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Original Research Article

Gastro-Intestinal Parasites of Goats in Rural and Urban Communities in Rivers State, Nigeria

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Abstract: Goat farming contributes greatly to the demands of our growing populations. Globally, goat is an important sources of animal proteins, providing a good percentage of meat and dairy products. Despites this valuable contribution of goats to our economy, extensive care of these goats are overlooked thereby making them hosts to a number of parasitic and zoonotic diseases. This survey aimed to investigate prevalence of Gastro-intestinal parasites of goats in rural and urban communities in Rivers State, Nigeria. A total of 240 fecal samples of goats were examined, using Formol-ether Concentration Techniques with diethy-ether and Formol-ether Concentration Techniques with fuel. The overall recorded prevalence of gastro-intestinal infections were 85.4%. Various species of helminths and protozoa observed during the study were *Haemonchus spp, Avitellina spp, Trichostronglus spp, Ostertagia spp, Oesophagostum spp, Dicrocoelium spp, Chabertia spp* and *Fasciola spp*. From the study areas Omerelu, a rural community recorded higher prevalance of 91.2%. Sex-related prevalence shows female goats are highly infected than the males. Thus, findings of this survey shows gastro-intestinal parasites are prevalent in our enviroments, and indigenous goats are at risks of these infection. Prevalent could impact negatively on the health and productivity of this important animals. Educating farmers on the epidemiology of this infective pathogens should be priotize while emphasis on veterinary services for good health of the animal must be maintained.

Keywords: Comparative, Prevalence, Gastro-Intestinal, Parasites, Goats, Rural, Urban Community.

INTRODUCTION

Goat farming is a critical component of livestock agriculture, offering significant contributions to the livelihoods of small-scale farmers and pastoralists world-wide. Goat is among the earliest animals domesticated by man and is distributed world-wide (FOA, 2009). Amongst other ruminants, goat rank first in terms of numbers and utilization. Goat provides socio-economic, cultural and religious benefits. Most especially, goats represent an important source of animal protein in many countries of the world, supplying a good percentage of the daily meat and dairy products (Ma'azu *et al.*, 2018).

In Nigeria, goat farming has increasingly become a major source of animal protein in most homes, contributing over 30% total meat consumption (Jatau *et al*., 2011). Indigenous goats serves as source of ready-cash to families. The skins of goats are known for their superior quality and the high premium it commands in the world markets (Miller *et al*., 2012, Lawal-Adebowale, 2012). Despite the valuable contributions of indigenous goat farming to livelihood, extensive care of these indigenous goats are overlooked in national agricultural development strategies.

Livestocks generally are hosts to a number of parasitic and zoonotic diseases. Amongst different parasitic diseases, gastro-intestinal parasites of protozoa and helminths are most common in goats. Gastro-intestinal parasites are known as internal parasites, that primarily inhibits the alimentary canal of an animal. They infects the animal through a process known as

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faecal-oral transmission. Their prevalence and heavy worm burdens are influenced by several factors such as climatic suitability, host immunity to infection and management practices (Kumar *et al*., 2013). Infections associated with gastro-intestinal parasites are known to cause direct harm to the animals. The physiological activities of these parasite lowers the animal immune system, causing weight loss, damages to the animal gastric function thereby leading to high morbidity rate in the animal and other complicated problems (Maingi *et al.,* 2013). Adedipe *et al.,* (2014) stated that poor health condition associated with gastro-intestinal infections decreases animal productivity and consequently leads to substantial economic losses.

Several studies within the Tropical and Sub-tropical region of the world, have shown that gastro-intestinal parasites are prevalent in goat, and varies from place to place due to prevailing climatic and environment conditions (Raza *et al*., 2014). Osakwe *et al*., (2007) stated that high incidence of these Gastro-intestinal infections in goats are agro-climatically related. Quality of pasture, temperature, humidity, grazing behaviour of the animals and environmental quality may be responsible for transmission of infections. Greenland (2015) in their studies also proves that transmission of gastro-intestinal parasites of goats occurs through environmental contamination and host interaction. Understanding the process and factors which influences the survival, development and contamination of the environment with Gastro-intestnal parasites can be an essential tool for effective control and management of gastro-intestinal infections in indigenous goats. It is also imperative to ascertain the prevalence of these infections due to gastro-intestinal parasites in indigenous goats reared in our vicinity. Thus, this survey tends to investigate on species prevalence of gastro-intestinal parasites on goats reared in urban and rural areas of Rivers State.

MATERIALS AND METHODS

Area of Study

This survey was conducted in rural and urban areas of Rivers State, Nigeria. The rural area is precisely in Omerelu community in Ikwerre Local Government Area while the urban area comprises two community which include Choba and Ozuoba communities in Obio/Akpor Local Government Area of Rivers State. The people of the urban and rural areas share some common behaviour. Despite the development in commerce, local businesses and civilization in the urban area some still involves in agriculture, particularly farming and fishing. People of rural areas are predominately farmers. Average temperature within the study areas are betweem 26 ºC and 28 ºC. Indigenous goats are farmed on free range. Saniation is poorly managed in the so called urban communities.

Sample Collection

A total of 240 indigenous goats were sampled from the three study communities between a period of Twelve (12) weeks. 80 goats from the rural community which is Omerelu, and 160 goats from the urban areas which is 80 from Ozuoba and 80 from Choba. During sample collection, a pair of sterile hand gloves was used to extract fresh faecal matters from the goats. The fecal samples were preserved in a clean sample bottles containing 10% formalin. The samples were labelled in each of the community and labelled appropriately before transported safely to the Parasitology Laboratory of Animal and Environmental Biology Rivers State University for parasitological examination.

Specimen Analysis

In the laboratory, Formol-ether concentration techniques with Diethyl-ether according to Cheesbrough (2005) recommended for rapid concentration of wide range of faecal parasites was used. Estimated 1g each faecal samples were emulsify with 4ml of 10% formol saline in a test tube. The mixture was filtered into another test tube using a coffee strainer. The solution was allowed to stand for about 3minutes and after that 1ml of Diethyl-ether was added and shooked to obtain a solution. The solution was centrifuged at 2,000rpm (Revolution Per Minutes). After centrifuging the supernatant was decanted. The sediments were then mixed using a pasteur's pipette and placed on a microscopic slide and stained with Lugol's iodine and covered with a cover slip. The prepared slides were viewed under X10 and X40 objectives.

This procedures were applied in all samples obtained from the urban and the rural community.

Data Analysis: Data obtained during the study were analysed using the ANOVA single factor statistical tools.

RESULTS

The overall prevalence of infection and various species of gastro-intestinal parasites observed from the study were demonstrated in tables below. A total of 240 indigenous goats were sampled from two study communities. Result in (table 1) shows an overall prevalence of 85.4% from the three sampled communities. Prevalence observed from the communities, shows Omerelu a rural community had a higher prevalence of 91.2%, followed Ozuoba and Choba an urban communities with a prevalence of 83.7% and 81.2% respectively.

Parasite species observed from goats fecal samples shows gastro-intestinal parasites of nematodes and helminths were most common infections of rural and urban goats. Eight (8) parasite species were identified during the study. These are *Haemonchus spp, Avitellina*

spp, Trichostronglus spp, Ostertagia spp, Oesophagostum spp, Dicrocoelium spp, Chabertia spp and *Fasciola spp* (Table 2). Prevalence of infections observed from various gastro-intestinal parasites in the study areas shows *haemonchus spp* recorded higher in Omerelu and Choba communities with a prevalence of 34.3% and 22.5% respectively. *Dicrocoelium spp* with higher prevalence of 18.6% were observed in Choba community. 0zero prevalence of infection in Choba and Ozuoba were observed in *Ostertegia spp and Chabertia spp*, while in Omerelu Community *Ostertegia spp* and *Chabertia spp* recorded 7.9% and 11.5% prevalence.

Sex-related prevalence of infection in (Table 3) shows female goats recorded prevalenec of 56.2% against male, which had 43.8% prevalence in Omerelu. 58.2% prevalence were recorded in female against male 41.7% in Ozuoba community, and 58.4% prevalence in female against 41.5% in male in Choba community.

Table 1: Overall Prevalence of Infections in the Three Study Communities

Study Communities	No. of samples Examined	No. (%) of samples Positive	No. (%) of samples Negative
Ozuoba	80	67 (83.7%)	13 (16.2%)
Choba	80	65 (81.2%)	15 (18.7%)
Omerelu	80	73 (91.2%)	7 (8.8%)
Total	**240**	**205 (85.4%)**	**35 (14.6%)**

Table 2: Species of Gastro-intestinal Parasites Observed from three Study Communities

Species of GI Parasites	Prevalence of Infections Observed from the Communities		
	Ozuoba	Choba	Omerelu
Haemonchus spp	10(14.3%)	12(22.5%)	24(34.3%)
Avitellina spp	3 (5.8%)	5(7.9%)	10(14.3%)
Trichostronglus spp	4 (6.5%)	2(4.5%)	6(8.0%)
Ostertagis spp	0 (0.0%)	0(0.0%)	5(7.9%)
Chabertia spp	0 (0.0%)	0(0.0%)	8(11.5%)
Oesophagostomum spp	4 (6.5%)	3(5.8%)	3(5.8%)
Dicrocoelium spp	11(18.6%)	6(8.0%)	0(0.0%)
Fasciola spp	1 (2.5%)	2($.5%)	4(6.5%)

Key: GI = Gastro-intestinal Parasites

Table 3: Sex-Related Prevalence of Infections from the Study Communities

Sex	*Omerelu*		*Ozuoba*		*Choba*	
	No Examined	No Positive	No Examined	No Positive	No Examined	No Positive
Male	35	32(43.8%)	32	28(41.7%)	37	27(41,5%)
Female	45	41(56.2%)	48	39(58.2%)	43	38(58.4%)
Total	**80**	**73(91.2%)**	**80**	**67(83.7%)**	**80**	**65(81.2%)**

DISCUSSION

Gastro-intestinal parasite infections are global issue, adversely affecting ruminants and causing devastating production losses (Abdelazeem *et al*., 2020). Indigenous goats which hold significant economic importance especially in developing country like Nigeria, providing income to families, contributing greatly to econmic demand for protein meat and milk, and has also been a source of by-products like manure for small-scare farmers are under threat. Thus, this present study revealed that goats reared in both rural and urban areas can be infected with various gastro-intestinal helminth and nematode parasites.

Overall high prevalence of 85.4% recorded in this study shows gastro-intestinal infections are major health challenge affecting indigenous goats. The study communities comprising both the urban and rural is an indicator of poor attention to sanitary measures and lack of neccssary care towards rearing of indigenous goats amongst the populace. The result corroborates to other studies within and outside Nigeria, where similar higher prevalence of infection was observed. Such studies include the reports of Pacheco *et al*., (2021), Paul *et al*., (2020) & Olanike *et al.*, (2015), who reported prevalence of 91.6%, 83.4% and 56.8% respectively.

Gastro-intestinal parasites encountered during the study, were nemtode and helminth parasites. Most especially, *Haemonchus spp, Trichostronglus spp, Dicrocoelium spp and Fasciola spp*, which have been reported to cause zoonotic diseaess and pose a major threat to human public health and food safety (Bansal *et al*., 2015). In recent reports, *Haemonchus spp* have been

found as the most prevalent species of nematode in goats (Rehman *et al*., 2011, Laha *et al.,* 2013). According to Josiah *et al*., (2015) that the higher prevalence of *Haemonchus spp* in ruminants is relating to multifactorial system which comprises hosts, parasites and environment. *Haemonchus spp* are blood sucking parasites. They are major cause of poor productivity and even death in untreated animals within the Tropical and Sub-tropical regions of the world (Marshall *et al.,* 2012). The tropical and subtropical region are areas mostly characterised with inadequate sanitary processes, people with inadequate knowledge/lack of awareness to infectious diseases and factors that stands as risk factor to infectious diseases. Within this regions, climatic factors have shown responsibility to maintaining and transmission of infectious diseases, which in this survey the study areas Omerelu, Choba and Ozuoba fall within.

CONCLUSION

It can be concluded from these survey, that infections with gastro-intestinal parasites of nemaodes and helminths are prevalent in indigenous goats reared in urban and rural communities. It further revealed that most frequent species of gastro-intestinal parasite observed from this survey can cause severe disease which can pose threat to human health and food safety in our developing society. It is therefore, imperative that sanitary and climatic factors are reponsible for this gastro-intestinal helminth prevalence in our local areas. Poor knowldge to epidemiology of infection has also contributed to sustaining parasitic infections.

Recommendation

This study thus recommends that animals either commercially or uncommercially reared should be monitored health wise and treated incase of any signs and symptoms. Good sanitary practice is every ones business, while adequate sanitaion should be observed and maintain all the time to avoid contamination of the environment and infecting the animals.

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