

## Research Article

## The Prevalence of *Cysticercus bovis* in Cattle Slaughtered at Lafia Central Abattoir, North-Central, Nigeria

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**Abstract:** A study to investigate the prevalence of *Cysticercus bovis* in cattle slaughtered at Lafia Central abattoir was conducted. A total number of 300 cattle were sampled across breed (White Fulani =291; Sokoto gudali = 9), sex (females = 264; males = 36) and age (< 3 = 147; > 3 years = 153). The kidney, diaphragm, tongue, thigh muscle and heart of each animal was examined for the presence of *Cysticercus bovis*. Out of the 300 cattle examined, 10 (3.30%) were infested with the parasite (*Cysticercus bovis*). Breed distribution showed that White fulani and Sokoto gudali cattle had 3.30% and 0.00% infestation rate respectively. Sex related prevalence rate was 2.7% and 0.70% for females and males respectively. Animals of < 3 years and > 3 years recorded 1.00% and 2.30% incidence of the parasite. The incidence of cysticercosis was only noticed on kidneys (2.0%) and tongues (1.3%) while no parasite was detected on diaphragm, thigh muscle and heart of the animals. The study confirmed the presence *Cysticercosis bovis* in cattle slaughtered at Lafia Central abattoir. White Fulani, males and animals of 3 years and above are mostly affected than Sokoto gudali, females and animals below the age of 3 years in this study area. Kidney and tongue of cattle are the predilection sites compared to other organs. Good animal husbandry practices such as good sanitation as well as proper meat inspection and consumption of well cook cattle meat should be implemented so as to curtail the menace *Cysticercosis bovis*.

**Keywords:** Abattoir, *Cysticercus bovis*, Cattle, Lafia, Prevalence, Slaughter.

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## INTRODUCTION

Bovine Cysticercosis is an infection caused by the larval stage of *Teania Saginata* with Humans been the final hosts of the cestode (Nigatu, 2004). Cysticercosis is an important zoonotic disease in Africa with high reported incidence cases when compared with other continent of the world. The parasite is universally distributed in both developed and developing countries (Abunna *et al.*, 2007). It was estimated that 50 million human cases occurs globally which results to 50, 000 death annually (Clifton and Atlanta, 2010). Mature tapeworm contain large amount of fertile eggs, which are passed in the faeces of infected individuals and under unsanitary condition can contaminate water ways and pasture. Cattle usually get infected after ingestion of the eggs which develop into *Cysticerci*. This can be spotted in the predilection sites such as heart, skeletal muscles, diaphragm and esophagus during post mortem examination. (Cabaret *et al.*, 2002, Kebede, 2008). Other main predilection sites of the cysts include

tongue, masseter muscles, cardiac muscles, triceps muscles and thigh muscles. The cysts of bovine cysticercosis were also identified on the spleen, intercostal muscles, diaphragm and liver (Garedaghi *et al.*, 2011). *Bovine Cysticercosis* is common where hygienic conditions are poor and inhabitants traditionally eat raw or insufficiently cooked or sun-cured meat (Minozzo *et al.*, 2002). Inadequate health education and low availability of Taeniocides are the major obstacles for the control of such infection (Oladele *et al.*, 2004). In cattle, cysticercosis is characterized by muscular stiffness, wasting, nervous symptoms and loss of conditions leading to poor quality carcass and condemnation of the affected organs (Ofokwu *et al.*, 2009). Urquhart (1961) listed Nigeria as one of the countries in Africa which has cysticercosis incidence greater than 10%. 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). The clinical signs in humans are nausea, headache, increased appetite, weight loss, abdominal pain, intestinal obstruction, nervous syndromes and epilepsy (Ofukwu *et al.*, 2009). Minozzo *et al.* (2002) have shown that in many countries, this disease constitutes a serious public health challenges which mostly is seldom recognized. Habarugira *et al.* (2015) posited that socio-economic and environmental factors that contribute to this prevalence of the disease in cattle is explained by absence of public latrines around the roads and markets and by the availability of open grazing pasture that brings cattle together during grazing thereby exposing them to the infection. Rainfall washes large land areas that might have been contaminated with human waste to grazing land thus contaminating the grazing areas. They recommended proper public education on the use of latrines and improved standards of human hygiene. Gracy *et al.* (1999) have shown that the most effective method of diagnosing bovine cysticercosis is by post mortem examination. Meat inspection therefore is the main public health measure for the prevention of the transmission of *Taenia saginata*. The relative public health importance of this parasite especially to humans and cattle has necessitated this study to determine the prevalence of *cysticercus bovis* in cattle slaughtered at Lafia Central abattoir.

## MATERIALS AND METHODS

### Study area

Lafia is located on latitude 8° 35 N, longitude 8° 32 E, altitude 181.53 m above sea level with mean

temperature of 34°C, relative humidity of 40-86 % and average day light of 9-12 h (NIMET, 2009).

### Sample size

A total number of 300 cattle slaughtered during the period of the study were examine before and after slaughter.

### Ante-mortem inspection

Anti-mortem inspection of the animals was conducted prior to slaughter. This is to allow for categorization into different sexes, age and breed. Breed categorization include white Fulani and Sokoto gudali, sexes are male and female while the ages are projected by dentition and were grouped as < 3 years and > 3 years old.

### Post-mortem examination

The method of Habarugira *et al.* (2015) with some modifications was adopted during the inspection of the various organs. Post-mortem examination was done by systematic examination of different parts of the carcasses with the aid of an incision, palpation and visual examinations of the various organs. The different organs examine include kidney, diaphragm, tongue, thigh muscle and heart.

### Statistical analysis

The obtained data for distribution and prevalence rate were analysed using descriptive statistics and chi-square test from SPSS version 23 for windows.

## RESULTS AND DISCUSSIONS

**Table 1:** Distribution of *Cysticercosis bovis* according to breed, sex and age of cattle examined at Lafia abattoir

Parameters	No. examined (%)	No. positive (%)
<b>Breed</b>		
White Fulani	291(97.00)	10 (3.30)
Bokoloji	9(3.00)	0 (0.00)
<b>Total</b>	<b>300 (100)</b>	<b>10 (3.30)</b>
<b>Sex</b>		
Female	264 (88.00)	8 (2.7)
Male	36 (12.00)	2 (0.7)
<b>Total</b>	<b>300 (100)</b>	<b>10 (3.30)</b>
<b>Age</b>		
< 3years	147 (49.00)	3 (1.00)
>3 years	153 (51.00)	7 (2.30)
<b>Total</b>	<b>300 (100)</b>	<b>10 (3.30)</b>

No. = number

Distribution of *Cysticercosis bovis* according to breed, sex and age of cattle examined at Lafia abattoir are presented in Table 1. Out of the 300 cattle

examined, 10 (3.30%) were infested with the parasite (*Cysticercus bovis*).

**Table 2:** Organs of cattle infested according to breed, sex and age

Parameters	Kidney	Diaphragm	Tongue	Thigh Muscle	Heart
Number positive (%)					
<b>Breed</b>					
White Fulani	6 (2.00)	0 (0.00)	4 (1.30)	0 (0.00)	0 (0.00)
Bokoloji	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)
<b>Total</b>	<b>6 (2.00)</b>	<b>0 (0.00)</b>	<b>4 (1.30)</b>	<b>0 (0.00)</b>	<b>0 (0.00)</b>
<b>Sex</b>					
Female	5 (1.70)	0 (0.00)	3 (1.00)	0 (0.00)	0 (0.00)
Male	1 (0.30)	0 (0.00)	1 (0.30)	0 (0.00)	0 (0.00)
<b>Total</b>	<b>6 (2.00)</b>	<b>0 (0.00)</b>	<b>4 (1.30)</b>	<b>0 (0.00)</b>	<b>0 (0.00)</b>
<b>Age</b>					
< 3 year	2 (0.70)	0 (0.00)	1 (0.30)	0 (0.00)	0(0.00)
> 3 years	4 (1.30)	0 (0.00)	3 (1.00)	0 (0.00)	0 (0.00)
<b>Total</b>	<b>6 (2.00)</b>	<b>0 (0.00)</b>	<b>4 (1.30)</b>	<b>0 (0.00)</b>	<b>0 (0.00)</b>

The results in Table 2 shows the organs of cattle infested according breed, sex and age. Prevalence rate was 2.00%, 0.00%, 1.30%, 0.00% and 0.00% for kidney, diaphragm, tongue, thigh muscle and heart respectively.

300 cattle were examined for the presence of the parasite, out of which 10 were infested which represent a prevalence rate of (3.3%). This is higher than the prevalence rate of 2.67% reported by Rabiou and Jegede (2010) in Kano-Nigeria and lower than 5.2% reported by Belay *et al.* (2014) in their study conducted in Ethiopia. The differences in the overall prevalence recorded with the current study might be due to the differences on agro-climatic conditions, number of animal sampled and the origins of animals as shown by Samuel and Berihun (2014). Onyango *et al.* (1996) postulated that cysticercosis generally have low prevalence rate in developed countries, they reported an overall prevalence rate of less than 1% in some developed countries, a value that is over 3 times lower than observed in this study. Maxwell *et al.* (2006) reported a prevalence of 26.2% from their study conducted in southern Nigeria, this is about 8 times higher than the prevalence rate from this study. The present study does not agree with the study of Samuel and Berihun (2014) conducted in Shire central abattoir, Ethiopia who reported a prevalence rate of *Cysticercus Bovis* of 5.2% which is 1.5 times higher than our findings. Breed distribution showed that White Fulani and Sokoto gudali cattle had 3.30% and 0.00% infestation rate respectively. This could be as a result of higher number of White Fulani cattle sampled during the study. Sex related prevalence rate was 2.7% and 0.70% for female and male respectively. This is in contrast to the study of Samuel and Berihun (2014) who recorded higher rate (4.6%) in male than 0.79% in females. The higher prevalence rate in females is in accordance with Beram *et al.* (2009) who reported 2.7% in females and 1.4% in males. This could be due to the fact that females are generally kept in the herd for

breeding, milk production and thus rarely being sent to market (Falake and Ogundipe, 2003). Animals of < 3 years and > 3 years recorded 1.00% and 2.30% incidence of the parasite. This is in agreement with the findings of Beram *et al.* (2009) who reported high incidence (2.7%) in older cattle as against (1.1%) younger cattle. and also the study of Samuel and Berihun (2014) where high prevalence rate was detected in older (1.8%) cattle than the younger (3.8%) age group.

Kidney and tongue from White Fulani cattle breed had 2.00% and 1.30% prevalence rate. While no part of Sokoto Gudali breed of cattle had recorded any infestation. Infestation rate of 1.70% and 1.30% were recorded from kidney and tongues of female animals respectively, while 0.30 and 0.30 were recorded from kidney and tongues of the males respectively. It was observed that kidney (0.70) and tongues (0.30%) of cattle age < 3 years old were lower than the prevalence rate of 1.30% and 1.00% recorded from kidney and tongues of animals of age > 3 years old respectively. The present study disagrees with the study of Demissie (1989) who stated that the parasites are most commonly found in muscles of mastication, particularly masseter muscle, heart and diaphragm.

The incidence of cysticercosis was only noticed on kidney (2.0%) and tongue (1.3%) of the sampled animals which was contrary to the investigation made in Kano-Nigeria by Rabiou and Jegede (2010) who recorded higher prevalence rate of 13%, 7.6% and 7.3% in tongue, diaphragm and heart respectively. The low detection rate of the parasites in other organs may be due to constraint in proper meat inspection and lack of available to inspection facilities. Additionally, organs such as heart and triceps muscles were not allowed to be incise for proper inspection, this could also explain the reason for zero prevalence rate in other organs.

## CONCLUSIONS AND RECOMMENDATIONS

This study confirms the incidence of *Cysticercose Bovis* in cattle slaughtered at Lafia abattoir. It further revealed that White Fulani, males and animals of one year and below are mostly affected than Sokoto gudali, females and animals above 2 years of age in this study area. Based on this study, kidney and tongue of cattle are the preferred predilection sites compared to other organs. Good animal husbandry practices such as good sanitation as well as proper meat inspection and control should be embarked on to curtail the menace of *cysticercosis bovis*. Proper disposal of abattoir waste should be adopted and human population should avoid the consumption of raw or partially cook cattle meat.

## REFERENCE

1. Abunna, F., Tilahun, G., Megersa, B., & Regassa, A. (2007). Taeniasis and its socio-economic implication in Awassa town and its surroundings, southern Ethiopia. *East African Journal of Public Health* 4(2): 73-79.
2. Basem, R. N., Abdo, Amal S.M., Sayed, Asmaa A.A. Hussein, & Mohsen, I. Arafa (2009 ) Occurrence of *Cysticercosis* in cattle and buffaloes and *Taenia saginata* in man in Assiut Governace of Egypt. *Veterinary World*.5(2): 173-176
3. Cabaret, J., Geerts, S., Madeline, M., Ballandonne, C., & Barbier, D. (2002). The Use of Urban Sewage Sludge on Pastures; the *Cysticercosis* Threat. *Vet. Res.* 33:575- 597.
4. Clifton, R.D., & Atlanta, G.A. (2010). Golbal division of parasitic disease malaria center for disease control and prevention.
5. Demissie A (1989) Prevalence and significant of *cysticercus bovis* among cattle slaughtered at Gonder meat factory. *DVM thesis*, Addis Ababa University Debrezeit, Ethiopia
6. Falake, O. O., & Ogundipe, G. A. T. (2003). Some risk factors for *Taenia saginata* *cysticercosis* in a North western state of Nigeria. *Nigeria Veterinary Journal*. 24(3): 65 – 71.
7. Garedaghi, Y., Rezaii, Saber AP., & Saberie, M. (2011). Prevalence of bovine *Cysticercosis* of Slaughtered Cattle in Meshkinshahr Abattoir. *Am. J. Anim. Vet. Sci.* 6(3): 121-124.
8. Gracey, FJ., Collins, DS., & Hiley, RJ. (1999). Meat Hygiene. 10th Edn., *Elsevier Health Sciences*, Harcourt Brace Company London, P. 758.
9. Habarugira, G., Nzeyimana, P., Udahemuka, J. C., Mushonga, B., & Michael, Tukei, M. (2015) Prevalence of bovine *cysticercosis* and age relationship at post-mortem in Nyagatare Slaughterhouse. *World Journal of Agricultural Sciences*. 3(3):29-033.
10. Kebede, N. (2008). *Cysticercosis* of slaughtered cattle in North Western Ethiopia. *Research in Veterinary sci.* 85:523-526.
11. Maxwell, N.O., Ukeme, M.U., IFeanyi, C.O., & Jude, C.A. (2006): *Cysticercosis* of slaughter cattle in Southern Nigeria. *Willey Interscience Journal of the Newyork Academy of Science*. 8:339-346
12. Minozzo, JC., Gusso, RLF., Castro, EA., Lago, O., & Coccol, VT. (2002). Experimental bovine infection with *Taenia saginata* eggs: recovery rates and *cysticerci* location. *Braz. Arch. Biol. Technol.* 45(4): 451-455.
13. Nigatu, K. (2004). *Cysticercus bovis* development and evaluation of serological test and prevalence at Addis Ababa abattoir. Msc thesis. Faculty of veterinary medicine Addis Ababa University, Debre Zeit, Ethiopia.
14. NIMET (2009). Nigerian Metrological Agency, Synoptic Office, Lafia, Nasarawa State, Nigeria.
15. Ofukwu, RA., Akwuobu, CA., & Okwori. (2009). Epidemiology and public health importance of bovine *cysticercosis* in Makurdi, North Central Nigeria. *Tanzania Vet. J.*, 26:37-42.
16. Oladele, O., Garry, M., Brad, S., G., Stanny, G., & Jeff, B. (2004). Bovine *Cysticercosis* Preliminary observation on the immune-histochemical detection of *T. saginata* antigens in lymph nodes of an experimentally infected calf. *The Canadian Veterinary Journal*. 45(10): 852-855.
17. Onyango-Abuje, JA., Hughes, G., Opicha, M., Nginyi, KM., Rugutt, MK., *et al.* (1996). Diagonosis of *Taenia Saginata*, *cycticercosis* in kenyan cattle by antibody and antigen ELISA *Veterinary Parasitology*. 61: 221-230.
18. Rabi’u, B. M, & Jegede, O. C. (2010). Incidence of bovine *cysticercosis* in Kano state, northwestern, Nigeria. *Bayero Journal of Pure and Applied Sciences*, 3(1):100 – 103.
19. Samuel, B., & Berihun, A. M. (2014) Prevalence of *Cysticercus bovis* in Cattle at Municipal Abbatoir of Shire. *Journal of Veterinary Science & Technology* 5(4):1-3.
20. Urquhart, O.M. (1961): Epizootological and Experimental studies on bovine *cysticercosis* in East Africa. *Journal of Parasitology*. 47:857-869.