


Prevalence of fascioliasis in slaughtered cattle in six Area Councils in Federal Capital Territory, Abuja, Nigeria

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Abstract

This study aims to evaluate bovine fascioliasis in cattle slaughtered in abattoirs of Federal Capital Territory (FCT) Abuja. Weekly from May 2022 to April 2023, liver and faecal samples collected from cattle slaughtered at the abattoirs were examined and recovered *Fasciola* preserved in 70% ethanol. The formal ether concentration technique was used for ova detection. Infected livers were further examined for lesions and presence of adult parasite. A total of 584 cattle were sampled and an overall prevalence of 275 (47.00%) was recorded. Out of 584 cattle examined, 294 were males and 290 females with prevalence of 115 (39.00%) in males and 160 (55.00%) in females. Sex related prevalence showed significant relationship ($p < 0.05$). Infection rate was significantly higher in older cattle (≥ 6 years), 36 (70.00%) than younger cows ($p < 0.05$). The highest prevalence was recorded in March, 20 (57.00%) and the least in May, 24 (33.00%). The relationship between season and prevalence of infection was statistically significant ($p < 0.05$). The abattoir, AMAC, 59 (69.00%) had the highest prevalence while Abaji, 8 (32.00%) had the least. The results showed that fascioliasis is still endemic in Abuja, therefore regular inspection and treatment of cows, ranching rather than nomadism and public enlightenment are recommended mitigation measures.

Introduction

Fascioliasis is regarded as one of the parasitic diseases in the world. It affects meat consumption, which is on the increase worldwide to meet protein demands (Odigie and Odigie 2018). Fascioliasis is one of the neglected tropical diseases (NTD), economically important to domestic farm animals, especially sheep and cattle (WHO 2021; CDC 2018). It constitutes an important helminth disease of livestock, domestic and wild ruminants such as cattle, sheep, swine, and occasionally man (WHO 2022). Cattle rearing form a substantial part of agriculture not only because cattle are a rich source of food (blood, meal, milk and meat) but also a source of industrial raw materials (hair, hide and horn). The low productivity of cattle in the tropics was traced to parasitic disease infection and most causes are helminths, especially the genus *Fasciola* (Omoleye *et al* 2021). Losses as a result of the disease are enormous because of cattle mortality, condemned livers from infected slaughtered cattle, reduction in milk and meat production and expensive anti-helminth treatment (Hussain *et al* 2019). The disease is responsible for considerable economic losses in the cattle industry. Fascioliasis is regarded as one of the major setbacks to livestock productivity, incurring huge losses in the country. The liver fluke infection is the major cause of these economic loss around the world (Raza *et al* 2010).

Northern Nigeria always had their fair share of economic loss as a result of fascioliasis and this is often because stationary water and fadama ranches are

constantly employed as watering and grazing location during the dry season, allowing for heavy infections (Magaji *et al* 2014). Hence, the need for effort to increase investigation and inspection for adequate steps in eradication of fascioliasis. This study was therefore, necessary to establish the prevalence of fascioliasis from liver of randomly selected cattle slaughtered in the six Area Councils of the Federal Capital Territory (FCT), Abuja, Nigeria.

Materials and methods

Study area

The study was conducted in the six Area Council central abattoirs of FCT, Abuja, Nigeria. Abuja is the capital city of Nigeria, it is located at the centre of Nigeria within latitude 9° 4' 20.15.04"N and longitude 7° 29' 28. 6872"E.

Study population

Study population comprised of cattle that were reared in the study area and those brought alive for sale from the northern parts of Nigeria and Niger Republic.

Sample collection

The abattoirs were sampled weekly for 12 months (May 2022 to April 2023). The cattle were usually slaughtered between 6:00 and 10:00am. The sexes and age of the cattle were noted before being slaughtered. Gall bladder and faecal samples from cows selected at random were placed in properly labelled specimen bottles containing 70% ethanol. The liver was examined by making lengthwise incision of the ventral side of the bile duct. The specimens

obtained were immediately taken to the laboratory of Department of Biological Sciences, University of Abuja, Abuja, Nigeria.

Examination of liver for adult *Fasciola*

The examination of infected liver was done according to the technique outlined by Iyaji *et al* (2019). The liver was incised with scissors and the adult *Fasciola* species found within the bile were picked using forceps into specimen bottle containing 70% ethanol.

Parasitological analysis of faecal and bile specimen

Microscopic bile examination was done using bile sedimentation method and formal ether concentration method for faecal sample as described by Shinggu *et al* (2019). The bile was mixed thoroughly and allowed to settle after which each 10ml sample was centrifuged and the supernatant decanted; 2ml of the sediment was transferred using dropping pipette to the centre of a clean slide and mounted on a microscope and examined at $\times 10$ objective to identify the parasite egg. Identification of eggs and adult flukes were based on size, colour and standard morphological characteristics as described by the Center for Disease Control (CDC 2018).

Data analysis

Data obtained were entered into Microsoft Excel sheet, version 2013. The percentage prevalence was calculated and chi-square test was used to determine significant differences in prevalence between sexes at $p < 0.05$.

Results

A total number of 584 cattle were examined for *Fasciola* infection and an overall prevalence of 275 (47.00%) was recorded in the period under survey.

Infection rate was significantly lower in male 115 (39.00%) than in female 160 (55.00%) ($\chi^2=0.84, p < 0.05$) as shown in Figure 1.

The age specific rate of infection was observed to increase with increased cattle age. Prevalence was highest 36(70.00%) in cattle ≥ 6 years and least 12(35.70%) in age group 2–3 years. Prevalence increased significantly ($p < 0.05$) with increase in age (Table 1).

The highest infection rate was in March, 20 (57.00%), and the least was recorded in May, 24 (33.00%) (Figure 2). The relationship between infection rate and months of sampling was not significant ($p > 0.05$).

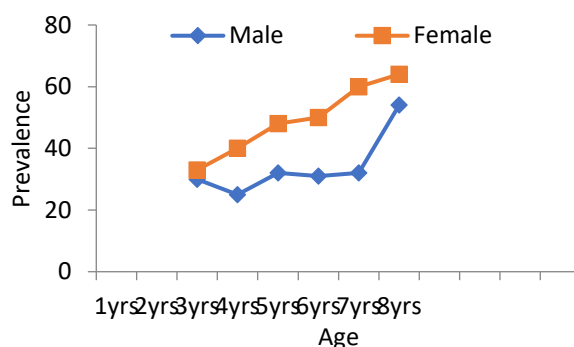


Figure 1. Prevalence of *Fasciola* according to sex

The overall prevalence across the abattoir locations showed highest prevalence in AMAC abattoir 59 (69.00%) while Abaji abattoir, 8 (32.00%) had the least prevalence (Figure 3).

The highest prevalence during the wet season was in June 20 (48.57%), while the highest prevalence in dry season was in March 27 (57.00%). The least prevalence during the wet and dry seasons was in May (12; 33.00%) and November (20; 44.00%), respectively (Figure 4). Seasonal difference in *Fasciola* infection was not significant ($p > 0.05$)

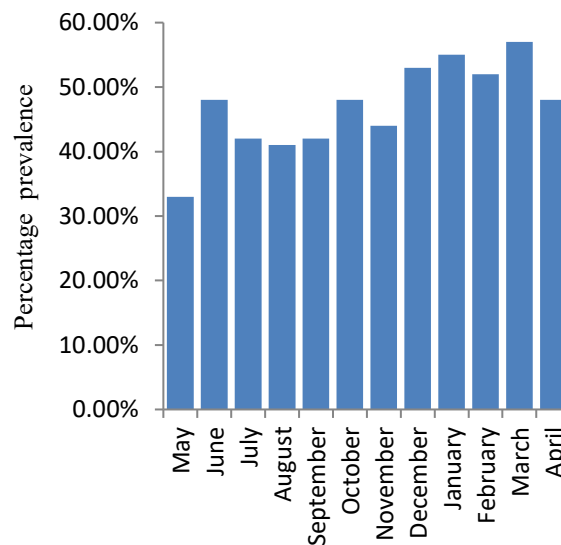


Figure 2. Monthly variation of the prevalence of fascioliasis

Table 2: Age and sex related prevalence of fascioliasis among slaughtered cattle in abattoir of FCT

Gender Age (years)	Male			Female			Total		
	No Examined	No infected	%	No Examined	No. infected	%	No. Examined	No. infected	%
2-3	18	6	33.33	10	4	40	28	10	35.71
3-4	20	8	40.00	23	10	43.48	43	18	41.86
4-5	27	10	37.04	25	14	56.00	52	24	46.15
5-6	32	15	46.88	26	15	57.69	58	30	51.72
6-7	30	15	50.00	30	17	56.67	60	32	53.33
7-8	20	11	55.00	31	25	80.65	51	36	70.59
Total	147	65		145	85		292	150	

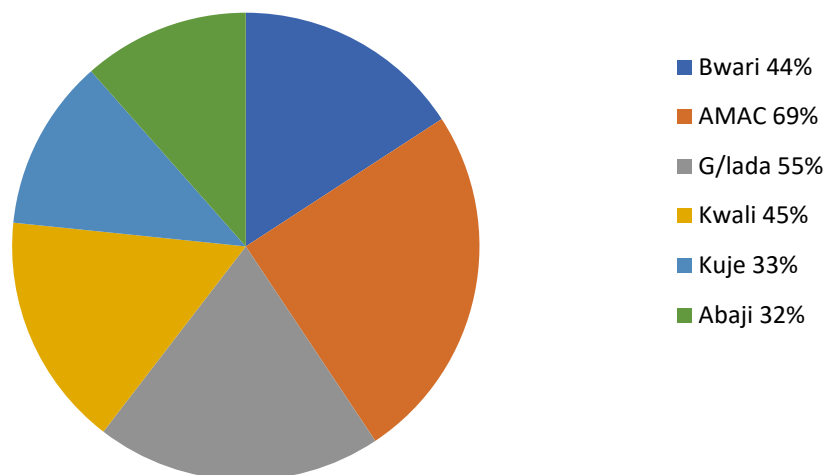


Figure 3. Prevalence of fascioliasis in slaughtered cattle of six abattoirs in FCT

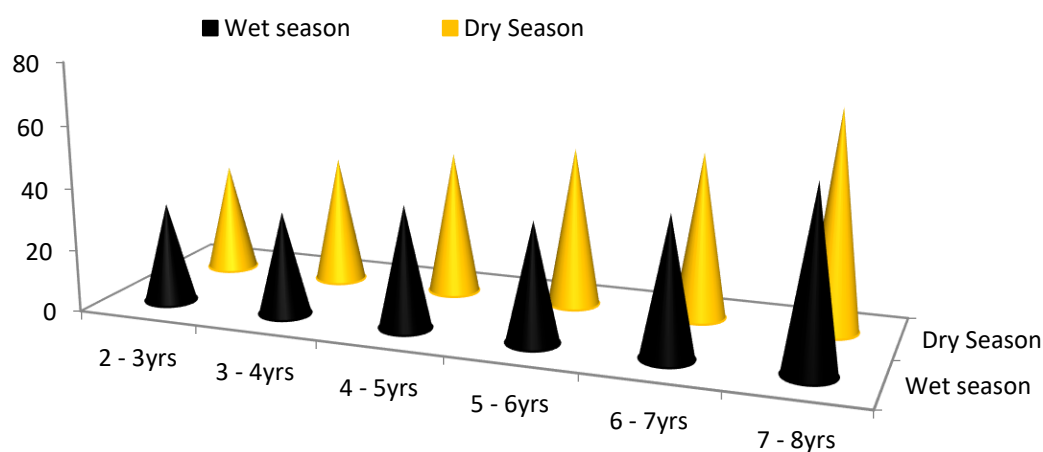


Figure 4. Seasonal variation in prevalence in relation to age of cattle

Discussion

During this study, an overall prevalence of 47.00% was observed in 584 cows slaughtered in FCT abattoirs from May 2022 to April 2023. Aliyu *et al* (2016) reported that the prevalence of fascioliasis in tropical region is usually between 30-90%. The prevalence of 47.00% from this study falls within this range and it is moderate compared to University of Ibadan (56.00%), Akwa Ibom (74.10%), Ibadan (76.00%) and Akure (84.40%) as reported by Yaro *et al* (2022), Oyebamiji *et al* (2021) and Omoleye *et al* (2021). According to Iboyi *et al* (2017) and Iyaji *et al* (2019), moderate prevalence might be due to the low presence of the intermediate freshwater snail host of *Fasciola gigantica* in the locality where cattle are brought from. Moderate prevalence has also been reported in other parts of the world, Turkey (38.80%), Pakistan (37.00%) and Egypt (30.00%) by Bostanci and Oguz (2017), Saira *et al* (2015) and Nagwa and Wafaa (2017).

Studies in Onitsha, southern Nigeria reported prevalence of 10.51% (Ekwunife and Eneanya 2006), which is low compared to the result obtained in this study. This might be due to differences in the pasture grazed and

the prevailing environmental and climate factors in different parts of the country (Iboyi *et al* 2017; Oyebamiji *et al* 2021). Another reason might be differences in resistance to infection i.e. immunity of the host breed (Iyaji *et al* 2019).

There was higher prevalence of infection recorded in dry season 150(51.00%) as compared to wet season 125(43.00%). The higher prevalence during the dry season may be associated with snail vectors around ponds and stagnant water bodies or cercariae contaminated pasture grazed by the cows (Magaji *et al* 2014; Oyebamiji *et al* 2021). The results showed that *Fasciola* infection was statistically non-significant ($p > 0.05$) between seasons in this research.

This study revealed that fascioliasis varied significantly ($p < 0.05$) between sexes and between ages, which contrasts the study on Ibadan abattoir (Oyebamiji *et al* 2021). There was also significant difference in fascioliasis between the Abattoirs ($p < 0.05$). AMAC abattoir had the highest prevalence while Abaji had the least. Differences in fascioliasis between abattoirs have been reported for Kebbi, Katsina and Sokoto states (Bunza *et al* 2019; Magaji *et al* 2014).

Conclusion

This study reveals the prevalence of fascioliasis in the study area, FCT, Abuja to be 47.00%, which shows a moderate but worrisome infection rate. In view of this result, animal health workers and public health workers need to enlighten herders on the importance of treating the animals before and after the dry season. Furthermore, proper management of grazing areas and watering sites is important in the management and eradication of fascioliasis.

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Conflicts of interest

Authors declare no conflict of interest.

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