PREVALENCE OF FASCIOLIASIS AND PARAMPHISTOMIASIS IN CATTLE IN UMUAHIA, ABIA STATE, NIGERIA

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ABSTRACT. A study was conducted to estimate the prevalence of *Fasciola* spp and *Paramphistomum* spp in slaughtered cattle at the abattoir in Umuahia, Abia state with the aim of bringing to fore the public health importance of these trematodes in meat processing facilities. 396 animals were examined for postmortem signs of the trematode infection with 86.36% as the overall prevalence. For *Fasciola*, female animals (54.17%), young animals (74.11%) and animals with poor body condition (54.78%) had the higher prevalence whereas females (42.95%), adults (39.44%) and poor conditioned animals (44.74%) had a higher prevalence of *Paramphistomum* infection. *Fasciola* being a zoonotic helminth and *Paramphistomum* being highly rated as having public health consequence highlighted the hygienic state of the meat which humans are exposed to in developing countries. It is therefore recommended that government look into the state of hygiene of abattoirs and their workers to produce safe and wholesome meat for the consumption of the populace. Regular deworming will also be a good sanitary effort.

Keywords: abattoirs, *Fasciola*, *Paramphistomum*, public health, zoonoses

INTRODUCTION

Poor developing countries around the world have parasitic diseases as a major constraint to animal production (Molomo and Mumba, 2011; Adediran *et al*., 2014). These constraints come in various forms including mortality, morbidity, increased susceptibility to secondary diseases and losses due to high cost of veterinary care and condemnation of carcasses (Rajakaruna and Warnakulasooriya, 2011).

Trematodes, which are among the major causes of parasitic diseases of ruminants with potential zoonotic effects (Yilma and Melsfin, 2000) are not given much attention in international public health compared with other diseases affecting domestic ruminants and humans (Haridy *et al*., 2002). Liver flukes (*Fasciola*) and rumen flukes (*Paramphistomum*) are the most important flukes of ruminants recorded in different parts of the world (Dreyfuss *et al*., 2006; Sultan *et al.,* 2010).

Data gathered on animals slaughtered at abattoirs can be a convenient and inexpensive source of information (Bisimwa *et al*., 2018). Cases of fascioliasis (Onyeabor., 2014; Kalu *et al*., 2015) has previously been reported at the abattoir where this study was

conducted. This study was therefore carried out to check for the presence of helminths in slaughtered cattle in Abia state by post mortem examination.

MATERIALS AND METHOD

The study design

This study was conducted to provide information on the occurrence of fascioliasis and paraphistomiasis in cattle slaughtered at Ubakala abattoir in Umuahia, Abia state. It is where most of the cattle consumed in Umuahia are slaughtered. The animals were selected by systematic random sampling method. This study was conducted between September and November 2017. Visits to the abattoir took place once a week (7:00 a.m. to 10:00 a.m.),

Sample size determination

To calculate the total sample size, the following parameters were used: 95% level of confidence interval (CI), 5% desired level of precision and with the assumption of 50% expected prevalence in the study area. The sample sizes were determined using the formula given in Thrusfield (1995).

$$n = \frac{1.96^2 \times Pexp\ (1\text{-}Pexp)}{d^2}$$

Where n = required sample size,

P_{exp} = expected prevalence,

d^2 = desired absolute precision.

Postmortem examination

Upon inspection of the meat, various organs were eviscerated and the organs thoroughly examined visually. Palpation was followed by transverse incision of the organ to confirm the presence of the parasites (Urquhart *et al.*, 1996). The estimated age by dentition (Pace and Wakeman, 2003), sex and breed were recorded. The recorded data, acquired visually, palpation and incision of organs, was used to extract the prevalence rate of these parasites. Identification of liver and rumen fluke was conducted following the approach of Soulsby (1986).

RESULTS

384 samples were calculated but 396 samples were used for better precision.

Table 1. Prevalence of fascioliasis based on sex, age and body conditions.

Variable		No. of cattle sampled	No. of cattle affected (%)
Sex	Male	84	18 (21.43)
	Female	312	169 (54.17)
Age	Young	112	83 (74.11)
	Adult	284	104 (36.62)
Body condition	Poor	266	146 ((54.89)
	Good	130	41 (29.29)

Table 2. Prevalence of Paramphistomiasis based on sex, age and body conditions.

Variable		No. of cattle sampled	No. of cattle affected (%)
Sex	Male	84	21(28.00)
	Female	312	134 (42.95)
Age	Young	112	43 (38.39)
	Adult	284	112 (39.44)
Body condition	Poor	266	119((44.74)
	Good	130	36 (27.69)

DISCUSSION

The meat was inspected at an abattoir to assure maintenance of public health by ensuring meat safety and protection of animal health and welfare (EFSA, 2009). Fascioliasis and other helminth infections have been reported to be widespread in Nigeria (Adedipe *et al*., 2014; Bunza *et al*., 2008; Elelu *et al*.; 2016; Elkanah *et al*., 2006; Magaji *et al*., 2014). In this study, *Fasciola* and *Paramphistomum* had prevalences of 47.22%and 39.14%, respectively, with an overall prevalence of both at 86.36%. It should be noted that unless no animals were infected with both, it is not right to simply add the percentage of different infection and use the compounding number to reflect high prevalence. This high prevalence gives us valuable information on the state of trematode infection in the region of south-eastern Nigeria since most of the abattoirs in the region obtained their cattle from the same sources.

For *Fasciola*, this result is higher than those reported by Adedipe *et al.* (2014); Aliyu *et al.* (2014); Magaji *et al.* (2014); Ngele and Ibe (2014); Yidnekachew (2015); Elshraway and Mahmoud (2017); Desta and Belete (2017) and Hayider *et al*. (2018) where prevalences were 8.6%, 17.1%, 27.6%, 23.4%, 22.4%, 30.9%, 30.2% and 6.2%, respectively. It was however, lower than reports from Elelu *et al*., (2016) and Khadijat *et al.* (2017) who reported 74.9%, 42.0% and 67.0% prevalence, respectively. The difference seen is likely due to ecological differences and differences in methods used in sample analysis. Most of the work on prevalence used ELISA but this study was based on visual analysis at post mortem, which is the gold standard for fascioliasis (Demirci, 2003).

The prevalence of *Fasciola* in cattle could also be attributed to the type of water supplied to the cattle, namely ponds and lakes, which are good reservoirs for the larvae of *Fasciola* (Bunza *et al*., 2008).

For *Paraphistomum*, the results in this study is higher than that reported by Njoku-Tony and Nwoko (2009); Adedipe *et al.* (2014); Elelu *et al*., (2016); Khadijat *et al.* (2017) and Hayider *et al.* (2018) who reported prevalences as 26.2%, 15.4%, 16.1%, 5% and 5.4%, respectively. It was, however, lower than that of Desta and Belete (2017) who reported a prevalence of 56.8%. The differences observed could be related to the usage of different parasitological techniques,

geographical differences and presence of ecological factors that increased the population of snails as intermediate hosts for the parasite. *Paraphistomum* has a worldwide distribution and is rated as a neglected trematode infection of ruminants and has re-emerged recently as an important cause of lowered productivity.

Infection was more in females than in males with prevalence rates of 54.2% and 42.8% for females, and 21.4% and 28.0% for males, in *Fasciola* and *Paraphistomum,* respectively (Table 1&2). It is a known fact that females have physiological peculiarities which usually constitute stress factors, thus, reducing their immunity to infection and increase susceptibility to disease conditions (Radostits *et al*., 2000).

For body score, it has been shown that with increase in body score, fascioliasis decreases (Hayider *et al*., 2018). In this study, animals with poor body score condition were more susceptible for *Fasciola* and *Paraphistomum* than those with good body condition (Table 1 and Table 2). In Marquardt et *al*., (2000), both trematodes predisposed infected animals to proteinaemia and also feed on tissue plugs, damaging liver parenchyma and the duodenum, leading to depletion of protein in affected animals (Hayider *et al*., 2018).

Based on the age factor, more young animals were infected with *Fasciola* than the adults while more adult animals were infected with *Paraphistomum* than the young. Adult animals travel longer distances to forage and as such, may be exposed to contamination. Whilst young animals may get infected when contaminated pasture is cut and brought to them for feeding. Thus, they can ingest large quantities of contaminated pasture especially those contaminated with *Fasciola* larvae. Fascioliasis has become more relevant in the past decade as a human infection (Mas-Coma *et al*., 2014) causing illness and morbidity, especially in developing countries due to the presence of snail species that transmits the disease (Carrique-Mas and Bryant 2013; Nyindo and Lukambagire, 2015). *Paraphistomum* is an important parasitic disease of livestock which has remarkable direct or indirect effects on the livestock industry (Melaku and Addis, 2012) with immense economic losses.

CONCLUSION

Meat hygiene in developing countries is uncertain due to inconsistent and incorrect techniques during meat inspection and unhealthy practices employed by abattoir workers. These can predispose abattoir workers and meat consumers to pathogens by direct contact with infected or carrier animals, or through the ingestion of contaminated meat products or from other environmental sources. The effects could be mild or could constitute a major threat to public health and food safety with severe economic losses (Denta and Bellete, 2017).

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