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Prevalence of Fascioliasis in Cattle Slaughtered at a Municipal Abattoir in Choba, Port Harcourt, Nigeria

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Abstract

The study was aimed at determining the prevalence and intensity of fascioliasis in cattle slaughtered at the abattoir in Choba Port Harcourt, Rivers State. A total of one hundred and forty-two (142) samples of cattle slaughtered at the abattoir were examined for fascioliasis, by direct microscopy of faeces and bile. Formol-ether concentration technique was used to examine the faecal and bile samples for the eggs of *Fasciola gigantica.* Out of the 142 samples examined, a total of 34 (23.9%) of faecal samples were positive for eggs of *F. gigantic* while a total of 90 (63.4%) of bile samples showed positive for eggs of *F. gigantica*. The data obtained were analyzed using percentage (%) prevalence and chi-square for the significant difference at $p<0.05$ level. Result revealed that the bile samples showed higher positive prevalence than the faecal samples for eggs of *F. Gigantic* and the intensities of eggs of *F. gigantic* were higher in bile samples than in the faecal samples. The study concluded that the high intensities of *F. gigantica* eggs were potential risk factors for direct prevalence in the abattoir. It is recommended that sanitation improvement and health education, treatment of infected animals and destruction of molluscan hosts by the use of molluscicides will help to reduce the spread.

Keywords: Abattoir, formol-ether concentration, bile samples and Port Harcourt

Introduction

Parasitic diseases are considered as the main obstacle in the health and food safety in animal origin and cause economic loss in countries where livestock industry is an important segment of the agricultural products. In considering the economic significance resulting from parasitic diseases, it is important to assess the financial losses estimated at various levels in different locations (Borji et al., 2012).

Bovine fascioliasis is the main public health problem in many areas of the world especially in developing countries where animal husbandry is associated with poor sanitation, poor personal hygiene and poverty (WHO, 2007). Fascioliasis is an economically important disease of domesticated livestock mainly in cattle caused by Trematodes of the genus *Fasciola*, commonly referred to as liver flukes with two (2) species most implicated as the aetiological agents namely *F. hepatica* which is predominant in temperate zones and *F. Gigantic* which is exclusively tropical and predominates in Africa, where it is endemic (FAO, 2009; Chanie and Begashaw, 2012). Fascioliasis in animals is presented in two main forms; acute and chronic. Persistence and degree of infection depends on several factors including the presence of animals in an endemic area rich in water and vegetation; age and general health condition of the animal; the dose of the metacercariae that reached the animal and the frequency of

medication available in relation to the transmission season and animal movement. The acute form of the disease is more commonly seen in sheep and is not usually a feature of fascioliasis in man or other animals. It occurs when very large numbers of metacercariae (>10,000) have been ingested at once. In these cases, the resulting large number of migrating larvae invade the liver causing traumatic hepatitis, frequently might rupture into the peritoneal cavity causing death due to peritonitis. More commonly, on ingestion of fewer metacercariae, a period of fever and eosinophilia is seen. This form of the disease is much more common in all hosts, particularly human. In this case, the infection is only rarely fatal but at least in domesticated animal, is of economic importance (Soliman, 2008). The immature parasite migrates in the hepatic parenchyma, establishes and develops in the bile ducts to adult. Among diseases not often apparent to farmers are liver flukes which are of considerable economic and public health significance and parasites constitute the main variable in livestock production and worm infestation has been found to be the single greatest constraint in the tropics (Ayana et al., 2009).

It is a zoonotic infection and humans become infected by ingesting encysted metacercariae attached to aquatic or semi-aquatic plants, drinking water contaminated with floating metacercariae, ingesting metacercariae attached to the surface of food or kitchen utensils washed with water contaminated with floating metacercariae. Although animals could support enormous worm burdens without developing serious disease, *Fasciola species* could cause severe, even fatal disease in humans. The world Health Organization (WHO) estimated that at least 2.4million people are infected, with more than 180 million at risk of infection (WHO, 2007; Arene, 2010).

In Nigeria, meat derived from cattle, sheep and goats provide the main source of protein for the people and incidentally, ruminants are the definitive host of this parasite. *F. Gigantic* has been implicated in the limitation of the productivity of ruminants hence control or elimination of the parasite will lead to an improvement in the quality of meat protein available to human (Olusengu-Joseph et al., 2011).

Meat is considered as food of choice due to its great nutritional value, an excellent biological valued protein and main source of many nutrients, especially B vitamins, iron and zinc. Cattle are considered the main sources of animal protein for the population of Nigeria, where the human demand for meat is annually increasing. The results of meat inspection at slaughterhouses with appropriate trends indicate possible risks due to unsafe meat obtained from cattle carcasses at the slaughterhouses. Such risks are eliminated by strict veterinary inspection of animals prior to slaughtering. Slaughterhouses provide an excellent opportunity for detecting pathological lesions of both economic and public health importance (Vecerck et al., 2003). Abattoirs are instruments for the insurance of wholesome meat and meat products as well as providing abattoirs by-products for livestock base industries. More importantly, abattoirs are used for the purposes of surveillance against animal and zoonotic diseases with a view to protecting both man and animals from these diseases of livestock cannot be over emphasized, to keep these records for future studies and research (Shitta, 2013).

Recently, losses in terms of reduction in milk and meat production, condemnation of liver, loss of draught power, reproductive failure and mortality were estimated at 3.2 billion dollars per annum and it is now an emerging zoonosis with 2.4 million people infected and 180 million at risk (WHO, 2007; Henok & Mekonnen, 2011; Hossain & Paul, 2011; Arene, 2010). Therefore, it is against this background that thiswork is aimed at evaluating the Prevalence of Fascioliasis in cattle slaughtered at a Port Harcourt Municipal Abattoirs.

Materials and Methods

Port Harcourt City is situated on Bonny River within the Niger Delta, South-south of Nigeria. It lies between latitudes $4^{0}41^{1}$ and $7^{0}10^{1}$N to longitude $7^{0}55^{1}$ E of Greenwich meridians. It is situated some 60km from the open sea which is immediately where the coastal marshes give way to the land of the interior. The metropolitan area covers two Local Government Areas. Port Harcourt City and Obio/Akpor Local Government Areas; it enjoys the tropical monsoon climate characterized by high temperature, low pressure and high relative humidity all year round. It has a mean temperature of about 30ºC/86ºF and a relative humidity of between 80% and 100% and a mean annual rainfall of 2,300m (Mmom, 2003).

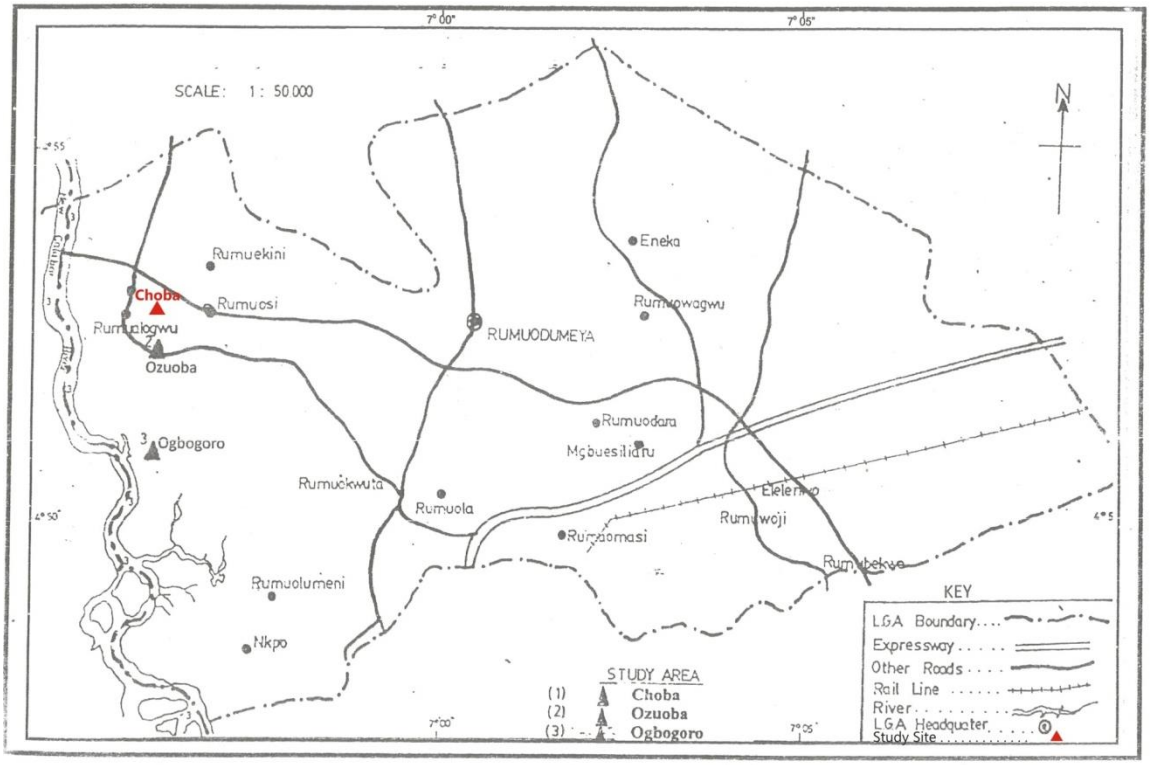

Figure 1: Map showing study site
Source: Obio/Akpor Secretariat

Sample Area
There are many slaughter houses in Obio/Akpor Local Government Area. Many of which are officially recognized by Rivers State Government. One of the officially recognized abattoirs selected for this study is in Choba. The choice of this site is because of its proximity to main market and animals are slaughtered regularly for human consumption. Most of the meats used for suya; pepper soup meats in restaurants and fast-food joints are gotten from these sites.

Sample Collection
Total of 142faecal and bile samples were collected for the study. These samples from abattoirs were collected directly from the rectum of the slaughtered animals using a pair of hand gloves; put in a well labelled clean grease free specimen bottles, numbered and taken to the laboratory for microscopic examination for eggs of *F. gigantica* after an hour. The abattoirs were usually visited in early hours of the day for two weeks (14 days) between February and March, 2014. The sex and sources of each randomly selected cattle was noted and recorded. The cattle were gotten from Sokoto, Maiduguri and Alaokpa in Enugu State. Intact gall bladders (bile) removed

from randomly selected animals in the abattoirs were put into properly labelled polythene bags and transported to the laboratory for examination for the presence of adult flukes. When found, were removed, counted and recorded.

The content of each gall bladder was emptied into well labelled centrifugal tubes and centrifuged at 2000 revolution per minutes (rpm) for 5 minutes. The supernatant was decanted and sediment poured onto clean glass slides covered with cover slip and examined under the low power objectives of microscope. Oval of *F. gigantica* were observed and the intensity recorded.

Laboratory Examination of Samples

Formol-Ether Concentration Technique (Sedimentation Method)

In this method, about 2g of the faeces was thoroughly mixed in a physiological saline. The mixture was passed through a sieve, to remove large debris into a centrifuge tube. About 6ml of 10% formol saline was added to it and mixed to have a homogenous solution; 5 minutes later, 3ml of ether was added to the suspension and the mixture was centrifuged again at 2000 revolutions per minute (rpm) for another 5 minutes. The supernatant was poured off, leaving the sediment. A pipette was used to collect the sediment and placed on a clean grease-free slide, covered with a cover slip. It was then examined under the low power objectives of the microscope.

Identification of the Fluke

With the help of a key from medical parasitology textbook (Arora & Arora, 2007), the species of the parasite was recognized by the characteristics of its eggs, shape, nature of stage in development, appearance of operculum as illustrated by Cheesbrough (2005).

Data Analysis

Data obtained was presented as percentage prevalence (%) and using Chi-square with p-values equal to or less than 0.05 considered significant ($p<0.05$).

RESULTS

Table 1: Percentage prevalence of *F. gigantica* by sex (faecal and bile samples)

Sex	No. examined	Faecal No. infected (%)	Bile No. Infected (%)
Male	136	32 (22.5)	90 (63.4)
Female	6	2 (1.4)	4 (2.8)
Total	142	34 (23.9)	94 (66.2)

Table 2: Percentage prevalence and intensity of parasites (faecal and bile samples)

Parasites	Number examined	Faecal No. Infected (%)	Intensity (%)	Bile No. Infected (%)	Intensity (%)
F. gigantica	142	24 (16.9)	9.60	63 (44.4)	25.20
Paramphistomum sp	142	7 (4.9)	2.80	17 (11.9)	6.80
Mix	142	3 (2.1)	1.20	12 (8.5)	4.80

A total of 142 faecal and bile samples were collected from cattle and examined during the study period out of the total samples examined 32(22.5%) male and 2(1.0%) females were infected with *F. gigantica.* Data revealed that 34(23.9%) of the overall sampled animals were infected with *F. gigantica*.

In bile sample collected from cattle and examined during the study, out of the total samples examined 90 (63.4%) of males were infected with one or more parasites and 4(2.8%) females also had infections of one or more parasites. Bile samples of male and female had 94 (66.2%) positive infection of *F. gigantica* and others.

The intensity of parasites was recorded after the examination of the faecal sample, *F. gigantica* were many, 24 (16.9%) with intensity of 9.60%, *paramphistomum* sp were few, 7 (4.9%) with intensity of 2.80% and others were scanty, 3(2.1%) with intensity of 1.20%. This indicates that the cattle slaughtered at Choba abattoir habour *F. gigantica* and other parasites of public health and economic importance. The result shows a significant difference, $p<0.05$ in this study.

The intensity of parasites as recorded after the examination of the bile sample shows that *F. Gigantic* had highest parasites burden (Moderate to very many) 63(44.4%)with the intensity of 25.20% followed by paramphistomum sp. 17(11.9%) with the intensity of 6.80% (Moderate) and others 12(8.5%) with the intensity of 4.80% (Moderate). This showed that cattle slaughtered at Choba abattoirs habour more parasites in their bile than in their faeces. This shows a significant difference, $p<0.05$.

In comparing the intensities of parasites in faecal samples and that of bile samples, it was observed that the intensity of parasites in the bile samples had more number of parasites (parasite burden is high) than the ones in faecal samples. This is because the bile samples are fluid while faecal samples are unformed. The high intensity indicates endemicity and requires immediate control measures.

Discussion

The study revealed a prevalence of 34(23.9%) for *F. gigantic* in cattle slaughtered at Choba abattoir with faecal sample while the prevalence with the bile samples was higher 90(63.4%) with *F. gigantic* in cattle slaughtered at Choba. Jeno and Lajos (2010) statement supported that prevalence is the proportion of infected hosts among all the hosts examined.

The males had higher prevalence than females. This finding agrees with Shitta (2013) who stated out of the 163 male cattle examined, a higher prevalence of 62(38.04%) was observed when compared to the 60(32.10%) of their female counterpart. This might be as a result of the more number of the cattle slaughtered at the abattoirs being males. The study, within the period did not show any direct prevalence loss; although had high prevalence and high parasites burden in both faecal and bile samples. There is a higher statistical significant difference in the bile samples than in the faecal samples. The study observed two main parasites *Fasciola gigantic* and *paramphistomum sp.* Shitta (2013) confirmed that the *F. gigantica* and its phenotypic characters were useful for diagnosis and veterinary education. This might be because of the presence of permanent, extensive swamps in some areas and seasonal flooding of grazing land and rivers which collectively provide suitable habitats for snails in swampy areas. Moreover, humid, warm conditions in the main cattle-rearing areas are conducive for the survival of the aquatic snails that act as the intermediate hosts for *F. gigantica*. This is supported by work of Gboeloh (2012), who stated that the prevalence of *F. gigantica* was significantly high ($p<0.05$) in, Port Harcourt on the other hand, that the prevalence was higher in female than the male as against the finding of low prevalence in female than in male.

The study showed high intensity of *F. gigantica* in cattle slaughtered at a Port Harcourt municipal abattoir. Higher intensity with the bile samples 92(63.4%) than faecal samples 34 (23.9%). It also showed significant difference ($p<0.05$). The high parasite burden could not show direct prevalence loss in the study. This is in accordance with the works of WHO (2007) which estimated that at least 2.4 million people are infected with more than 180 million at risk of infection yet not really showing direct economic loss. Also, Arene (2010) stated that

animals could support enormous worm burdens without developing serious disease. This might be due to change in location of the animals from the environment of poor hygiene to the place of slaughter with an improvement in environment which reduced the activities of infection only to show potential risk infection.

Conclusion

The prevalence and intensities of *F. gigantica* had been investigated and determined in the cattle slaughtered at a Port Harcourt municipal abattoir. There were also higher intensities of parasites in the bile samples than the faecal samples; this might be due to migration which is an indication of their presence in the bile duct.

Recommendations

1. There should be sanitation improvement by the health workers among the abattoirs to reduce the molluscan host using molluscicides.
2. The veterinary and health officers should ensure that cattle slaughtered in the study area are carefully examined for health diseases before approving cattle for slaughter to reduce *F. Gigantic* infection in the society.
3. The veterinary doctors should ascertain the safety of cow before transporting such cow to a place with more infection.
4. Health officers working in abattoir should not allow the slaughter of infected cattle for human consumption in our society.

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