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Study on the Prevalence of Fascioliasis on Cattle Slaughtered at Minna Modern Abattoir, Niger State, Nigeria

M. O. Iboyi[1*], P. A. Agada[1] and N. G. Imandeh[1]

[1]Department of Biological Sciences, Federal University of Agriculture, Makurdi, P.M.B. 2373, Benue State, Nigeria.

Authors' contributions

This work was carried out in collaboration between all authors. Author NGI designed the study. Authors MOI and PAA performed the statistical analysis. Author MOI wrote the protocol and wrote the first draft of the manuscript. Authors MOI and PAA managed the analyses of the study. Authors MOI and NIG managed the literature searches. All authors read and approved the final manuscript.

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ABSTRACT

Aims: Fascioliasis is a helminthic disease caused by trematodes of the genus *Fasciola*. This study determined the prevalence of fascioliasis on cattle slaughtered at Minna Modern Abattoir, Tayi village, Bosso Minna, Niger State of Nigeria.
Study Design: A cross sectional study was used to determine the prevalence of fasciolosis.
Place and Duration of Study: Four hundred faecal samples were collected from the rectum of slaughtered cattle between August through November 2016 at Minna Modern Abattoir located at Tayi village, Bosso Minna, Niger State of Nigeria.
Methodology: Faecal samples were examined using concentration by flotation techniques for the presence of *Fasciola* ova.
Results: Out of the 400 sampled examined, 169 (42.0%) were found to be positive with *Fasciola.* Based on breed, Bunaji breed recorded the highest infection rate 123 (44.0%) and Bakologi had the

**Corresponding author: E-mail: iboyi.mo@uam.edu.ng, iboyimark@yahoo.com;*

lowest infection rate 30 (36.0%). Statistical analysis of the data showed a significant difference (P<0.05) in the prevalence of fascioliasis among the three common cattle breeds in the area. The prevalence of Fasciolosis in males was found to be 79(45.0%), while the prevalence in females was 90(40.5%). There was no significant relationship (P > 0.05) between sex of the cattle and prevalence of the infection. Age related prevalence shows that there was a significant difference (P<0.05) in the prevalence of fascioliasis in the different age groups. A higher prevalence 167(45%) was in adult cattle and a lower prevalence 2(8%) was found in young animals. Other parasites such as *Ascaris*, *Haemonchus*, *Bunostomum*, *Coccidia*, were also recorded.

Conclusion: It is recommended that veterinary and health officers should inspect cattle slaughtered in Minna especially at Minna Modern Abattoir before public consumption.

Keywords: Prevalence; Fascioliasis; cattle; slaughtered; Abattoir.

1. INTRODUCTION

Parasitic diseases are one of the main constraints in the expansion of livestock production throughout the world. Fasciolosis also known as, distomatosis and liver rot is a parasitic trematode infection caused by the common liver fluke of the family Fasciolidae [1]. The two important species are *Fasciola hepatica* found in temperate areas and in cooler areas of high altitude in the tropics and subtropics and *Fasciola gigantica*, which predominates in tropical area [2]. It affects humans, but its main host is ruminants such as cattle and sheep [3]. Meat derived from cattle, provides major sources of animal protein for the people of Minna and its environs.

According to [4] Fascioliasis has become a food-borne infection of public health importance in parts of the world such as the Andean Highlands of Bolivia, Ecuador, and Peru; the Nile Delta of Egypt; and Northern Iran. It is an economically important parasitic disease, which migrate in the hepatic parenchyma, and establish and develop in the bile ducts. *Fasciola* species are responsible for wide spread morbidity and mortality in cattle [2]. Important economic losses associated with fascioliasis are great expenses on anthelmintics for treatment; production loss due to mortality; lower production of meat and milk; reduced weight gain; metabolic diseases and impaired fertility [5,6].

The estimation of economic losses due to fascioliasis at national and regional level is limited by lack of accurate estimation of prevalence of the disease [7]. Apart from direct economic losses associated with the disease, other non-quantifiable losses are also experienced. For instance, liver is generally regarded as a delicacy in Nigeria, usually in high demand [8]. This makes condemnation during post-mortem inspection a problem as butchers and meat traders hide their meats from inspectors or even refuse inspection. Others are death of unknown number of animals (including the under-aged) due to acute fascioliasis; indirect losses from the chronic form of the disease e.g. poor feed conversion, weight loss, slow fattening, reduced milk yield, and ultimately death. According to [8] it may also lead to an additional cost of control in terms of medication costs, veterinary fees, and labour costs aimed at reducing parasitism [8].

Fascioliasis is an important worldwide zoonotic helminthic disease. Humans can accidentally ingest the eggs/larvae and become infected [9]. Cases of human fascioliasis are said to be on the increase since the 1980's. Apart from its veterinary and economic importance throughout the world, fascioliasis has recently been shown to be a re-emerging and widespread zoonosis, affecting many people [10].

In Nigeria, Fascioliasis is of great economic importance especially in Northern Nigeria where stagnant water and 'fadamas' are used as watering and grazing sites in the dry season [8]. The prevalence of fascioliasis has been reported from different parts of the country. [11] reported 62 (27.68%) in Sokoto, from slaughtered cattle in Maiduguri, [9] reported a prevalence of 80%, from Zaria, Northwest Nigeria.

Works have been carried from the Northern region of Nigeria but only limited work has been done on fascioliasis of cattle in the study area Minna. The aim of the research is to determine the prevalence of fascioliasis in cattle slaughtered at Minna modern abattoir, so that it can be given the attention it deserves and whether or not to institute control measures of this infectious disease in the area.

2. MATERIALS AND METHODS

2.1 Study Area

The study was carried out in August through November, 2016 in Minna modern abattoir located at Tayi village Bosso, Minna. The study area has a latitude and longitude of 9°35′0.8″N, 6°32′46.74″E and the area is found at an altitude of 259.14 m (850.21 ft). The average annual temperature is 27.5℃. The annual rainfall of the area averages 1229 mm. The least amount of rainfall occurs in January. The average in this month is 1 mm. Most of the precipitation in Minna falls in September, averaging 260 mm. The temperature is highest on average in March, at around 30.5℃. August is the coldest month, with temperature averaging 25.3℃. The variation in the precipitation between the driest and wettest months is 259 mm. Throughout the year, temperature vary by 5.2℃. The main livestock types kept in the area include cattle, sheep, goat, horse, donkey and poultry.

2.2 Study Population

A total of 400 cattle were examined for the presence of Fascioliasis. The study population consisted of 174 male and 226 female indigenous cattle brought to the abattoir for slaughtering purpose. The common breeds of cattle in this area include Bunaji (White Fulani), Bokologi (short-horned) and Rahaji (Red Fulani). Twenty six young and three hundred and seventy four adult cattle were also examined.

2.3 Sample Collection

The faecal samples were collected early hours of the morning from 6am to 7:30am either directly from the rectum of the animals using smooth edge glass rod (i.e. from smaller cattle) or hand gloves were used to collect the samples from the rectum of large cattle and dropped into sterilized sample bottles containing 1ml of formaldehyde for preservation of the ova, and were transported to the laboratory for parasitological examination. Each sample was labeled, carrying the breed, sex and age.

2.4 Parasitological Examination

Faecal samples were examined by flotation techniques for the presence of fasciola eggs [12].

2.4.1 Standard flotation technique

Three grams (3 g) of faecal sample were crushed in the mortal and dissolved in 20 millilitres (ml) of saturated salt solution in a beaker. The obtained faecal solutions were filtered using sieve with minute holes. This was done so as to trap the large particles or debris and was turn into voss bottle and covered with cover slip and allows for 15 minute, the grass slide was averted and covered with slip. It was then mounted and examined under the microscope using objective of 10x to determine the location of eggs (ova) and objective 40x to determine the morphological structure of the ova of the helminthes seen. This method was used continuously for the remaining sample collected [12].

2.5 Statistical Analysis

The recorded raw data were entered into Microsoft excel data base system and analyzed using SPSS version 22 statistical software. Descriptive statistics was computed. Pearson's chi-square (χ^2) was used to evaluate the association between variables (prevalence, sex and age). A 95% confidence interval and P-value less than 0.05 (at 5% level of significance) were considered significant in all analysis.

3. RESULTS

Out of the 400 faecal samples examined 169 (42%) were positive of fascioliasis. The highest prevalence among the three different cattle breeds was in Bunaji breed 123 (44%), followed by Rahaji 35 (38%), and Bokologi breed had the lowest prevalence 11 (36%) [Table 1] (P>0.05).

Table 1. Prevalence of Fascioliasis based on breed

Breed	No. examined	No. positive	Prevalence (%)
Bunaji	277	123	44.00
Bokologi	30	11	36.00
Rahaji	93	35	38.00
Total	400	169	42.00

Table 2 shows the prevalence of fascioliasis in relation to sex of the slaughtered cattle. Male had the highest infection rate 79 (45%) than the female 90 (40%). However there was no significant differences (P=.0000) between the sex of cattle and the prevalence of the infection.

Table 2. Prevalence of Fascioliasis based on sex

Sex	No. examined	No. positive	Prevalence (%)
Male	174	79	45.00
Female	226	90	40.00
Total	400	169	42.00

There was no significant difference (p =0.2636) between the sex of cattle and prevalence of the infection

Age related prevalence of the infection among the cattle slaughtered shows that adult animals had the highest prevalence rate 167 (45%) while the young cattle had the lowest prevalence rate 2 (8%). There was a significant difference (P<0.05) in the prevalence of bovine fascioliasis in different age groups (Table 3).

Table 4 shows co-infection of fascioliasis with other intestinal parasites. The parasites encountered were *Ascaris sp.,* Coccidia, *Haemonchu sp.* Although this was not subjected to statistical analysis.

4. DISCUSSION

The prevalence of fascioliasis among cattle slaughtered in Minna Modern Abattoir revealed an overall prevalence of (42%). The result of this study is in close agreement with the findings of [13] who reported 41.41% prevalence in a study of bovine Fasciolosis in and around Woreta, Northwestern Ethiopia and [9] reported 37.8% prevalence of bovine Fasciolosis at Ibadan Municipal abattoir; this value is higher than the value reported in the present work. The result in this study is not in conformity with the findings of [14] who reported 28.0% in Hadejia northeastern corner of Jigawa State, [15] reported prevalence of Fasciolosis in cattle as 28.6%, [16] reported prevalence of Fasciolosis to be 29.1%, [17] reported prevalence of 20.3%, [11] in Sokoto and [18] in Cario who recorded 27.68% and 28.6% respectively. [19] in Onitsha Abattoir reported prevalence of 10.51%, which is much lower than the value obtained in the present study. The differences among the geographical locations could be attributed mainly due to the variation in the climatic and ecological conditions such as altitude, rainfall and temperature. The ecological condition is favourable for the survival and development of the snail intermediate host for specie of Fasciola [17].

The result obtained from this study is relatively lower than the report of [20] in Jos who recorded a prevalence of 94.8% and [21] who reported 61.3% in Afikpo, Ebonyi state. The low result from this study could be attributed to the fact that the freshwater snail intermediate host of *Fasciola* may not have been in large numbers in the study area and may probably be due to the low numbers of cattle found in the study area when compare to States like Sokoto and Bauchi which are the major homes of cattle.

The prevalence based on breed revealed that the Bunaji breed haboured more of the infection, followed by the Rahaji breed and then Bokologi breed. The result obtained showed that there was a significant difference between the prevalence of fascioliasis among the breeds of the cattle (P<0.05). This is in contrast to the findings of [11] who recorded no significant difference between rates of infection in the breeds sampled.

Fascioliasis is not gender specific disease, rather it occur due exposure of the animal to the contaminated posture. The study further revealed that male cattle were found to harbour more of the infection as compared to the females

Table 3. Prevalence of fascioliasis based on age

Age	No. examined	No. Infected	Prevalence (%)
Young (estimated ≤1year)	26	2	8.00
Adult (estimated > 1 year)	374	167	45.00
Total	400	169	42.00

There was a significant difference (p =.0000) between the age of cattle and prevalence of the infection

Table 4. Co-infections of *Fasciola* with other parasites in cattle

Parasites	No. of co-infections	Percentage (%)
Fasciola +*Ascaris*	8	2.00 %
Fasciola + Coccidia	1	0.25%
Fasciola+ *Haemonchus*	4	1.00%
Fasciola+ *Ascaris* + Coccidia	2	0.50%
Fasciola+ Ascaris + *Haemonchus*	1	0.25%
Total	16	4.00 %

However, the result obtained was not significant (P>0.05). This agrees with the findings of [11] who recorded no significant difference between infection of males and females. The possible reason could be that Fasciolosis is not gender specific since both sexes move along the same grazing path search of food and water. This study also agrees with the report of [22,23] who reported a higher infection rate among the male cattle than the female cattle from Gwagwalada abattoir, Abuja, Nigeria, and Jalingo abattoir, Taraba state, Nigeria, respectively but not consistent with the work of [24,25,26] Who stated that it may be due to the physiological peculiarities of female animals, which usually constitute stress factors thus, reducing their immunity to infections and for being lactating mothers. Females are usually weak and malnourished and consequently are more susceptible to infections besides some other reasons [27].

The age groups used under the present study are 0-1 year for young and >1 year for adult cattle. It was observed that the age group >1 year (adult) recorded higher prevalence while the age group 0-1 year (young) recorded lower prevalence. The result obtained is in conformity with the work of [28,15] who reported in their finding higher prevalence in adult cattle than in young cattle. This contrasted the findings of [29,30] who reported that the higher prevalence was in young animals. Similarly, a higher prevalence rate recorded in adult animals as compared to younger ones is not in agreement with [31,32,33] from different countries of the world. [15] explained that by the fact that younger animals are usually kept in door or around home and are not allowed to go far with adult animals for grazing so that they have reduced chance of exposure to infective posture when compared with adult. The higher prevalence in this study may be attributed to the fact that fewer younger animals were examined in this study. Co-infection of *Ascaris*, *Haemonchus*, Coccidia, with fascioliasis were also recorded.

5. CONCLUSION

The study has clearly demonstrated the presence of fascioliasis in cattle slaughtered in Minna. Fascioliasis is therefore of serious economic importance to livestock industries, especially in Minna where most farmers are still ignorant of the disease. Public enlightenment about the disease should be taken seriously; also animals should be inspected before release for public consumption by appropriate authorities.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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