

Distribution of Gastrointestinal Helminthosis of Small Ruminants in Ibadan, South Western Nigeria: Role of Traditional Rearing System

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Abstract: In Nigeria, where the great majority of herds are managed traditionally, the search for feed and water results in scavenging livestock-raising methods. This often exposes such animals to high levels of infections, causing considerable losses. A survey was conducted during the short wet season to determine the prevalence and role of factors associated with small ruminant helminthosis in Ibadan region. A total of 880 sheep and goats were examined using standard parasitological procedures. The overall prevalence of helminthosis was 92.7%. Species prevalence of helminthosis was 96.1% and 89.3% in sheep and goats respectively. Sex prevalence was 94.1% and 87.8% in females and males respectively. Peri-urban prevalence was 96.0% while urban had 88.8% of mixed helminth infection. It was also observed that 42.5% and 57.7% of animal owners in urban and peri-urban areas lacked knowledge of anthelmintic used. Others, 20% and 30% of urban and peri-urban owners expressed some knowledge of existence of worms but believed that scavenging animals when infected have innate ability to seek medicinal herbs and plants to graze on. A total of 10% of all owners interviewed are aware that veterinary care should be given but only when the animals are obviously sick or fail to thrive. Our results reveal that the entire Ibadan region is endemic for gastrointestinal helminthosis and owners in the region believe that the best system for rearing small ruminants is the extensive management.

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1. Introduction

Developing countries especially in Africa have a high human and animal population, but Africa has trailed in controlling livestock diseases and this has affected the welfare of a lot of animals (Molomo and Mumba, 2011). Sheep and goats, although representing an important source of animal protein in developing countries (Ijaz *et al.*, 2009) such as Nigeria, seem to have benefitted little from veterinary care and production improvement. About 99.97% of Nigerian sheep and goats are traditionally managed (RIM, 1992) and are therefore, constantly threatened by ectoparasites and endoparasites. Sheep and goats harbour a variety of gastrointestinal tract (GIT) parasites, many of which are shared by both species. Gastrointestinal helminth infections are recognized as a major constraint to livestock production throughout the tropics and elsewhere (Githiori *et al.*, 2004) causing lowered productivity (Perry and Randolph, 1999), mortality (Sykes, 1994) and high economic losses (Iqbal *et al.*, 1993; Butswat *et al.*, 2005) which affect the income of small household farming communities.

In Nigeria, ruminant production has been characterized by low productivity in some indices such as growth and lactation performance, with very low infant survival rates (Zahraddeen *et al.*, 2007). This reduced performance has been traced to several

factors such as poor nutrition (Sadaghian *et al.*, 2011), pests and diseases (Butswat *et al.*, 2005). Kuchai *et al.* (2013) reported that grasslands are one of the main sources of gastro-intestinal parasitic diseases to animals. It has been estimated that gastro-intestinal helminthosis in sheep and goats causes losses up to 60 million dollars annually (Akerejola *et al.*, 1979).

In Nigeria, small ruminants are often reared extensively and the animals scavenge over great distances. This often exposes such animals to high levels of infection. For successful creation and implementation of an effective strategic helminth control system, a periodic observation of the prevalence of gastrointestinal helminthosis within given environment and associated risk factors for transmission is required (Shimelis *et al.*, 2011).

Several studies have been conducted on ruminant helminthosis of various regions (Butswat *et al.*, 2005; Zahraddeen *et al.*, 2011). However, these surveys were mainly restricted to institutional farms which may not be representative of the various geographical regions in Nigeria. Additionally, there is paucity of published reports on the prevalence of small ruminant helminthosis in Ibadan region. Therefore, this study was conducted to generate baseline data on the prevalence of gastrointestinal parasites in small ruminants of the eleven local

government areas of Ibadan, south western Nigeria. Attempt was made to identify risk features as well as determine the knowledge and attitude of owners to parasitism.

2. Materials and Methods

The study area, Ibadan region is made up of five urban and six peri-urban areas. It is located within the tropical rainforest characterized by two (i.e. long and short) wet seasons. Samples were collected during the short wet season of August to October 2011. The region is located at latitude 7°21'N and 3°54'E.

Sample Collection

The owners of the animals were purposively sought out. They were small household small ruminant herd and flock owners. They were interviewed on the management system, routine medications and beliefs on gastrointestinal helminthosis.

Faecal samples from 880 sheep and goats were randomly sampled using the sedimentation and floatation techniques of faecal examination as described (Thienport *et al.*, 1979; Shah-Fischer and Say, 1989). The eggs of different parasite species were identified using keys given by Soulsby (1982).

Statistical analysis of results was carried out using t-test.

3. Results

It was discovered from the interview that extensive rearing of the ruminants was largely practised and a good number of animal owners were unsure of anthelmintic administered to their animals (Figure 1).

Overall prevalence

Out of 880 sheep and goats examined, 92.7% (n= 816) were found to harbour one or more parasite species. The prevalence of gastrointestinal helminthes was higher in sheep than goats but the difference was not significant ($P>0.05$). The gastrointestinal parasites found in the small ruminant population of the study area are shown in Table (1).

The prevalence of gastrointestinal parasites was higher in females compared to males but the difference was not significant ($P>0.05$). However, the prevalence of *Fasciola* was significantly different ($P<0.05$) as shown (Table 2).

Relatively higher prevalence of helminthosis was observed in the peri-urban areas (96.0%) compared to urban (88.8%) but the difference was not significant (Table 3).

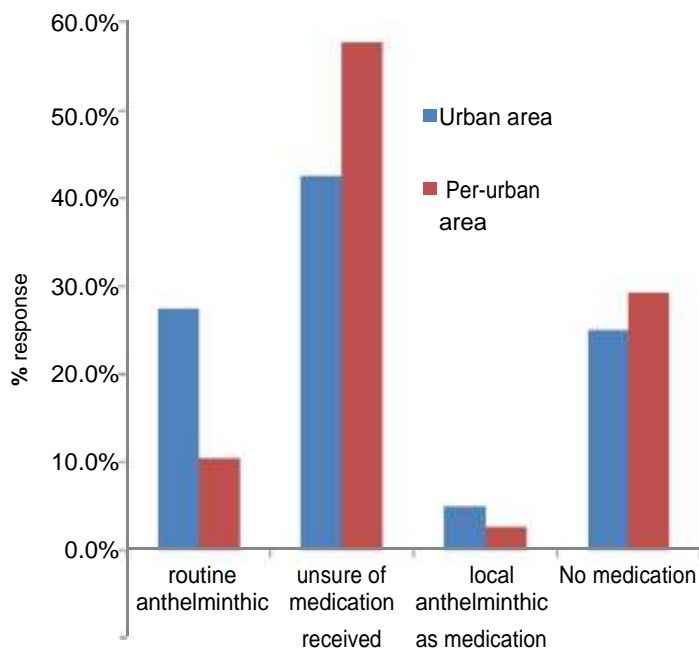


Figure 1: Predisposition to medication by animal owners

Table 1: Prevalence of small ruminant Helminthosis in sheep and goats in Ibadan region

| Species | No. sampled | No. positive | Types of parasite identified | | | | | |
|---------|-------------|--------------|------------------------------|---------------|-----------|----------|-----------|-----------|
| | | | Strongyles | Strongyloides | Tapeworm | Ascaris | Trichuris | Fasciola |
| Sheep | 440 | 423(96.1%) | 235(53.4%) | 77(17.5%) | 48(10.9%) | 6(1.4%) | 4(0.9%) | 53(12.0%) |
| Goats | 440 | 393(89.3%) | 228(51.8%) | 70(15.9%) | 40(9.1%) | 13(3.0%) | 2(0.5%) | 40(9.1%) |
| Total | 880 | 816(92.7%) | 463(52.6%) | 147(16.7%) | 88(10.0%) | 19(2.2%) | 6(0.7%) | 93(10.6%) |

Table 2: Prevalence of helminthosis based on sex of small ruminants in Ibadan region

| Sex | No. sampled | No. positive | Types of parasite identified | | | | | |
|--------|-------------|--------------|------------------------------|---------------|-----------|----------|-----------|-----------|
| | | | Strongyles | Strongyloides | Tapeworm | Ascaris | Trichuris | Fasciola |
| Female | 692 | 651(94.1%) | 368(53.2%) | 114(16.5%) | 68(9.8%) | 14(2.0%) | 5(0.7%) | 82(11.8%) |
| Male | 188 | 165(87.8%) | 95(50.5%) | 33(17.6%) | 20(10.6%) | 5(2.7%) | 1(0.5%) | 11(5.9%) |
| Total | 880 | 816(92.7%) | 463(52.6%) | 147(16.7%) | 88(10.0%) | 19(2.2%) | 6(0.7%) | 93(10.6%) |

*: significant difference ($P < 0.05$)

Table 3: Prevalence of gastrointestinal parasites in urban and peri-urban areas of Ibadan

| Area | No. sampled | No. positive | Types of parasite identified | | | | | |
|------------|-------------|--------------|------------------------------|---------------|-----------|----------|-----------|-----------|
| | | | Strongyles | Strongyloides | Tapeworm | Ascaris | Trichuris | Fasciola |
| Urban | 400 | 355(88.8%) | 204(51.0%) | 66(16.5%) | 35(8.8%) | 7(1.8%) | 2(0.5%) | 41(10.3%) |
| Peri-urban | 480 | 461(96.0%) | 259(54.0%) | 81(16.9%) | 53(11.0%) | 12(2.5%) | 4(0.8%) | 52(10.8%) |
| Total | 880 | 816(92.7%) | 463(52.6%) | 147(16.7%) | 88(10.0%) | 19(2.2%) | 6(0.7%) | 93(10.6%) |

4. Discussion

It was observed that mixed infection with helminth parasites was a common occurrence in the survey. This may be due to the fact that under extensive management, a common practice in the study area; with little or no supplementary feeding, sheep and goats are exposed to helminth infestation. The little or no supplementary feeding may lead to poor immune response (Yohanna *et al.*, 2008) and this may make the small ruminants to readily succumb to gastrointestinal helminth infestation.

The high incidence of gastro-intestinal infection by gastrointestinal helminthes in the peri-urban and urban areas of the study, especially during the wet season may be attributed to the low input production systems widely practiced in the country; sheep and goats are crowded in open pens with little or no removal of droppings, non-existent veterinary attention or provision of drugs, cross infection and grazing in communal pastures. In Nigeria, the concept of a general chemo prophylactic anthelmintic flock treatment does not exist among livestock owners (Ankers *et al.*, 1998); only individually targeted animals are routinely dewormed (Bullerdieck, 1996).

The use of prophylactic anthelmintic has been proffered as a possible intervention strategy in developing countries to reduce the impact of gastrointestinal parasitism (Bullerdieck, 1996). The findings of high level of lack of knowledge of anthelmintic medication (indicated as unsure anthelmintic medication) by the small ruminant owners in this study, may suggest indiscriminate use of chemical drugs for the control of helminthosis.

This unselective use of anthelmintic has been identified as the main cause of anthelmintic resistance, affecting the profitability of small ruminants (Kaplan and Vidyashankar, 2012).

The prevalence of helminthosis both in sheep and goats is comparable. However, this study revealed a relatively higher prevalence (89.3%) in goats than had been earlier reported; 55% by Shimelis *et al.* (2011) in Ethiopia and 71.26% in Ladakh, India (Kuchai *et al.*, 2013). This variation may be associated to the practice of grazing sheep and goats in the same area which could possibly lead to higher exposure of goats and increasing acquisition of helminth infection. Immunological response of goats for helminth infection is limited compared to sheep (Urquhart *et al.*, 1996). The findings of this study is in harmony with findings by different researchers (Raza *et al.*, 2007; Kuchai *et al.*, 2011) who have found a direct influence of grazing on the prevalence of most of gastrointestinal helminthes. *Fasciola gigantica* had a mean prevalence of 10.6% in sheep and goats in Ibadan region and this is relatively high when compared to the mean prevalence rate of 6.99% in both animals as reported by Shimelis *et al.* (2011). However the fact that the study was carried out during the short wet season may account for this variation, since incidence of fasciolosis is highest during and just after the rainy season as reported by Schillhorn van Veen *et al.* (1980) and Adedokun *et al.* (2008).

Female animals showed higher infection rates than males under similar management system. This finding supports the general understanding of helminth infections that female animals are more

susceptible to helminthosis (Valcarcel and Garcia, 1999). It was observed that sex is a determinant factor influencing prevalence of parasitism (Valcarcel and Garcia, 1999; Adedokun *et al.*, 2008) and females are more prone to parasitism during pregnancy and peri-parturient period due to stress and decreased immune status (Urquhart *et al.*, 1996).

In conclusion, the findings of the study revealed that the entire Ibadan region is endemic for gastrointestinal helminthosis and the belief by the owners that the extensive management is the best system for rearing small ruminants coupled with the lack of knowledge on use of anthelmintic may be contributing factors to the observed prevalence in the study area.

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