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A Survey of Gastrointestinal Parasitic Helminths of Bovine Slaughtered in Abattoir, Wudil Local Government Area, Kano State, Nigeria

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ABSTRACT

A survey of gastrointestinal helminth parasitic infections of Bovine (cattle) slaughtered in Wudil Local Government Area abattoir in Kano State, Nigeria was carried out for 12 months in 2013. A total of 375 of faecal samples of the animals were examined comprising of 251 adult males and 124 adult females using formol ether concentration technique. Out of which 131 (34.9%) were infected with one or more parasites. Two species of parasitic nematode 79 (21.1%) and two species of parasitic trematode 52 (13.9%) were encountered. Male cattle had the highest prevalence of helminths infections than females, and was statistically significant ($p<0.05$). The prevalence rates of the species encountered consist of Ascaris 58 (15.5%), *Haemonchus contortus* 21 (5.6%), *Fasiola gigantica* 19 (5.1%) and *Schistosoma bovis* 33 (8.8%). The helminth infections were significantly highest (18.2%) in the rainy season ($p<0.05$). The study reveals that there is a high tendency for increase in the transmission of helminth zoonoses within the studied area especially fascioliasis. But with personal hygiene and environment sanitation, the prevalence of helminthic diseases can be reduced.

INTRODUCTION

In Sub-Saharan Africa, as in other tropical and sub-tropical regions of the world livestock farming is one of the major sources of animal protein, cattle serves as one providing beef during festivities around the world, flexible income for family units, employment, farm energy and manure. It accounts for as much as one- third of Nigeria's agricultural gross domestic product (GDP); it also provides hide and skin as a raw material in the leather industries (Mohammed and Agbede, 1980; Nuru, 1984; Opasina, 1992; De-Castro, 1997). Nigeria had a mean cattle population of 13.9 million in 1990, of which 11.5 million of this population were kept under pastoral system (Okoli *et al.,* 2012) and 2.4 million in the villages (Roger, 1999). Furthermore, these cattle were predominantly zebu, such as, Bunaji (White Fulani), Rahaji (Red Bororo), Sokoto gudali and others. A seasonal change in the relative proportion of these animals in various ecological zones of the country has also been reported. In communities where livestock production have become the mainstay of the people, Gastro-intestinal infection have, in addition to other socio-economic parameters, constituted major impediment to the development of an economically viable livestock industry (Soulsby, 1982).

Infections with parasites especially those of gastrointestinal tract (GIT) can, and in some circumstance do cause substantial losses to Bovine (cattle) owners. The disease causes a gradual deterioration of animal performance and has been known to be major causes of economic losses in livestock in the tropics and Nigeria in particular (Maina, 1986; Kudi and Kalla, 2001). Eradication of these parasites is impossible especially in a degrading environment (Ohaeri, 2011). An animal will show the symptoms of diseases only when parasite load becomes excessive or when an animal's natural immunity to disease become suppressed. The effects of the disease range from decreased utilization of feeds in unthrifty animals to weight loss or even death (Hansen and Perry, 1994; Anon, 2005). Symptoms include loss of weight, poor growth, unthriftness, and a marked decrease in milk production, gut damage, blood loss, and anaemia. According to Jacquiet *et al.* (1998), among the gastrointestinal parasites, nematodes present the greatest potential problems, of which the barber pole worm (*Haemonchus contortus*) is the most important.

Overstocking is a major problem in large part of the world particularly in African. In addition to pasture degradation and soil erosion in certain marginal areas, it also causes the animals to graze closer to faecal materials, which inevitably result in the uptake of higher number of infective larvae. Reducing the stocking rate of these animals can significantly reduce the parasites burden of grazing livestock (Hanson and Perry, 1994; Larsson, 2006). Gastrointestinal nematodes and trematodes were almost universally present in animals examined by many workers (Ogunrinade and Adegoke, 1982; Maingi and Gichigi, 1992; Nwosu *et al.,* 1996; Keyyu *et al.,* 2005).

Cattle are a great source of hides, skin and protein, meat and dairy product to man. Their products are also used for other purposes such as medicines, glues, soap and leather. The males are used for pulling large loads or ploughing the soil because of their large size and strength. The dung is a good source of manure and fuel. Cows are often important culturally as a form of currency. Most cattle are not supplied with adequate balanced ration. As a result the general nutritional status of most of the cattle is in subnormal level, which greatly increases susceptibility to parasitic diseases (Blood *et al.,* 1990).

Abattoirs are instruments for the insurance of wholesome meat and meat products as well as providing abattoir by-products for livestock base industries. More importantly, abattoirs are used for the purpose of surveillance against animal and zoonotic diseases.

The importance of abattoir records in analysis of prevalence rate and planning strategy for the control of disease of livestock cannot be overemphasized. The temperature, humidity and rainfall of the study area are also highly favourable for parasites transmission. Therefore, the present study was undertaken in Wudil Local Government Area Abattoir to determine the prevalence and seasonal variation of various gastrointestinal helminth parasitic infections in slaughtered cattle so as to suggest the best possible ways that will help to curtail the worm burden on these animals as well as to keep these records for future studies and research.

MATERIALS AND METHODS

The Study Area

The study was conducted in Wudil, Wudil Local Government Area, Kano State, Nigeria. Wudil is located 43Km South-East from the State capital and is one of the important commercial towns in Kano State. It covers an area extending between latitude 11º37'N and latitude 11º56'N as well as between longitude 8º45'E and 8º57'E and has a population of 105,106 (NPC, 2006). The rainy season lasts from April to September while the dry season begins from October to March (Olofin et al., 2008).

The inhabitants of the area are diverse in occupation ranging from the elite to traders and artisans with majority of its populace using farming as a source of income. Major crop produce are corn, rice, sugar cane, groundnut, vegetables and with some few people engaged in fishing activities, cattle rearing, pottery and traditional hand weaving (Olofin *et al.,* 2008).

Cattle slaughtered in abattoir of Wudil Local Government Area. Kano State, Nigeria formed the study

animals. These animals were transported from the North- eastern parts of Nigeria mainly Sokoto, Bauchi, Yobe and Adamawa States as well as neighboring countries such as Niger, Chad and Cameroon. The study animals were 375 adult cattle comprising 251 males and 124 females.

Sample collection

Visits were done to the abattoir on each day of the sample collection during the study period (January-December) as early as 6:00am when the animals are usually taken to the abattoir. The animals were identified and labelled as male or female.

A total of 375 samples of fresh faecal samples (directly from the rectum of slaughtered cattle, one sample per animal) from cattle were collected using a pair of hand gloves into clean labelled polythene bags. The samples were transferred to Biology Laboratory, Kano University of Science and Technology, Wudil, Nigeria for investigation. Each faecal sample was tested for helminth parasites by formol ether technique (Cheesbrough, 1999; Ballweber, 2001).

Sample examination

The Formol-ether concentration technique was used to analyze the samples. 1 g of stool sample was emulsified with 4 ml of 10% formol saline in a test tube. The mixture was filtered into a test tube using a cloth gauge and 3-4 ml of diethyl ether was added and shaken vigorously and allowed to stand for two minutes. The mixture was then centrifuged at 1000 revolutions per minutes (1000 rpm) for 3 minutes. Using a glass rod, the faecal debris from the side of the tube was loosened and the tube inverted to pour off the supernatants. The tube was returned to its original upright position and the fluid from the side of the tube allowed draining to the bottom.

The deposit was mixed by tapping the tube with the finger and using a Pasteur pipette. A drop of the sediment was applied on a microscope slide; covered with a cover slip and examined under the microscope using ×10 and ×40 objectives (Cheesbrough, 1999; Ballweber, 2001). Lugol's Iodine was also used as a stain. Identification of parasites was done using standard keys of Soulsby (1982).

Statistical Analysis

The proportions obtained in the study were analyzed using Chi-square test in SPSS 19 windows. The level of significance was set at $P<0.05$.

RESULTS

Table 1 shows that of the 375 samples collected from the cattle slaughtered in Wudil abattoir, (34.9%) were infected. The distribution of helminths parasites of slaughtered cattle by gender in the study area is shown in Table 2. The result indicated that male cattle had higher prevalence of gastrointestinal parasitic helminths (24.8%) than their female counterpart (10.8%). There was significant difference in the distribution of helminth parasites by sex ($P<0.05$). *Ascaris lumbricoides* had the highest (15.5%) prevalence followed by *Schistosoma bovis* (8.8%), Haemonchus *contortus* (5.6%), and then *Fasciola gigantica* with prevalence of 5.1% (Table 2). However, the difference in the prevalence of gastrointestinal parasitic helminths species was not significant ($p>0.05$). Figure 1 depicts the seasonal prevalence of gastrointestinal helminths infection of cattle slaughtered in the study area. The results indicated that higher infections (38.8%) were encountered during the rainy season than in the dry season (23.7%) and this was found to be statistically significant ($p<0.05$).

Table 1: Distribution of Helminths parasites of slaughtered cattle by gender in Abattoir Wudil Local Government Area, Kano State, Nigeria

Sex	No. Examined	No (%) infected
Male	251	93 (24.8)
Female	124	38 (10.1)
Total	**375**	**131 (34.9)**

Table 2: Prevalence of gastrointestinal helminths parasite species of slaughtered cattle from Abattoir, Wudil Local Government Area, Kano State, Nigeria

Parasites	No. Detected	% Detected
Nematode	*(79)	*(21.1)
Ascaris lumbricoides	58	15.5
Haemoncus contortus	21	5.6
Trematode	*(52)	*(13.9)
Fasciola gigantica	19	5.1
Schistosoma bovis	33	8.8

*( ) = Not included in total, N= 375

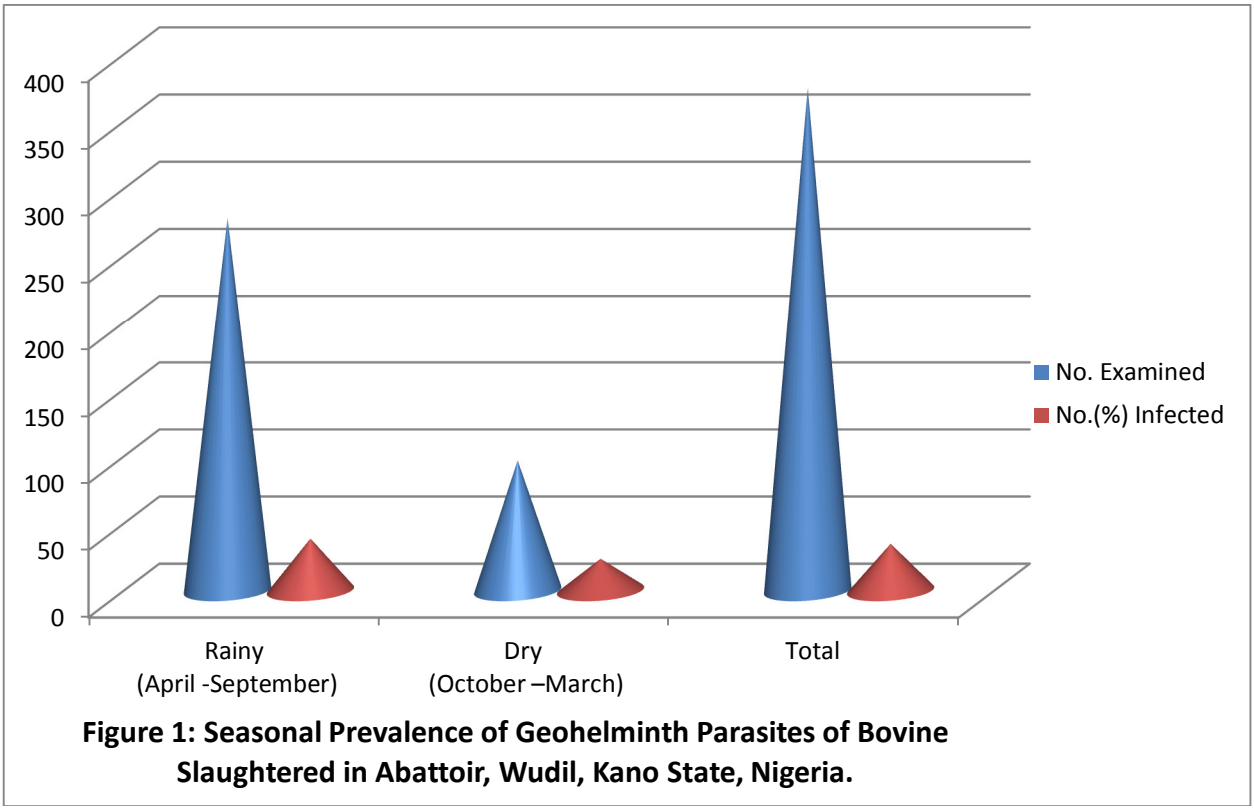

Figure 1: Seasonal Prevalence of Geohelminth Parasites of Bovine Slaughtered in Abattoir, Wudil, Kano State, Nigeria.

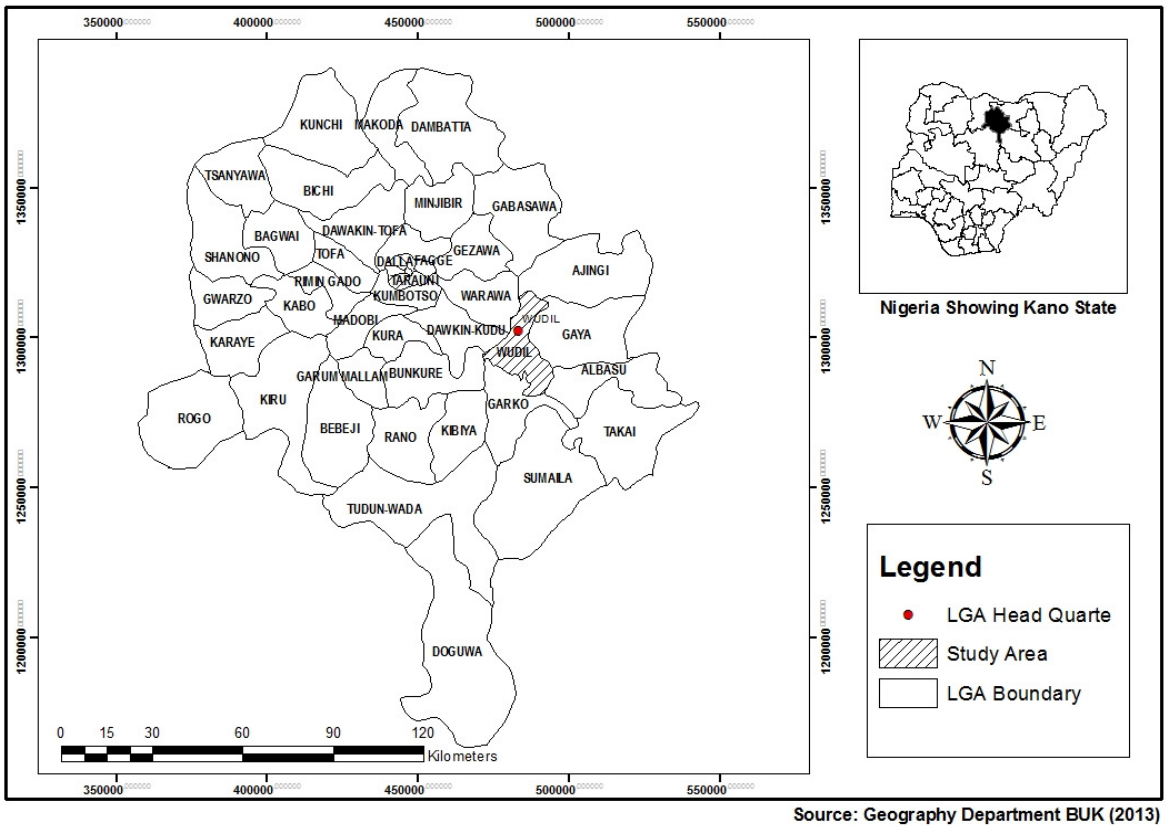

Figure 2: A Map showing the Study Area.

DISCUSSION

The result of the study clearly indicates a relatively high prevalence of gastrointestinal helminths in cattle slaughtered in abattoir, Wudil local Government Area. The study revealed that 34.9% of the sampled animals within the period were infected with various species of parasitic helminths. These results are almost consistent with findings of different researchers elsewhere and in other parts of Nigeria such as in Nyandura district, Kenya (Maingi and Gichigi, 1992); in the semi-arid zone of North-Eastern and South-Eastern Nigeria (Fakae and Chiejina, 1993; Anene *et al.,* 1994; Opara *et al.,* 2005); in the Southern highland of Tanzania (Keyyu *et al.,* 2005; Nwosu *et al*., 2007) and in Umuahia, South Local Government Area, Abia State, Nigeria (Ohaeri, 2012); but lower than the result of Kingsley *et al.* (2013) who found as high as 62.1% prevalence rate of helminthes in Port Harcourt, South-South, Nigeria.

Therefore, the recognition of the health risk placed by the rising incidence of parasitic infections is very essential. This means that the parasites have the ability to find their way in infecting animals. The agricultural practices of the people combined with such factors as ecosystem degradation could aid in creating conditions favourable for the high transmission and sustenance of many diseases, especially parasitic diseases. Some infections occur with multiple genera and these are mostly responsible for the severe disease suffered by the grazing ruminants. Environmental pollution resulting from livestock grazing contributes to sustained transmission, while poor nutrition and other stress factors may be responsible for clinical disease in adult animals.

In Nigeria, livestock industry is faced with many problems such as parasitic diseases which cause great economic loses (Jawara, 1990; Ajayi, 1995). In this study, *Haemonchus contortus,* Ascaris *lumbricoides*, *Fasiola gigantica* and *Schistosoma bovis* were the helminths encountered in all herds and Ascaris infection predominates while *F. gigantica* occurred least probably because the intermediate host might be scarce. However, no eggs of other low prevalence of gastrointestinal helminths were seen. The result suggests that most of the cattle brought for slaughter in Wudil abattoir were infected. The high prevalence of these parasites observed in the present study can have important epidemiological implications because they can serve as source of infection for calves.

In the study area, it was observed that cattle brought for slaughter may be transported direct from the neighboring States such as Yobe and Borno, Bauchi States from North Eastern part of the country as well as neighboring countries such as Niger, Chad and Cameroon by vehicles or by trans-human through nomadic rearers and whichever way cattle share grazing

with wild animals and cross infections of parasites between wild animals and domestic cattle are likely to occur. The dangers of these parasites in animal production are undoubtedly a major problem. These parasites cause great losses in domestic animals, especially sheep, goat and cattle. *Haemonchus contortus* is a bloodsucker and can induce anaemia and oedema. The haemolytic protein that the parasite releases could as well lead to other intestinal disturbances. *H. contortus* is also known to adapt well to even harsh conditions which makes it more difficult to eliminate. The control of helminths and their intermediate hosts is therefore crucial in reducing productivity loss and improve food sufficiency.

The higher prevalence of helminths parasitic infections recorded during the rainy season in this study may be due to high moisture content and temperature which favours the growth and development of larvae on pasture resulting in increased contact between the host and parasites. This finding is in agreement with Bhattacharya and Ahmed (2005), Wadhwa *et al.* (2011) and Ohaeri (2012) who recorded higher incidence of parasitic infection during rainy season.

Control programme is essential even when the infection is low and should be tailored to individual situation by use of drugs at specific times of the year coupled with improved pasture management as well as good knowledge of the epidemiology of the parasite in question, all of which are essential ingredients in integrated parasite control. Further, a novel diagnostic technique to monitor the spread of infection in large areas, there is a need of point of control diagnostics for developing nations (Liu *et al.,* 2011, Cui *et al.,* 2013 and Li *et al.,* 2014). Molecular epidemiological, phylogenetic analysis and mathematical modeling should be carried out at the time of new outbreaks to understand the origin, efficacy of current vaccines and design control strategies (Kumar *et al.,* 2013 and Massaro *et al.,* 2013).

CONCLUSION AND RECOMMENDATIONS

The result obtained in this study clearly suggests that gastrointestinal helminths parasites are prevalent in cattle and possibly in the wild animals as they share grazing. As most of these parasites are known to adapt well even to harsh conditions; elimination is therefore difficult, which threatens food security in this area. As long as these diseased cattle are slaughtered and consumed, the health of individuals is at risk unless there is appropriate meat inspection. These calls for constant chemotherapy to enhance food sufficiency both in quantity and in quality. Regular control measure should be practiced and farmers educated in proper use of antihelminthes.

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