17302**	**9691**	**7611**	
Sheep	2015	23,643	851	620	231	3.6
	2016	23,774	953	544	409	4.0
	2017	20,278	509	217	292	2.5
	2018	24,664	651	281	370	2.6
	2019	23,945	493	312	181	2.1
Total		**116,304**	**3457**	**1974**	**1483**	
Goats	2015	36,289	513	381	132	1.4
	2016	40,382	975	619	356	2.4
	2017	36,500	475	204	271	1.3
	2018	57,960	711	294	417	1.2
	2019	39,860	692	457	235	1.7
Total		**210,991**	**3366**	**1955**	**1411**	

Table 2: Showing the prices of healthy and partially infected liver

Conditions of Liver	Cattle (N)	Sheep (N)	Goats (N)
Healthy	N4000	1,000	1,000
Partially Infected	N2,000	7000	700

Source: Field survey 2024

Table 3: Estimate Economic Loss in Cattle, Sheep and Goats due to Fascioliasis

Animal	Number of Cases	Estimate Loss (N)
Cattle	Total Condemnable 7,611	3,044,400.00
	Partial Condemnable 9,691	1,938,200.00
Sub-Total	17,302	N4,982,600.00
Sheep	Total Condemnable 1,483	148,300.0
	Partial Condemnable 1,974	98,700.00
Sub-Total	3,457	247,000.00
Goats	Total Condemnable 1,411	98,770.00
	Partial Condemnable 1,955	68,425.00
Sub-Total	3,366	167,195.00
Grand Total		**5,398,795.00**

DISCUSSION

Result of the survey revealed that between January 2024 and December 2024, A total of 143, 118 herds of cattle, 116, 304 sheep and 201, 991 goats were slaughtered at Damaturu modern abattoir. Cut of those figures, 17,302 herds of cattle of 12.1% were reported to have cases of fascioliasis with 7,611 of them having their liver totally condemned at slaughtered. Three thousand four hundred and fifty seven (3,457) of the sheep or 3% had cases of fascioliasis with 1,583 of them having their liver totally condemned at slaughtered while 3,366 or 1.6% of the total number of goats slaughtered had cases of fascioliasis with a total liver condemnation of 1,411.

The result further revealed that cattle (large ruminants) are more susceptible to diseases than sheep and goats (small ruminant this is in conformity with reports of Mitchell. (2017) and Robert (2012). In cattle, the incidence of fasciolasis was a highest in 2015 with 16.5% followed 14.2% in 2016, 12.7% in 2017 and 10.9% in 2015 with the lowest of 8.2% in 2012, while in sheep, the highest incidence of 4.0% was recorded in 2016 followed by 3.6% in 2015, 2.6% in 2018, 2.5% in 2017 and 2.1% 2015 respectively. In the case of goats, the highest incidence of 2.4% was recorded in 2016 with the others varying between 1.2% and 1.7% the results also revealed that with the exception of 2015 in the case of sheep and 2016 in the case of goats the variation in the incidence of the disease in minimal. The result are presented in table 1.

The result of market surveyed of prices of liver during the period under review in Damaturu market, Damaturu Main market) reveal that a healthy cow liver was average sold at N4,000 while a partially condemned ones was sold at N2000. In the same vain, healthy liver of sheep and goats were sold at N1,000 while partially condemned ones was sold at N700 respectively. The implication of these is that when a liver is completely condemned and declare unfit for human consumption, the whole amount is loss to the disease. The summary of the price surveyed is presented in table 2

Using the price indices from the result of the market survey and the total number of cases of the incidence in all the animals, the models used by alonge and Ayanwale (2014), was employed in computing the estimate economic loss. Result revealed that a total of N5,396,95.00 (2015) was loss to liver fluke between January 2015 and December 2019 of this amount N4,982, 600.00 (92.32%) was account for by cattle alone, N247,000,00 (4.5%) was accounted for by sheep, while the remaining N167,195.00 (3.1%) was accounted for by goats (Table 3)

This loss however portrays a gross under estimate of the actual situation in Yobe State in particular and the Nation in general. For there are uncountable and unrecorded.

Slaughter outlets particularly during festival and ceremonies where cases during seasonal migration are never reported either. Furthermore, if condemned organs are value at current market prices, the implication of the loss on the economy could be enormous.

CONCLUSION

This study has reveals that liver fluke infestation on cattle, sheep and goats has had a negative effect on both the state the National Economies. Despite this however, no grounded policy has been put in place towards it eradication it is therefore, pertinent to advice that policy on grazing reserves should go beyond demarcation of area pragmatic action. For if such is done, the rate of animal's consumption of infested grass on ponds and Fadamas could be drastically reduced thereby reducing the incidence of the disease.

RECOMMENDATIONS

The infection of the parasite can be prevented and control through the following ways

1. Animals should be dewormed regularly at a specific interval to prevent liver fluke infestation.
2. The intermediate host of the parasite which is snail can be controlled using molluscide and sometimes biological control using birds such as ducks which eat up the snail.
3. Infected liver and condemned carcass should be properly discarded through burning or burying.
4. Regular meat inspection by qualified veterinary doctors to destroy infected liver unfit for human consumption.
5. Regular inspection of grazing areas of these animals to ensure that the intermediate host (snail) are not breeding there.

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