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Survey of Gastrointestinal Parasites of Slaughtered Small Ruminants from Kawo, Mando and Tudun Wada Abattoirs in Kaduna State.

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Abstract

Gastrointestinal parasites have been recognized as a major constraint to both small and large-scale small ruminant production in developing countries. The aim of the study was to determine the gastrointestinal parasites of slaughtered small ruminants from Kawo, Mando and Tudun wada abattoirs in Kaduna state. This study was conducted within six months to identify the parasites from slaughtered small ruminants in the study area. Flotation and sedimentation method was carried out on the faecal samples for detection of cyst, eggs and adult worms. Results showed that 212 of faecal samples out of 330 examined were infected, an overall prevalence (64.2%) of animals infected with parasites. Out of this 96(45.2%) of sheep were infected while 116 (54.2%) of goats were infected. The rate of infection was 80.0% in female than that of the male was 60.0% and there was no significant association between the prevalence of gastrointestinal parasites with the age of the ruminants. The parasites identified were *Trichostronglus* species (25.0%), *Ancylostoma duodenale* (20.5%), *Ascarias lumbricoides* (18.2%), *Trichuris trichuiria* and *Strongyloides stercoralis* (13.6%) all belonging to the taxonomic group Nematoda. It can be concluded that the slaughtered small ruminants from the abattoirs in Kaduna had 64.2% infestation of nematodes parasites and this could pose public health problem to the consumers of these animals.

Keywords: Abattoirs, GIT parasites, Slaughtered, Ruminant.

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INTRODUCTION

Gastrointestinal parasite infection in small ruminants remains one of the major economic losses caused by reduced productivity. Intestinal parasites have become more difficult to manage in small ruminants because of the parasite's increasing resistance to several anthelmintics [6]. Small ruminant is numerous in Nigeria and are reared in most part of the country, because they serve as the major animal protein source consumed by the people [15]. Small ruminants are very important in human nutrition both in urban and rural economies and have the potential of serving as tools for poverty reduction in Nigeria. They play a vital role in rural economies through provision of meat, milk, household income, manure and hide. Sheep and goat contribute a large proportion of readily available meat in the diet of pastoralists. The ruminants play significant roles in the social and economic wellbeing of the Nigerians in various ways. Economically, the animals serve as sources of income earning to major ruminant's dealers, sellers of live animals and butcher's/meat sellers; generates employments and creates markets for larger number of people who explore the animal's products and by-products for economic gain [11].

Small ruminants harbor a variety of gastrointestinal tract (GIT) parasites, many of which are shared by both animals. Among these parasites, helminths such as nematodes (roundworms), cestodes (tapeworms), and trematodes (flukes) are the most important as they affect the growth as well as the production of the animals. Gastrointestinal nematodes of the *Trichostrongylidae* family are perhaps the most important parasites of small ruminants' world-wide, causing significant morbidity and loss of production [13]. Accompanying mankind since the dawn of civilization, ruminants became in various environments an integral part of human society. By supplying milk, meat and hides and by plowing the fields [14], they have become the most important domestic animal species. Their role in social networks, ceremonies and games also gives ruminants a central place in human culture, this in spite of a less affectionate human-animal relationship than has been established. Over time a large diversity of ruminants has emerged, which now may be threatened by the prevailing industrial approach to animal husbandry and a focus on high productivity [7] [8].

MATERIALS AND METHODS

Study Area

The study was conducted in Kaduna which consists of four Local Government Areas namely: Kaduna North, Kaduna South, Igabi and Chikun located between latitudes 10º 35' N and Longitudes 7^0 25 E. It has an area of 72 km^2 and density of 5, 883.1 inh./km^2 which the population of 423,580 [12]. Kaduna climate is located at an elevation of 585.86 meters (1922.11feet) above sea level, has a tropical wet and dry or savanna climate. The Local Government is dominated by farmers who produce crops on commercial level, with yams, maize, guinea corn, beans and sugar cane being the major crops. The small ruminants slaughtered in the abattoirs are brought from the pastoralist to the market then to the abattoir. It covers an area of 3,222 km^2 and lies within latitude 10° 47′ 0″N and longitude 7° 46′ 0″E, 998mm/39.3-inch precipitation falls annually and the area is situated on a relatively low plain liable to flood [4].

Collection of Faecal Samples

A total of 330 faecal samples were collected from the rectum using a pair of hand gloves into a clean labeled universal bottle in goats and sheep slaughtered from Kawo in Kaduna North, Mando in Igabi Local Government and Tudun Wada abattoirs in Kaduna South respectively for isolation and identification of gastrointestinal parasites. These were done from the abattoir each day of the sample collection during the study period (August to January) as early as 6:00am when the animals are taken to the abattoirs. The samples were preserved on ice and taken to Laboratory of Biological Science Department, Nigerian Defence Academy Kaduna.

Examination of Faecal Samples

The faecal samples were examined by flotation and sedimentation techniques for the presence of

parasites.

Flotation Method

Five gram pellet (5g) of the faecal sample was crushed and dissolved in saturated salt solution in a beaker and filtered through a sieve into a second beaker. The solute in the second beaker was put in a 15ml centrifuge tube and centrifuged at 1500rpm for 10mins. The supernatant was discarded; the saturated salt solution was added into the tube and centrifuged again at 1500rpm for 10mins. The tube was filled with a salt solution; a coverslip was placed on the tube and on a glass slide for microscopic examination after 30mins using x10 and x40 objective [9].

Sedimentation Method

Five gram (5g) of faeces was mixed with 200ml of water in a beaker and the mixture was poured into a new beaker through a sieve. After 10mins, approximately 70% of the supernatant fluid in the beaker was discarded and refilled the beaker with water. This step was repeated 3-5 times until the supernatant was clear, approximately, 90% of the supernatant was discarded. Finally, one drop of the sediment was placed on the glass slide, and a coverslip was placed on the glass slide and examined under a microscope using x10 and x40 objective [9].

Identification of Parasites to Species Level

Identification was made using the pictorial guide to internal parasites of ruminants by [3].

Collection of Blood Samples

Three ml (3ml) of blood samples were collected from the jugular vein using 5ml syringes for each animal slaughtered and was dispensed into labeled 5ml ethylenediamine tetra-acetic acid (EDTA) anticoagulant bottles. The blood samples were properly mixed to avoid clotting, kept into a flask containing ice packs and were transported to the laboratory for analyses.

Data analysis

Data obtained was presented in tables and percentages was analyzed using Chi-square to determine the association between the prevalence of the parasites and age. Level of significance was taken at < 0.05.

RESULTS

Prevalence of Gastrointestinal Parasites of Slaughtered Small Ruminants from Kawo, Mando and Tudun Wada Abattoirs in Kaduna

A total of 330 faecal samples which comprised of 100 from Kawo abattoir, 100 from Mando abattoir and 130 from Tudun Wada abattoir were examined. An overall prevalence of 64.2% for gastrointestinal parasite infestation in small ruminants slaughtered at the abattoirs as 212 out of the 330 ruminants examined were infected with at least one species of the parasites. With respect to species of ruminants, 116 out of the 180 goats examined were infected with gastrointestinal parasites, while 96 of the 150 sheep were also infected. These corresponded to prevalence of 64.4% and 60.0% infection with gastrointestinal parasites in goat and sheep, respectively.

The highest burden of the infection was recorded at Kawo abattoir with a 68.0% prevalence, followed by Tudun-Wada with a prevalence of 67.7%, while Kawo recorded the least prevalence of 60.0%. The difference in prevalence based on the sampling locations was not statistically significant (p> 0.05). At Kawo and Mando abattoirs, the prevalence of gastrointestinal parasite was higher in sheep than in goat, however, in each instance, the difference was not statistically significant (p > 0.05): the prevalence of intestinal parasites among goats at Kawo and Mando was 66.7% and 52.0% respectively, while in sheep the prevalence was 70.0% and 60.0% respectively. At Tudun-Wada abattoir, the prevalence of the infection was higher in goats than in sheep: in goat, the prevalence of gastrointestinal parasite was 71.4% while in sheep a prevalence of 63.3% was recorded (Table 1).

Prevalence of Gastrointestinal Parasites among Slaughtered Small Ruminants from Kawo, Mando and Tudun Wada Abattoirs in Kaduna Based on the Age

There was no significant association between the prevalence of gastrointestinal parasites with the age of the ruminants. The highest infection prevalence was recorded in ruminants between the age 5 and 7 years with a prevalence of 74.0% as 37 out of the 50 ruminants in that age category were positive for the infection. Among ruminants ages 3 and 5 years, the prevalence of gastrointestinal infection recorded was 70.0% as 70 of the 100 small ruminants within that age bracket were infected with intestinal parasites. A 60.0% prevalence was recorded in ruminants that were between 1 and 3 years old as 60 out of the 100 examined were infected with the parasites. The least prevalence was recorded in ruminants between ages 0 and 1 year old (Table 2).

Table 1: Prevalence of gastrointestinal parasites of slaughtered small ruminants from Kawo, Mando and Tudun Wada Abattoirs in Kaduna

Location	Species	Number examined	Number infected	Prevalence (%)	χ^2	p-value
Kawo	Goat	60	40	66.7	0.123	0.726
	Sheep	40	28		70.0	
Subtotal		100	68	68.0		
Mando	Goat	50	26	52.0	0.649	0.420
	Sheep	50	30	60.0		
Subtotal		100	56	56.0		
Tudun Wada	Goat	70	50	71.4	0.968	0.325
	Sheep	60	38	63.3		
Subtotal		130	88	67.7		
Total		330	212	64.2		

Table 2: Prevalence of Gastrointestinal Parasites among Slaughtered Small Ruminants from Kawo, Mando and Tudun Wada Abattoirs in Kaduna Based on the Age

Age	Number examined	Number infected	Prevalence (%)	χ^2	p-value
0-1year	80	45	56.3	6.524	0.089
1-3years	100	60	60.0		
3-5years	100	70	70.0		
5-7years	50	37	74.0		
Total	330	212	64.2		

Prevalence of Gastrointestinal Parasites of Different Species of Small ruminants from the Abattoirs in Kaduna

There was significant difference ($p< 0.05$) in the parasitic infection with respect to the five species of gastrointestinal parasites identified in the slaughtered small ruminants, with *Trichostronglus* species accounting for the highest burden of the infection among the examined ruminants. *Trichuris trichuiria* and *Strongyloides stercoralis* being the least. *Ancylostoma duodenale* accounted for 20.5% of all the parasites identified, followed by *Ascaris lumbricoides* with a parasite load of 18.2%, while *Trichuris trichuiria* and *Strongyloides stercoralis* accounted for constituting 13.6% of all the gastrointestinal parasites identified in the small ruminants that were examined (Table 3).

Table 3: Prevalence of Gastrointestinal Parasites of Different Species of Slaughtered Small Ruminants from the Abattoirs in Kaduna

Parasite species	Taxonomic group	No. of parasites	Prevalence (%)	χ^2	p-value
Trichuris trichuiria	Nematode	30	13.6	16.178	0.03
A. lumbricoides	Nematode	40	18.2		
Trichostronglus species	Nematode	55	25.0		
A. duodenale	Nematode	45	20.5		
S. stercoralis	Nematode	30	13.6		

DISCUSSION

In this study, higher prevalence of gastrointestinal parasites was detected in small ruminant from Tudun wada than in Kawo and Mando abattoirs. The highest prevalence rate of infection of 71.4% in goats than sheep with 70.0% could be due to system of management that these goats were subjected to transfer and were always left to wander about feeding on anything they come in contact with and their poorly kept sheds. These findings agree with the work of [6] that reported prevalence of 75.0% for goat and 63.2% for sheep from Minna modern abattoir. [5] recorded prevalence of 60.0% for goat and 58.0% for sheep from abattoir effluents in Jos metropolis. [1] had reported that animals are exposed to massive parasitic infections when they are kept in poor ranches/conditions and also when they are fed with contaminated food and water.

The higher prevalence of 74.0% of parasites among the age group of 5-7years compared to younger age group of 0-1year with 56.3% of parasites of the small ruminants in the study area could be due to the advanced age of the animal which might have resulted to compromised body defense as they developed immunity [16]. This result is in conformity with the report of higher infection in adult (66.7%) than the young ones (55.3%) in Riyom [2]. [10] also reported that adult animals are more readily susceptible to parasite infection than the younger ones.

The parasites species identified in the gastrointestinal parasites were all nematodes which include *Trichuris trichuiria, A. lumbricoides, Trichostronglus* species, *A. duodenale* and *S. stercoralis*. Similar parasite species was reported by Daminabo and Damen, (2020) in their study carried out from Abattoir Effluents in Jos Metropolis. The authors reported the presence of *Strongyloides stercolaris* (0.8%), *Trichuris trichiura* (3.2%), *Ascaris* species (28.6%) and *Trichostrongylus* (8.3%). The factors responsible for variations in the prevalence of different parasitic diseases might be the different climate and immune status of the individual animal.

CONCLUSION

The study shows an overall prevalence (64.2%) of gastrointestinal parasites detected from slaughtered small ruminants from the different abattoirs was not statistically significant. The parasites identified were

Trichuris trichuiria, A. lumbricoides, *Trichostronglus* species, *A. duodenale* and *S. stercoralis* and there was significant difference in the parasitic infection.

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