

Occurrence of Adult *Taenia saginata* in Cattle Slaughtered in Major Abattoirs in Port Harcourt Metropolis, Nigeria

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Abstract—The occurrence of adult *Taenia saginata* in major abattoirs in Port Harcourt metropolis was investigated. Out of 514 cattle investigated, an overall prevalence of 35(6.8%) was recorded. Infected male and female cattle represented 1.2% (6/514) and 5.6% (29/514) of the overall prevalence respectively. There was a statistical significant difference ($P < 0.05$) in prevalence of adult *Taenia saginata* between male and female cattle examined in the study area. Old cattle have a significant ($P < 0.05$) infestation rate than young ones. Adult *Taenia saginata* exists in cattle and still remains a public health concern in the study area. Deliberate effort is needed from stake-holders and the Government to design and implement programs that will lead to the prevention and possible eradication of the parasite.

Keywords— *Taenia saginata*, Adult, Cattle, Occurrence, Port Harcourt.

I. INTRODUCTION

TAENIA SAGINATA, also called beef tapeworm is an obligate endoparasitic worm with a worldwide distribution [1]-[3]. It is, however, prevalence in developing countries especially in Sub-Saharan Africa [4] due to prevailing low sanitary standard and poor animal management practices [5], [6] and the culture of eating raw or inadequately cooked beef [4]. The juvenile (*Cysticercus bovis*) is found in the tissues of cattle, the intermediate host [2], [7], [1] while the adult live in the gastrointestinal tract of man, the definitive host in which it causes taeniasis [5].

The zoonotic and public health importance of *T. saginata* cannot be over emphasized especially in developing countries. Although humans harbouring the adult worms show no symptoms [7], [8] the larvae *Cysticercus bovis* invade the tissues of the brain and spinal cord causing neurocysticercosis and the eye causing ocular lesson [9]-[12]. Humans become infected by eating raw or mealy cooked beef containing the larvae embedded in the tissues of the animal.

Cattle acquire the infection through grazing on pasture laden with human faeces containing eggs of *T. saginata*. The eggs can thrive for a long time on pasture, in the winter and in fresh, brackish and salt water [13] while the larvae remains viable in infected tissues of the cattle for as long as 639 days causing serious pathological damage [14]. It may also be asymptomatic in cattle but may be detected during meat

inspection procedure [12] resulting in the condemnation of many parts.

In Nigeria, meat derived from cattle, sheep and goats provide major source of protein for the people [15], [16] and a major source of animal protein and economic viability among farmers. Hence, a high prevalence of this parasite will have far reaching consequences on both means of revenue for animal farmers and availability of animal protein for the populace.

According to [17], cattle rearing in Nigeria involves a system in which owners of cattle allow their animals, cared for by herds men, to roam for grazing, for a long- period and long distance from owner's area of residence. This system increases the vulnerability of the cattle to eggs of *T. saginata*. [18] reported that about £45.0 Million is lost due to cysticercosis in the United Kingdom annually, in Kenya, about £7 million is lost annually [19]. In Nigeria, [20] recorded that in Akwa Ibom abattoirs alone, an annual loss of N2,842,321.61 or 57 heads of cattle occurred annually. Reference [21] also reported an annual loss of \$3,300.00 in South Africa due to cysticercosis.

It is reported that about 10,000 to 20,000 trucks of cattle are transported to various abattoirs in Nigeria daily, were they are slaughtered for human consumption [22]; hence, it is necessary that public health officials and other veterinary personnel to conduct proper and routine examination of carcasses of slaughtered cattle before presentation for human consumption [20].

Economic loss associated with bovine cysticercosis are as a result of condemnation of carcasses, cost of refrigeration, extra handling and transportation [23], [21] and treatment cost of carcasses, including treatment of infected animals and human being. Lack of awareness of the epidemiology of *T. saginata*, poor hygiene, lack of sanitary facilities and poverty are some of the factors that contributes to the prevalence of cysticercosis [24].

Although the prevalence of taeniasis and cysticercosis among cattle slaughtered in some regions and abattoirs in Nigeria have been studied, none of such studies seems to have been conducted in slaughter houses in Port Harcourt, South-South Nigeria. This study is therefore designed to investigate the occurrence of adult *T. saginata* in cattle slaughtered in major abattoirs in the study area.

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II. MATERIALS AND METHODS

A. Study Area

The study was conducted in Port Harcourt Metropolis. The city is situated on Bonny River within the Niger Delta, South-South of Nigeria. It lies between latitude $4^{\circ}41'$ and latitude $7^{\circ}10'$ to longitude $7^{\circ}55'$ east of Greenwich meridian. It is situated some 60km from the open sea, which is immediately where the coastal marshes give way to the land of the interior [25].

The metropolitan area covers two local government areas, Port Harcourt City and Obio/Akpor Local government Areas. Port Harcourt city is situated within the subequatorial region. 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 $30^{\circ}(86^{\circ}\text{F})$ and a relative humidity of between 80% and 100% and a mean annual rainfall of 2,300mm [26].

Two distinct seasons are experienced in Port Harcourt, the dry season, and the rainy season. The dry season last for five months (November, December, January, February and March) while the rainy season last for seven months (April, May, June, July, August, September and October). However, there is rarely any month of the year without rainfall [27].

B. Collection of Samples

Cattle slaughtered in major abattoirs (Trans-Amadi, Rumuodamaya, Eastern-by-pass and Mile III) in Port Harcourt metropolis were investigated for the presence of adult tapeworm (*T. saginata*). Each abattoir was visited in the morning (6:00AM – 8:00PM) during which the cattle were slaughtered. With the aid of the butchers, the gastrointestinal content of the slaughtered cattle were thoroughly inspected by manual and visual examination. The adult worms seen were collected and preserved in well labeled specimen bottles containing 10% formalin. The specimens (Figs. 1 and 2) were transported to the biology laboratory, Department of Biology, Ignatius Ajuru University of Education, Port Harcourt for further examination and identification. The study was conducted within April and September, 2015.

C. Data Analysis

Data obtained were subjected to statistical analysis using SPSS version 10.0 and variations in prevalence between sexes and age groups were determined using Chi-square (χ^2) at a statistical significance of $p < 0.05$.

TABLE I
OCCURRENCE OF ADULT *T. SAGINATA* IN CATTLE SLAUGHTERED IN MAJOR ABATTOIRS IN PORT HARCOURT METROPOLIS

Abattoir	No. Examined	No. Infected (%)
Trans Amadi	142	12(2.3)
Rumuodamanya	131	11(2.1)
Eastern- by- Pass	120	06(1.2)
Mile III	121	06(1.6)

TABLE II
OCCURRENCE OF ADULT *T. SAGINATA* IN CATTLE SLAUGHTERED IN MAJOR ABATTOIRS IN PORT HARCOURT METROPOLIS IN RELATION TO SEX

Sex	No. Examined	No. Infected (%)
Male	289	6(1.2)
Female	225	29(5.6)
	514	35(6.8)

TABLE III
OCCURRENCE OF ADULT *T. SAGINATA* IN CATTLE SLAUGHTERED IN MAJOR ABATTOIRS IN PORT HARCOURT METROPOLIS IN RELATION TO AGE

Age	No. Examined	No. Infected (%)
Young	109	7(1.4)
Old	405	28(5.4)
	514	35(6.8)



Fig. 1 Adult *T. saginata* (in petric dishes) recovered from cattle



Fig. 2 Samples of adult *T. saginata* recovered from cattle.

III. RESULTS

The results indicated that out of 514 cattle investigated for the presence of adult *T. saginata*, an overall prevalence of 35(6.8%) was recorded (Table I). Infected male and female cattle represented 1.2% (6/514) and 5.6% (29/514) of the overall occurrence respectively (Table II). This shows a significant difference ($P < 0.05$) in prevalence of adult *T. saginata* between male and female cattle examined in the study area. Table III showed that there was a statistically significant ($P < 0.05$) difference in prevalence among cattle of different age group.

IV. DISCUSSION

Several researchers have reported the prevalence of *Cysticercosis bovis* in cattle slaughtered in various abattoirs in Nigeria but it is believed that none reported the prevalence of adult *T. saginata* in slaughtered cattle especially in Port Harcourt, South-South Nigeria. This study revealed an overall prevalence of 6.8% of adult *T. saginata* in cattle slaughtered in the study area. This result is higher than the 3.6% prevalence of bovine cysticercosis recorded by [5] in cattle slaughtered in Addis Ababa municipal abattoirs, Ethiopia. It is also higher than the 4.8% prevalence recorded by [12] in cattle slaughtered at Ibi slaughter house, Taraba state, Nigeria. The overall 6.8% prevalence recorded in this study is equally higher than the 0.7% recorded by [28] in Nsuka urban abattoir, Nigeria, the 2.09% reported by [29] in cattle slaughtered in Uyo, Nigeria, the 3% reported by [30] in cattle slaughtered in Meshkinshar abattoir, Iran and the 5.1% recorded by [24] in Jimma town, Ethiopia. The result is however lower than the 13.3% reported by [31] in cattle slaughtered in Addis Ababa abattoir, 21.7% reported by [32] in animals slaughtered in Nekemte municipal slaughter houses and 26.25% recorded by [33] in cattle slaughtered in Awassa municipal abattoir, all in Ethiopia. It is also lower than the 26.2% reported by [34] in major abattoirs in southeastern Nigeria.

The differences in prevalence may be due to different animal husbandry practices adopted in the various study areas as well as the level of sanitation. The exposure of cattle to eggs of *T. saginata* is largely determined by cattle rearing method and level of sanitation among the populace. It may also be due to climatic variation and control measures adopted in the study areas [35].

In this study, there was statistically significant ($P < 0.05$) difference in prevalence between male and female cattle. More females 29(5.6%) were infected than males 6(1.2%). This result is in agreement with the report of [12], [28], [35], [4] but contrary to the report of [5], [30].

The high prevalence recorded in female as against the male may be due to hormonal fluctuation in female especially during pregnancy which predisposes females to infection [12]. Again, female cattle are left in the breed for a relatively long period to enhance reproduction, and are presented for slaughter at an older age than males [35]. This practice increases their chances of contracting the infection [35], [12], [36].

In this study, a significantly high prevalence was observed in old cattle (5.4%) than in young ones (1.4). This result agreed with the observation of [37] who recorded 6.77% and 2.24% prevalence in old and young cattle respectively among cattle in Debreberhan City, Ethiopia. However, the result is contrary to the record of [38] who reported 5.6% and 4.05% prevalence in young and old cattle respectively in Kenya and [39] who recorded no significance difference in prevalence of *T. saginata* in age group of cattle slaughtered in Metabeleland provinces of Zimbabwe.

The observation made in this study may be partly attributed to sample size as less number of young cattle were slaughtered compared to the number of old animals slaughtered. It could

also be attributed to the age dependent immunity and repeated infestation [40]-[42].

V. CONCLUSION

The study confirms the existence of adult *T. saginata* in cattle slaughtered in the study area, and proved that the parasite remains a public health concern in Nigeria especially in the study area. Therefore, concerted and deliberate effort is needed from stake holders and the government to design programs that will enhance the prevention and possible eradication of this parasite.

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