



## INCIDENCE OF BOVINE CYSTICERCOSIS IN KANO STATE, NORTH-WESTERN, NIGERIA

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### ABSTRACT

*The incidence of infection due to *Cysticercus bovis* in Kano abattoir located in Fagge local government area (LGA) of Kano state, Nigeria was studied. Out of the 11,804 cattle which were examined, 315 (2.67%) were found to be infected. The tongue, cardiac and masseter muscles were the main predilection sites of the cysts. The relative occurrence of the cysts in the organs of infected cattles showed tongue (76%), heart (66%) and masseter (63%) had the highest rate of infestation. There was no significant difference ( $p > 0.05$ ) in the distribution of the cysticerci in the organs of cattle slaughtered at the abattoir. The results also show 205 (0.37%) and 304 (0.55%) head and heart condemnations respectively. This information is considered useful for government authorities to direct control strategies as well as for farmers to take measures tailored to local situations.*

**Keywords:** Incidence, *Cysticercus*, *C. bovis*, Cattle, Kano, Nigeria

### INTRODUCTION

Bovine cysticercosis is caused by the larval stage of the beef tapeworm *Taenia saginata*. Humans are the final hosts of the parasite (Nigatu, 2008). *Cysticercus bovis* is the larval stage of *T. saginata* of the small intestine of humans and as larvae or cysts (*C. bovis*) man acquires infection only by eating poorly cooked or raw beef (Cheruiyot and Onyango-Abuje, 1984). In man the disease is called Taeniasis and is characterized by weakness, nausea, headache, increased appetite, weight loss, abdominal pain, intestinal obstruction, nervous syndromes and epilepsy (Gracey *et al.*, 1999; Ofukwu *et al.*, 2009).

In cattle, the presence of cysticerci in the tissue could cause muscular stiffness, wasting, nervous symptoms and loss of conditions leading to downgrading and condemnation of the affected carcasses (Onyangu- Abuje *et al.*, 1996; Ofokwu *et al.*, 2009). The life cycle and transmission of *T. saginata* occurs most commonly in environments characterized by poor sanitation, poor livestock husbandry practices and inadequate meat inspection and control. The beef tapeworm is found almost all over the world. In sub-Saharan Africa, It causes an important economic loss due to condemnation of meat (Cabaret *et al.*, 2002).

In Africa, inadequate health education and scarcity of Taenicides are the major obstacles for the control of the disease (Nigatu, 2008). In many countries, this disease constitutes a serious but sometimes less recognized public health problem (Minozzo *et al.*, 2002).

Cysticercosis infestation is an important zoonosis in the African continent where the incidence is high in comparison to other parts of the world. Urquhart (1961) listed Nigeria as one of the countries in Africa which has cysticercosis incidence greater than 10%. Epidemiological data on the prevalence of porcine cysticercosis was however

Lacking in Kano. This is primarily due to social and religious reasons. Logistic regression revealed the following 5 factors as being positively associated with occurrence of bovine cysticercosis, the presence of railway line or a car park close to areas grazed by cattle, leisure activities around the areas, use of purchased roughage and organized public activities on farms attracting visitors (Flutch *et al.*, 2008). The objective of this investigation therefore, was to determine the incidence of bovine cysticercosis in slaughtered animals in the Kano abattoir.

### MATERIALS AND METHODS

Standard veterinary procedure was used to examine 11,804 cattles which were brought to the abattoir. The cattles examined were selected by using systemic random sampling technique at the Kano abattoir located at Fagge local government area of Kano state ( $12^{\circ} 12' N 8^{\circ} 30' E$ ) (Olofin, 1987).

### Examination for cysticercus

Carcasses of these animals were thoroughly inspected both by the author and local meat inspectors, incisions and inspections were done following the methods described by Okafor, 1988.

Internal organs such as heart and occasionally liver were incised and examined for parasitic cysts. In the tongue, after careful palpation, 3 parallel incisions were made underneath the base and extending from the tip to the root and cutting through the substance of the dorsum. Both the outer and inner masseter muscles were examined by slicing the muscle thinly and parallel to the mandible. At least 3 or 4 slices were made on each muscle. After removal of the pericardial sac, the surface of the heart was observed, and then the organ was incised starting from the right side of the base extending to the apex cutting through the septum and five parallel incisions made in the cardiac muscle.

The pillars of the diaphragm and intercostals muscle were incised and examined.

The muscle of the arm (*Musculus triceps brachii*), the large 3-headed muscle occupying the angle formed by the scapular and humerus was examined by making 3 parallel incisions perpendicular to the humerus mid-way between the elbow and shoulder joints. Inspection of the medial muscles of the thigh was performed by making 2 incisions near and parallels to the symphysis pubis and deep enough to cut through the gracilis, sartorius and adductor muscles. The liver was also examined, palpated and incised. The suspected cysts obtained were examined for the presence or absence of scolices and fluid filled vesicle (Tail bladder) for the confirmation of cysticerci cysts. The cysts were then identified as *C. bovis* if there were no hooks on the evaginated scolex (Opara *et al.*, 2006 and Nigatu, 2008).

Under the pressure of time and unfavorable conditions in the abattoir, it was not possible to determine and record the number of apparently viable, dead and necrotic cysticerci; hence only notations indicating the presence or absence of viable cysticerci were examined in each location. The breed, age, colour, sex and origin of animals were not sought for under the pressure of time and unfavorable conditions in the abattoir.

**Data analysis**

**Table 1: Incidence of Bovine cysticercosis encountered during organized meat inspection in the Kano abattoir.**

<b>Incidence rate</b>	<b>Total</b>
Total number of cattle Examined	11,804
Total number of cattle Infected with <i>C. bovis</i>	315
<b>% positive for <i>C. bovis</i></b>	<b>2.67</b>

**Table 2: Distribution of Cysticerci in 315 infected cattle slaughtered at the Kano abattoir**

<b>Location of cysticerci</b>	<b>Number of cattle</b>	<b>Percent(%)</b>
Tongue only	41	13.0
Diaphragm (Including intercostals muscle only)	24	7.6
Heart only	23	7.3
Masseter only	13	4.1
Liver only	1	0.3
Tongue and Masseter	30	9.5
Tongue and Heart	21	6.6
Masseter and Heart	15	4.7
Heart and arm	4	1.3
Tongue, Masseter and Heart	54	17.1
Masseter, Heart and Thigh	4	1.3
Tongue, Masseter and Thigh	3	0.9
Tongue, Heart and Arm	3	0.9
Tongue, Masseter, Heart and Arm	38	12.1
Tongue, Masseter, Heart, Arm and Thigh	26	8.3
Tongue, Masseter, Heart and Thigh	12	3.8
Tongue, Heart, Arm and Thigh	3	0.9

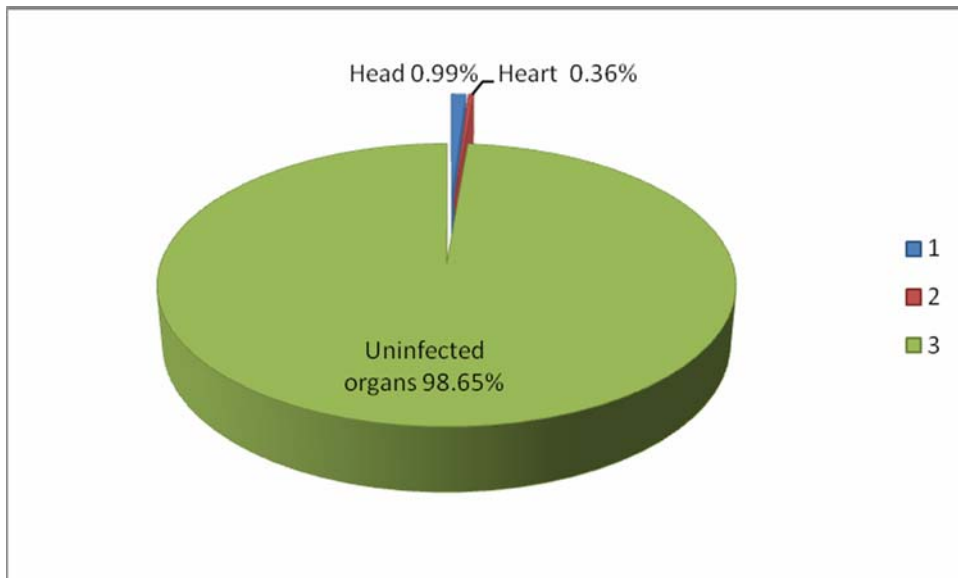
The occurrence of *C. bovis* cyst was calculated by dividing the number of animals harboring a cyst by the total number of animals examined. Data obtained were analyzed statistically using statistical packages for the social science (SPSS) version 10. At (P> 0.05) there was no significant difference in the distribution rates of the cysticerci in the organs of the cattle slaughtered at the abattoir.

**RESULTS**

The study showed that the incidence of *Cysticercus bovis* in cattle was 2.67 % and the infestation was highest in the tongue compared to other organs (Tables 1 and 2). The cysts were found in the tongue (13%), diaphragm (7.6%), heart (7.3%), masseter (4.1%) and liver (0.3%) (Table 2). Table 3, shows the predilection sites of *C. bovis* in 315 infected cattle, where tongue (76%) was mostly infected, followed by the heart (66%), masseter muscle (63%), Muscle of the arm (26%) and muscle of the thigh (18%) which is least infected. Further investigations on condemnation revealed that there was neither carcass nor tongue condemnation due to bovine cysticercosis at the Kano abattoir but 0.37% and 0.55% head and heart were condemned respectively (Figure 1). There was no significant difference (p>0.05) in the distribution rates of the cysticerci in the organs of the cattle slaughtered at the abattoir.

**Table 3: Predilection sites of *C. bovis* for various locations in 315 slaughtered cattle**

Location	Number of cattle	Percent(%)
Tongue	238	76
Heart	208	66
Masseter	198	63
Muscles of arm	81	26
Muscles of thigh	57	18



**Fig. 1: Percentage of organs condemned due to infection with *C. bovis* in Kano.**

**DISCUSSION**

The study revealed the incidence of 2.67 % (Table 1) for *C. bovis* in cattle which is low compared to the natural prevalence of 18 % (Anon, 1975) and 26.2% in Southern Nigeria (Maxwell *et al.*, 2006). But higher than 1% documented in the abattoir records, 1.9% by Dada (1980) and 2% by Dada and Belino (1979). It is also much lower than 0.62% recorded by Ajogi *et al.*, 1995 in Sokoto state abattoirs. The higher incidence rate obtained may be due to the seasonal congregation of cattle herds around contaminated stagnant water sources areas during the period of water scarcity (dry season) leading to high rate of host parasite contact (Ofukwu *et al.*, 2009).

Further findings which revealed that cysticerci are most frequently located in the tongue, heart and masseter appear to confirm earlier reports by Belino (1975). According to Dolman (1957), *C. bovis* tends to concentrate in the heart region, thereby making a deduction that probably 100% of animals containing 4 or more cysts in the heart, masticatory muscles, tongue and diaphragm could have their infection detected by complete examination of the heart alone. This however, does not correlate with the findings in this study where only 66% of the

animals found positive had their infection in the heart, but it compares favorably with the findings of Belino (1975) that detection of the cysts adequately require complete examination of the heart, masticatory muscle and tongue. One probable explanation for the massive infection of the organs is their continued physiological activity and it is believed that these parasites are commonly found in such organs that are constantly in motion (Belino, 1975).

**CONCLUSION**

Investigation on bovine cysticercosis in Kano is a fertile area of scientific investigation. The 2.67% incidence in this investigation is higher than 1.9% and 2.1% in Bauchi zone but lower than 4% found in Kaduna and Zaria (Guinea zone) (Dada, 1980). This could be as a result of improvement in the number of veterinary personnel, actual technique of meat inspection, the recording system and abattoir facilities. This data could be used as a base line for proper evaluation of these parasitic diseases in future coordinated researches as it is believed to be better indication of the rate of infection cattle than obtained from previous abattoir records.

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