OCCURRENCE OF SOME INTESTINAL HELMINTH PARASITES OF RUMINANTS IN JOS ABATTOIR, PLATEAU STATE, NIGERIA

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Abstract

Ruminant animals (cattle, sheep and goats) carry a lot of parasitic burden due to their grazing nature on contaminated pastures thus, contributing greatly to increase in the morbidity and mortality rates in Africa and Nigeria in particular. This study was carried out to determine the occurrence of intestinal helminthes of some ruminants in Jos abattoir Plateau State, Nigeria. A total of 390 fecal samples were randomly collected from cattle, sheep and goats. The samples were examined using floatation and sedimentation techniques. 250(64.10%) samples were positive with helminthes and 12 parasites belonging to 3 groups of helminthes were recovered. Nematodes: Strongyle spp (43.2%), Trichostrongylus spp (7.6%), Strogyloides spp (6.0%), Toxocaria vitularum (0.8%), Trichurus trichura (0.4%), Cooperia pectinata (0.8%), Oesophagustomum radiatum (2.0%), and Haemonchus contortus (1.6%). Trematodes: Fasciola spp (24%), and Paraphistomum cervi (3.6%). Cestodes: Moniezia expansa (3.2%) and Taenia spp (1.2%). There are cases of mixed infection (5.60%) observed among the animals. Mixed infections occurs among Strongle spp and Fasciola gigantica, Strongyloides papillosus and Paramphistomum cervi as well as Strongle spp and Paramphistomum cervi. The highest prevalence were found in Strongyle spp followed by Fasciola spp. The prevalence of helminthes species among the animals was significant ($p<0.05$), there was no significant ($p>0.05$) difference of infection in males and females as well as the sources of the animals. There was significant ($p<0.05$) difference of infections among the breeds of the animals. The results revealed a high prevalence of intestinal helminthes among the ruminants slaughtered in the abattoir. This calls for intervention from the government, Agricultural extension and veterinary health workers, to educate farmers on the impact of helminthes on livestock production.

Keywords: Helminth Parasites, Ruminants, Abattoir, Jos, Plateau State, Nigeria.

Introduction

Ruminants are farm animals like Cattle, sheep and goats which are the most important prominent domesticated livestock in Nigeria, because of their ability to convert forages, crops and household residues into meat, fiber, skin and milk (FAO, 1985). In Nigeria, there are about 22.1 million sheep, 34.5 million goats and 13.9 million cattle currently being reared by farmers (Lawal-Adebowale, 2012). These animals are mostly managed on free range/extensive system and semi-intensive system, (Lawal- Adebowale, 2012). These management systems though cheap and allows animal to feed on freely available pasture and forages all year round, exposed the livestock to

environmental hazards and poor production performance of the local breeds of ruminants in terms of meat and milk production. (Omoike *et al.,* 2014).

Helminths also commonly known as parasitic worms, are large multicellular organisms, known to be a major constraint to ruminants' well-being and productive performance (Rajput *et al*., 2006). With infected animals having reduced weight gains, reduced growth rate, diarrhea, anorexia, as well as anaemia, (Swai *et al*., 2006). According to Okoli (2003), high incidence of infectious disease constitutes a major impediment to livestock production in most developing countries. Environmental factors such as favourable climate and soil conditions considerably influence development of intestinal helminth on pastures and their capacity to infect and inflict damage to livestock (Gasbarre *et al., 2001*) while diminished nutritional status, compromised immunity and free grazing habits on pastures among the reared livestock increases their susceptibility to infective stages of intestinal helminth (Bamaiyi, 2012). The most important predisposing factors of helminth infections are grazing habits, climate, nutritional deficiency, pasture management, immunological status, presence of intermediate host, and the number of infective larvae and eggs in the environment (Chiejina, 1987). Other factors may incudes: varying susceptibility of the host species, the pathogenecity of the parasites species, the host/ parasite interaction, and the infective dose, (Zahid and Balocch, 2005; FAO, 2000). Intestinal helminth infections of ruminant livestock cause major problems such as high mortality in severe cases in the developing world. These parasites are difficult to manage because in some cases they develop resistance to all available commercial dewormers which has become a concern worldwide (Zajac and Gipson, 2000).

Intestinal helminth parasites are ubiquitous in Africa, both temperate and tropical countries, where climatic and many environmental factors provide near-perfect conditions for their survival and development (Perry *et al.,* 2002). Construction of dams and establishment of irrigation systems have further increased the distribution of these parasites by creating favorable environments for their snail intermediate hosts (Anonymous, 1994).

It is therefore, important to assess the type and level of parasitism in ruminant livestock, in order to be able to determine the significance of parasite infections and to recommend the most beneficial and economically acceptable control measures. This study is therefore carried out to determine the occurrence of some intestinal helminth parasites of cattle, sheep and goats in Jos abattoirs, Plateau State.

MATERIALS AND METHODS

Study design

The study was conducted on Cattle, sheep and goats slaughtered in abattoir in Jos south local government area of Plateau State. Random sampling procedure was used to select the animals. One hundred and thirty (130) Cattle, sheep and goats each were randomly selected.

Sample Size and collections

A total of 390 animals comprises of male and female Cattle, sheep and goats were randomly selected from Jos abattoir for the study**.** Fecal samples were collected directly from the rectum of Cattle, sheep and goats (about 10 grams per animal) into a plastic container, with the help of the veterinary health workers. For each animal, parameters such as the sex, source and breeds were recorded. The collected feces were preserved in 10% formalin and were transported to parasitology laboratory of the National Veterinary Research Institute, (NVRI) Vom for analyses.

Fecal analyses

Flotation technique

Two grams of feces was transferred to a mortar and mixed with 10ml of saturated sodium chloride solution. The mixture was stirred gently until the feces was thoroughly suspended. It was then poured through a tea strainer into a beaker. The excess fluid was gently poured from the debris remaining in the tea strainer. The mixture was immediately poured into a test tube until it produced a convex meniscus. A clean glass slides was placed over the top of each tube and left for 10 minutes, after which they were quickly removed, and cover glass was applied on the slide which was then examined microscopically for parasite eggs, as described by Soulsby (1986).

Sedimentation technique.

Two gram of feces was mixed with 10ml of normal saline solution. After thorough mixing, the suspension was passed through a tea strainer into a beaker and then into a conical flask. The filtered solution was poured into a centrifuge tube and centrifuged for five minutes at 1500 revolution per minute using centrifuge. The supernatant was then poured off leaving behind the sediments. Two drops of the sediment was placed on the microscope slide using a pipette and then covered with cover slip and viewed under a light microscope using low objective (x10) first and then high objective (x40) for identification of the ova/egg of helminthes

Data Management and Analyses

Data obtained were subjected to descriptive statistical analysis using percentages to determine the prevalence of helminthes in different males and females, breeds and sources of the animals examined. The differences in the prevalence of helminthes in relation to males and females, breeds and source were analyzed using chi-square statistical test, Using IBM, SPSS 23.0 software version. The results were considered significant at 95% and $P< 0.05$.

RESULTS

Table 1: Overall Prevalence of Intestinal Helminths Parasites in Cattle, Sheep and Goats in Jos Abattoir, Plateau State.

Animal	Number Examined	Number Infected	% Infection	Chi-square (χ^2) Value	P-value
Cattle	130	88	67.69	138.784	0.000
Sheep	130	84	64.62		
Goats	130	78	60.00		
Total	390	250	64.10		

Table 2: Occurrence of Helminths Parasites Groups in Cattle, Sheep and Goats in Jos Abattoir, Plateau State.

Groups of Helminth Parasites	Number Infected	% Infection
Nematode	156	62.40
Trematode	69	27.60
Cestode	11	4.40
Mixed infection	14	5.60
Total	250	64.10

Table 3: Prevalence of Different Species of Intestinal Helminths in Cattle, Sheep and Goats in Jos Abattoir, Plateau State

Helminths species	Cattle (N = 130) No. (%) infected	Sheep (N =130) No. (%) infected	Goats (N =130) No. (%) infected	Total (N =390) No. (%) infected
Nematodes				
Strongyle spp	23(26.14)	45(53.57)	40(51.28)	108(43.20)
Trichostrongylus axei	0(0.00)	14(16.67)	5(6.41)	19(7.60)
Strongyloides papillosus	0(0.00)	2(2.38)	13(16.67)	15(6.00)
Toxocaria vitularum	2(2.27)	0(0.00)	0(0.00)	2(0.80)
Trichurus trichura	0(0.00)	0(0.00)	1(1.28)	1(0.40)
Cooperia pectinata	2(2.27)	0(0.00)	0(0.00)	2(0.80)
Haemonchus contortus	0(0.00)	4(4.76)	0(0.00)	4(1.60)
Oesophagustomum radiatum	5(5.68)	0(0.00)	0(0.00)	5(2.00)
Trematodes				
Fasciola gigantica	46(52.27)	5(5.95)	9(11.54)	60(24.00)
Paramphistomum cervi	0(0.00)	3(3.57)	6(7.70)	9(3.60)
Cestodes				
Moniezia expansa	2(2.27)	4(4.76)	2(2.56)	8(3.20)
Taenia spp	3(3.41)	0(0.00)	0(0.00)	3(1.20)
Mixed infections.				
Total	88(67.69)	84(64.62)	78(60.00)	250 (64.10)

Table 4: Prevalence of Intestinal Helminth Parasites in Cattle, Sheep and Goats in Relation to Sex in Jos Abattoir, Plateau State.

Parasites Species	Animals examined						Total No (%) Infections	Chi-square (χ^2) Value	P-value
	Cattle (N = 130)		Sheep (N = 130)		Goats (N = 130)				
	Males (N =82)	Females (N =48)	Males (N =59)	Female (N =71)	Males (N =62)	Females (N =68)			
Strongyle spp	12	11	23	22	17	23	108(43.20)	10.727	0.634
Trichostrongylus axei	0	0	6	8	3	2	19(7.60)		
Strongyloides papillosus	0	0	1	1	6	7	15(6.00)		
Fasciola gigantica	30	16	4	1	6	3	60(24.00)		
Oesophagustomum radiatum	3	2	0	0	0	0	5(2.00)		
Paraphistomum cervi	0	0	2	1	4	2	9(3.60)		
Trichurus trichura	0	0	0	0	0	1	1(0.40)		
Moniezia expansa	2	0	0	4	2	0	8(3.20)		
Toxocaria vitularum	1	1	0	0	0	0	2(0.80)		
Cooperia pectinata	1	1	0	0	0	0	2(0.80)		
Taenia spp	2	1	0	0	0	0	3(1.20)		
Haemonchus Contortus	0	0	3	1	0	0	4(1.60)		
Mixed infections.	4	1	3	4	2	0	14(5.60)		
Total (%)	55(67.0)	33(68.5)	42(71.9)	42(59.1)	40(64.2)	38(55.8)	250(64.10)		

Table 5: Prevalence of Intestinal Helminths Parasites in Cattle, Sheep and Goats in Relation to Breeds in Jos Abattoir, Plateau State.

Breed of animals examined / **Species of helminths recovered**	*Strongyle spp*	*Trichostrongylus axei*	*Strongyloides papillosus*	*Fasciola spp*	*Oesophagustomum radiatum*	*Moniezia expansa*	*Toxocaria vitularum*	*Paraphistomum cervi*	*Cooperia pectinata*	*Taenia spp*	*Haemonchus contortus*	*Trichurus trichura*	*Mixed infections.*	**Total No (%) infection**	**Chi-square (χ^2) Value**	**p-value**
Cattle																
White Fulani (**No** =83)	14	0	0	34	2	1	1	0	1	1	0	0	4	58(69.88)	209.680	0.000
Sokoto gudali (**No** =19)	5	0	0	4	0	0	1	0	0	1	0	0	0	11(57.90)		
Muturu (**No** =28)	4	0	0	8	3	1	0	0	1	1	0	0	1	19(67.86)		
Total	23	0	0	46	5	2	2	0	2	3	0	0	5	88(67.69)		
Sheep																
Yankasa (**No** =60)	22	7	1	1	0	1	0	1	0	0	2	0	2	37(61.67)		
Uda (**No** =38)	13	2	1	1	0	1	0	1	0	0	1	0	4	24(63.16)		
WAD (**No**= 32)	10	5	0	3	0	2	0	1	0	0	1	0	1	23(71.88)		
Total	45	14	2	5	0	4	0	3	0	0	4	0	7	84(64.61)		
Goats																
Sahelian (**No** =43)	16	1	4	2	0	0	0	3	0	0	0	0	1	27(62.79)		
Red sokoto (**No** =41)	10	1	7	4	0	1	0	2	0	0	0	1	0	26(63.42)		
WAD (**No** =46)	14	3	2	3	0	1	0	1	0	0	0	0	1	25(54.35)		
Total	40	5	13	9	0	2	0	6	0	0	0	1	2	78(60.00)		

Key: WAD (West African Dwarf)

Table 6: Prevalence of Intestinal Helminth Parasites in Cattle, Sheep and Goats in Relation to the source in Jos Abattoir, Plateau State.

Parasites Specie	Animals Examined						Total (%) infection	Chi-square (χ^2) Value	P-value
	Cattle(N = **130)**		**Sheep** (N = **130)**		**Goats** (N = **130)**				
	Outside (N =50)	Within (N =80)	Outside (N =54)	Within (N =76)	Outside (N = 56)	Within (N =74)			
Strongyle spp	11	12	20	25	19	21	108(43.20)	13.435	0.415
Trichostrongylus spp	0	0	5	9	3	2	19(7.60)		
Strongyloides papillosus	0	0	1	1	5	8	15(6.00)		
Fasciola gigantica	21	25	1	4	6	3	60(24.00)		
Oesophagustomum radiatum	2	3	0	0	0	0	5(2.00)		
Paramphistomum cervi	0	0	2	1	4	2	9(3.60)		
Trichurus trichura	0	0	0	0	0	1	1(0.40)		
Moniezia expansa	0	2	2	2	1	1	8(3.20)		
Toxocaria vitularum	1	1	0	0	0	0	2(0.80)		
Cooperia spp	1	1	0	0	0	0	2(0.80)		
Taenia spp	2	1	0	0	0	0	3(1.20)		
Haemonchus contortus	0	0	1	3	0	0	4(1.60)		
Mixed infections	4	1	3	4	1	1	14(5.60)		
Total (%)	42 (84.00)	46(57.50)	35(64.82)	49(64.47)	39(69.64)	39(52.70)	250(64.10)		

Discussion

The results of this study indicated that ruminants slaughtered in Jos South abattoir were infected with intestinal helminth parasites of Nematodes, Trematodes and Cestoddes species. The high infection observed were attributed to the high moisture content and lower temperature which favour the growth and development of larvae on pasture which in turn favors contact between the host and parasites. High parasitic infection during wet season was reported in some studies (Ohaeri, 2012).

The overall prevalence of intestinal helminth infection in this study was 64.10% among the animals examined. This provides a valuable information on the helminth burden among the ruminants slaughtered in the abattoir. This finding was different from the result obtained by (Showdhury *et al.,*1993) and (Garrel, 1975) who reported 79.9% and 83.7% of helminth infestation in cattle respectively.

The result obtained from this study is however lower than the report of (Yahanna *et al.,* 2012), in Jos south who recorded a prevalence of 94.8%. This might be due to the period or season when the study was carried out. The

overall prevalence of helminth obtained from this study was higher than the prevalence obtained in South western and South Eastern Nigeria by (Adedipo *et al.,* 2014), (Nwigwe *et al.*, 2013) who recorded 41.6% and 50.8% respectively. This differences could be due to the period or seasons in which the studies were conducted, the management system, topography and climatic condition that favors the survival of infective stage of the parasites and the intermediate host as well as the sources of the ruminant sampled in the various region. There is a high probability to find high worm burden in ruminant on overgrazed communal pastures leading to severe diseases and death. (Preston and Leng, 1987).

The result of this study differ from that of (Dawet *et al.,* 2014) and (Ojurongbe, *et al,* 2014) who reported the prevalence of 56.67% and 56.8% respectively in their study in Jos and Ilorin, Nigeria. However, the result is closely similar to the report (61.3%) in Afikpo in Ebonyi State (Ngele and Ibe, 2014), and (Asakwe and Anyigor, 2007) in Ikwo Ebonyi State, Nigeria and (Owhoeli *et al.,* 2011) in Portharcout who reported the prevalence of 65.5% and 68.3% respectively. This could be attributed to the climate condition of the area, management system and the source of the ruminants sampled.

This study shows that cattle has the higher infection rate (67.69%) than the sheep (64.62%) and goats (60.00%). This agreed with the report of (Anosiko *et al.*, 2005) who recorded higher infection rate of 78.3% in cattle, 77.9% in goats and 76.9% in sheep. Also, (Dawet *et al*, 2014) reported higher infection in cattle (71.25%) than in sheep (51.25%) and goat (47.52%) (Edosomwon and Shoyemi, 2012) also observed a high prevalence of 64(47.41%) in cattle than goat 130 (10%) in Benin municipal abattoir. However, the result in this study differs from that of (Maichomo *et al.*, 2004) who reported higher (82%) prevalence in goats followed by Sheep (80%) and cattle (69.2%). This result also differs from that of (Nwosu *et al.*, 2007) who reported 55.8% and 43% in goat and sheep respectively, in North Eastern Nigeria. (Sultan *et al.*, 2010) also reported 51.9% prevalence of helminth infection among sheep slaughtered in Gharbia province in Egypt.

Nematodes were the most common parasites encountered in this study. This agreed with the report of (Dawet *et a.l.,* 2014) who consistently recorded nematodes infection in cattle, Sheep and goats. This result also agreed with the findings of (Ijaz *et al.,* 2008) who reported highest (42.67%) infection rate of nematodes in goats followed by trematodes (16.67%) and cestodes (4%). Similar trends also reported by (Owhoeli *et al.,* 2011) who recorded an overall prevalence of 62%, 25% and 13% for nematodes, trematodes and cestodes respectively in cattle and goats. However, the result varies from the findings of (Sultan *et al.,* 2010) who reported higher cestodes (37.57%) infection.

A total of twelve intestinal helminth parasites were recovered from this study they includes: *Strongyle spp,* Trichostrongylus *spp, Strongyloides papillosus, Fasciola spp, paraphistomum spp, Trichurus trichura, Toxocaria vitularum, Cooperia spp, Taenia spp, Haemonchus contortus, Moniezia expansa* and *Oesophagustomum radiatum.*

The helminthes recovered in this study were similar to those identified by (Edosomwan and Shoyemi, 2012) and (Elele *et al.,* 2013) in their earlier studies in Benin and Portharcourt Nigeria. This similarity in the helminth profile indicates exposure of these animals to common conditions such as climate condition, ecology, contaminated pasture and water, presence of suitable intermediate host which are prevalent in Northern Nigeria where majority of these animals are source from before being transported to different abattoirs in Nigeria.

The prevalence of individual parasites species were generally low among the three groups of animals examined. However, high prevalence were recorded among *Strongyle spp* 108(43.20%) followed by *Fasciola spp* 60(24.00%), *Trichostrongylus spp* 19(7.60%) and *Strongyloides papillosus* 15(6.00%) of the parasites recovered. This agreed with the findings of (Fabiyi, 1973) and (Ojurongbe *et al.,* 2014) who reported nematodes and cestodes as the major causes of morbidity in cattle and other ruminants in Nigeria. The high prevalence of *Fasciola spp* agreed with (Lemy and Egwunyenga, 2017) who reported *Fasciola spp* as the most prevalent in their study in Abraka abattoir, Delta State, Nigeria.

The high prevalence of *Stongyle spp* in this study disagree with the findings of (Dawet *et al.,* 2014) who reported *Haemonchus contortus* as the most prevalence. Also, (Amali *et al.,* 1998) reported *Trichostrongylus axei* as the most commonly encountered nematodes in cattle in Makurdi abattoirs. However, the high prevalence of *Strongyle spp* in this study agreed with the findings of (Olubukola *et al.,* 2014) who reported a high prevalent of *Strongle spp* 260 (65.50%) in cattle slaughtered in Ibadan south west Nigeria.

Furthermore, this study show no significance difference in helminths infection among males and females ruminants at $p>0.05$. One major reason for this is the fact that both the male and the female animals are exposed to poor feeding and climate conditions. Factor accounting for equal susceptibility to helminth infections as observed among the sheep and goats in this study. This result is similar to the finding of (Magaji *et al.,* 2014) who recorded no significant difference between the infection of male and female.

There was significant ($p<0.05$) difference of infections among the breeds of the animals. White Fulani cattle has the highest infection of helminth parasites, 58(69.85%). This agrees with (Pam *et al.,* 2013) who also reported high infection (24.53%) of helmiinth in white Fulani cattle, and least infection (9.43%) in muturu in Jos abattoir. Furthermore, the result of this study shows that there is no significant difference in the source/origin of the animals and the helminth parasites infection ($p>0.05$).

Conclusion

The result from this study shows that ruminants slaughtered in Jos South abattoir were infected with helminth parasites of trematodes 69(27.60%), cestodes 11(4.40%) and nematodes 156(62.40%). The high prevalence of helminth infection in this study suggest poor management system as well as veterinary care in the area and lack of awareness on the effect of helminth parasites in livestock production. This may present a public health problem and an epidemiological implication since they could also be zoonotic. It is therefore recommended that, education of small-holder famers regarding correct ways to improve animal management systems, optimized anthelmintic usage to preserve anthelmintic efficacy and prevent resistance to occur in gastrointestinal helminthes and provision of animal health extension services is highly important to prevent infection. And continued research on the ecology of the intermediate hosts and the free-living stages of helminthes, initiation of breeding programs to select for breeds of ruminants that can resist the effects of parasites and adapt well in the environment, as well as continued research on the relative importance of helminth parasites on productivity of ruminants.

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