

Upregulated Cxcl10 Gene Expression In Sars-Cov-2 Infected People Prevalence of Gastrointestinal Helminth Infections Of Goats Slaughtered In Abattoirs In Ijebu-Ode, Ogun State

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ABSTRACT

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Goats are excellent meat producers for human consumptions and a rich source of protein as they in most part of the world, are kept mainly for meat, milk and leather. Gastrointestinal (GI) parasitic infections are common in goats causing considerable economic losses as a consequence of mortality in infected animals, reduced productivity and reduced weight gain. This study investigated the prevalence of GI helminth infections of goats slaughtered in abattoirs in Ijebu-Ode. A total of 120 fecal samples were collected between the Months of February and April, 2022 from two selected abattoirs in Ijebu-ode and were examined by sedimentation technique. The result showed that Red Sokoto and the West African Dwarf (WAD) breeds of goats slaughtered in Ijebu Ode abattoirs were examined and it was discovered that Nematodes are the most prevalent helminth parasites among the goats examined followed by protozoa. The Cestodes are the least prevalent in the study. This study has revealed that gastrointestinal parasites are highly prevalent in the study area. Owing to the attendant economic consequences of these parasites, their control has become imperative. Routine treatment of parasitic diseases in symptomatic and non- symptomatic goats, improved orientation on goat diseases and proper sanitary and hygienic practice in the rearing of the goats would reduce the diseases incidence.

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1. Introduction

Domestic goats are among the earliest animals domesticated by man and are distributed with higher concentrations in tropical areas in dry zones [1]. Goats are excellent meat producers for human consumptions in view of its short generation intervals and the absence of religious taboos associated with their meat as they are rich source of protein and can help bridge the gap of protein malnutrition among consumers [2]. In most part of the world, goats are kept mainly for meat, milk and leather [3]. In Northern part of Nigeria, the skin of goat is used as raw material in leather industries for manufacturing shoes, bags, belts etc. Goats although representing an important source of animal protein, seem to have benefited little from the veterinary care and production improvement. Gastrointestinal (GI) parasitic infections are common in goats causing considerable economic losses as a consequence of mortality in infected animals, reduced productivity and reduced weight gain. Most common GI parasites in goats are helminthes and coccidia [4]. It leads to poor growth rate, diarrhea, dysentery and anaemia and supposed to be one of the economically most important diseases of small ruminants as far as intensive farming is concerned [4]. It is mainly suspected when animals are kept under poor hygienic conditions and the mortality is mainly evident during weaning period [5]. These parasites often led to destruction of epithelial cells of intestine and interfere with intestinal microflora [6]. Gut worms in goat cause economic and nutritional hardship in poor farming communities and livestock operations, which are meaningless without sound knowledge of the animal care, prevention and eradication of diseases. In Nigeria, an important killer disease of small ruminants and high morbidity in man is caused by nematodes, trematodes and cestodes [7] (Debela, 2002). The most pathogenic helminthes of goats commonly encountered in Nigeria includes *Haemonchus contortus*, *Strongyloides papillosus*, *Trichostrongylus columbriformis*, *Oesophagostomum columbianum*, *Fasciola* species and *Moniezia benedeni* [8], [9]. The disease is mostly transmitted by ingestion of contaminated feeds, water, pastures with parasitic eggs, ova, cysts etc. Gastrointestinal trichostrongyles of which *Haemonchus contortus* ranks highest in importance globally are recognized as a major constraint to both small and large-scale small ruminant production in developing countries, leading to significant economic losses [10], [11]. These nematodes (*Haemonchus*, *Trichostrongylus* and *Cooperia*) cause impaired digestion and also affect the absorption of minerals particularly calcium and phosphorus [11]. Surveys indicated that up to 95% of goats in the tropics are infected with helminths of *Haemonchus* and *Trichostrongylus* being the main genera involved [11]. The animal protein intake in Nigeria is



3.24 g/day falls far below the FAO recommended value of 34g per day [12]. Since small ruminants contribute an estimated 35% of the total meat supply in Nigeria, efforts at increasing the protein intake should partly be directed at steps aimed at increasing livestock production [12]. Besides, an increase in livestock production will translate into an improved livelihood of the populace since a number of people are involved in the livestock industry (maintenance, transportation, slaughtering and trading) [13]. There is dearth of information on the prevalence of GI among goats slaughtered in abattoirs in Ijebu Ode, Ogun State. The present study was therefore to assess the prevalence of GI helminth infections of goats slaughtered in abattoirs in Ijebu-Ode.

2. Materials And Methods

2.1 Study Area

The study was carried out in Ijebu-ode abattoir popular known as Atenda, a major abattoir located in Ijebu-Ode and a Mini abattoir at Imowo-eleran where different breeds of animals are reared, sold and slaughtered. Ijebu-ode is a Local Government Area and city located in Ogun State, South-West Nigeria, close to the A121 highway. The area has tropical climate and enjoys double maxima of rainfall from April –July and September - October with dry season from November to March [14]. Geographically, the climate of Ijebu-ode is characterized by two different seasons; the dry and wet seasons. The dry season is partly cloudy and it is hot and oppressive year-round while the wet season occurs between the months of April and October with a break in August popularly known as the “August Break”. The annual rainfall varies from 1581 mm/62.2 inch per year [14].

2.2 Sample Collection

Fresh fecal samples were collected every week at the abattoirs from slaughtered goats between February and April, 2021. The samples were collected in the early hours of the morning. All samples were collected in a clean transparent universal bottle and were labeled before transported to the Biological Science Department laboratory (TASUED) for examination.

2.3 Parasitological Procedures

Faecal samples will be collected directly from the rectum of the animals using clean disposable polythene gloves, as described by Jaffe and McMahon-Pratt [15]. These will be taken to the



laboratory for immediate processing. After simple flotation, all nematode eggs will be identified using a combination of keys given by Foreyt [16].

2.4 Fecal Examination

Fecal samples were examined for helminthes eggs/larvae by using direct and indirect techniques for identification of certain nematodes. Briefly, one gram of fecal sample was mixed well in a drop of water and a relatively homogenous and transparent preparation will be obtained and examined under microscope by placing a drop of suspension on slide with cover slip. At least three direct smears will be examined from each sample. All the samples were also examined by sedimentation. Five grams of the fecal samples were mixed in 30-50 ml of water and strained through a sieve to remove the course material. The mixture was allowed to sediment for half an hour. After centrifugation, the supernatant was decanted and washing was continued until supernatant became clear. A drop was taken from sediment with Pasteur's pipette on slide and was examined under microscope at 10 X for the presence of helminths eggs.

2.5 Data Analysis

Data collected were analyzed in simple percentages and using T-test in SPSS computer software version 22.

3. Results

A total of One hundred and twenty fecal samples were collected from goats slaughtered in Ijebu Ode between the study period. The breeds of goats examined are Red Sokoto 71, (59.2%) and West African Dwarf (WAD) 49, (40.8%). Among the 120 fecal samples collected, 88 (73.3%) were infected with one helminth or the other (Table 1).

Table 1: Prevalence of Gastrointestinal parasites in relation to breed of goats

	No. (%) Examined	No (%)Positive	No (%)Negative
Red Sokoto	71 (59.2%)	57 (80.3%)	14 (19.7%)
WAD	49 (40.8%)	31 (63.3%)	18 (36.7%)
Total	120 (100%)	88 (73.3%)	32 (26.7%)



Table 2 showed that Nematodes (*Strongyloides*) had the highest prevalence both in the Red Sokoto and WAD with 28 (49.1%) and 17 (54.8%) respectively. This was followed by Protozoan (*Coccidia*) in the both breeds with 15 (26.3%) and 7 (22.6%) respectively. The Cestode (*Taenia*) had the lowest prevalence 5 (8.8%) in Red Sokoto while the Trematode (*Fasciola*) had the lowest prevalence 2 (6.55) in WAD. Figure 4 showed the distribution of the types of infection in the study area.

Table 2: Distribution of parasites in goats

	Coccidiosis (Protozoa)	Strongyloides (Nematode)	Taenia (Cestode)	Fasciola (Trematode)
Red Sokoto	15 (26.3%)	28 (49.1%)	5 (8.8%)	9 (15.8%)
WAD	7 (22.6%)	17 (54.8%)	5 (16.1%)	2 (6.5%)
Total	22 (25%)	45 (51.1%)	10 (11.4%)	11 (12.5%)

There was mixed infection observed in the breeds of goats. In Red Sokoto breed, the highest mixed infection was observed between *Coccidia* and *Strongyloides* while the least was between *Coccidia* and *Taenia*. *Coccidia* and *Taenia* had the highest mixed infections among the WAD breed while there was no mixed infection between *Coccidia* and *Fasciola* in the breed (Table 3).

Table 3: Mixed infections among breeds of goats

	<i>Coccidia and Strongyloides</i>	<i>Coccidia and Taenia</i>	<i>Coccidia and Fasciola</i>	<i>Strongyloides and Taenia</i>	<i>Strongyloides and Fasciola</i>	<i>Fasciola and Taenia</i>
Red Sokoto	9 (7.5%)	2 (1.7%)	2 (1.7%)	3 (2.5%)	5 (4.2%)	4 (3.3%)
WAD	3 (2.5%)	4 (3.3%)	-	2 (1.7%)	1 (0.8%)	1 (0.8%)
Total	12 (10%)	5 (4.2%)	2 (1.7%)	5 (4.2%)	6 (5%)	5 (4.2%)

From Table 4, it was shown that there is no significant different in the infection of the breeds of goat observed. But the infections of the different types of parasites were observed to be highly significant at $p < 0.05$.



Table 4: Analysis of Statistics of breeds of goats and types of infections

	Breeds of Goats	Types of Infections
Chi-Square	4.257	.000
Df	1	3
Asymp. Sig.	.039	1.000

4. Discussion

Helminthiasis is one of the major problems which affect the productivity of goats. Losses caused by helminthes invariably depend on the prevalence, nature and intensity of infection and the management practices. In this investigation, the prevalence of helminthes was higher in young animals compared with the older ones, and higher in males compared with the females in this study. A total of four gastrointestinal helminthes were recorded in the study. They are *Coccidia sp.*, *Stroglyoides sp.*, *Taenia Sp* and *Fasciola sp* this was in agreement with the findings of Adejinmi *et al.* [17] who also found *Stroglyoides sp* and *Coccidia sp* in goats in Ibadan area of Oyo State. The prevalence rate was found to be 73.3%. This was similar to the findings of Adejinmi *et al.* [17] and Ovutor, *et al.* [18] who reported 75% prevalence in goats in Ibadan and 73.3% in Portharcourt respectively, but higher than that of Ma'azu *et al.* [19] who reported 55.8% rate in Bauchi are of Bauchi State. The findings showed that *Strongyloides* and *Coccidia* had the higher prevalence in Ijebu Ode. The finding of *Eimeria* and the *strongyles* as the most common parasites of goats in the Bauchi area is in conformity with similar works elsewhere in Nigeria where they were reported as the most incriminated gastrointestinal parasites of domestic ruminants as observed by Biu *et al.* [20], Biu and Eteng [21] and Maqsood *et al.* [22]. The prevalence of protozoan infection recorded in our investigation, may be due to overcrowding, poor management and hygiene. This is in accordance with the works of Manson and Statham [23], Adejinmi and Osayomi [24] and Nwigwe *et al.* [25] who in their different studies reported that increase rate of protozoa infection was as a result of overcrowding and poor hygienic practice which greatly encourage the spread of these parasites, as these animals become carriers of intestinal protozoa parasites and continually contaminate the environment with eggs and oocysts of the parasites.



There was no significant difference between the rate of infection of the Red Sokoto and the WAD breed collected in Ijebu Ode although, the Red Sokoto was more infected. This is contrary to the findings of Ma'azu *et al.* [19] where there was significant difference in the rate of infection among the different breeds examined. Meanwhile, a significant difference was observed between the intensity of infections of various parasites observed. The mixed infections observed in the breeds are similar to those of several researchers including Adejinmi *et al.* [17], Ma'azu *et al.* [19] and Ovutor, *et al.* [18]. The area of study shows how vulnerable workers in the abattoir and people who consume the intestinal parts of the animals may be to infections especially to *Taenia* and *Fasciola* which are zoonotic and were observed in course of study.

5. Conclusion

Globally, parasitic and other endemic diseases continue to be a major constraint on profitable livestock production. They are rarely associated with high mortality and easily identifiable clinical signs and their effects are usually characterized by lower outputs of animal products, by products, manure, and traction, all contributing to production and productivity losses. Red Sokoto and the West African Dwarf (WAD) breeds of goats slaughtered in Ijebu Ode abattoirs were examined and it was discovered that Nematodes are the most prevalent helminth parasites among the goats examined followed by protozoa. The Cestode are the least prevalent in the study. This study has revealed that gastrointestinal parasites are highly prevalent in the study area. Owing to the attendant economic consequences of these parasites, their control has become imperative. Since the sampled goats of Ijebu-ode abattoirs were infected with various intestinal parasites, District Livestock Service Office (DLSO) should initiate the routine treatment of parasitic diseases in symptomatic and non- symptomatic goats. Knowledge on goat diseases seems poor among farmers hence regular training programme of goat farming focused on disease aspect should be provided to goat farmers. There should be legislative control over slaughtering of goats and their distribution; the abattoir workers should be properly trained on meat handling and zoonotic infections. Animals should be restricted to special areas of land provided by the government for grazing. The public should be enlightened on proper cooking of animal parts especially the intestine. A comprehensive approach should be adopted to ensure all-inclusive meat inspection in the abattoirs before distribution to the public for consumption.



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