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## PREVALENCE OF BOVINE CYSTICERCOSIS IN JOS ABATTOIR, NIGERIA

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### ABSTRACT

*The prevalence of Cysticercus bovis at Jos abattoir during post mortem examination conducted on Fourteen thousand three hundred and seventy two (14,372) slaughtered cattle over a period of two years (January 1997 – Dec. 1999), using evagination method. Out of 14,372 carcasses examined 1924 (13.4 %) tested positive for C. bovis. The sites of the location of the larvae varied from one organ to another with the heart having the highest 48 (30.0 %) and the least affected were the visceral organs livers, lungs and esophagi. There is a positive correlation between the number of C. bovis cyst and the percentage frequency of the organ affected (P<0.05).*

**Keywords:** Prevalence, Cattle, *Cysticercus bovis*, Jos abattoir

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### INTRODUCTION

Cysticercosis is a zoonotic disease with the adult worm (*T. saginata*) found in the small intestine of man and the cyst in tissues of cattle (Falake and Ogundele, 2003). The disease in man and cattle are enzootic in Africa with infection rate ranging between 1.0 % and 4.0 % (Belino, 1998; Onah and Chiejina, 1986). Cysticercosis is more important in the livestock industry because of the economic implication of down grading and condemnation of the affected carcasses (Feachem *et al.*, 1983). Berton (1976) reported low cattle production and thus low quantity of beef supply for Northeastern, Nigeria. According to him most of the beef have been condemned during post mortem due to prevalence of taeniads (adult) and cysticerci. As a result of this wastage the recommended 88 grams of animal protein intake per caput per day has not been met, the supply still stands at about 15 grams for developing countries (FAO, 1990). The purpose of the present study was to determine the prevalence rate of cysticercosis in slaughtered cattle at Jos abattoir.

### MATERIALS AND METHODS

**Study Area:** Jos the state capital of Plateau is located in Northern part of the state in Jos North local government area. It is a tropical area with cool and windy climate. The mean ambient temperature ranges between a minimum of 18.7 ° F and maximum of 51.7 ° F. The annual mean rainfall is between 13.75 cm and 146 cm. The Plateau highland stands at an average of 1.2 m above sea level. It lies between latitude 7° N and 11° E.

**Animal:** Animals used in this study and were categorized according to breeds, ages, sexes and sources. There is only one modern abattoir in Jos state capital. On the average about 90 heads of cattle is being slaughtered per day in the modern abattoir and weekly 630 cattle were being slaughtered. Daily sample size was 75 animals and twice weekly was 150 animals. The size of the cattle slaughtered were averagely 250 kg per head i.e. equivalent to about 5

bags of cement. Their ages ranged from 2 years and to about 8years, generally, male animals were mostly slaughtered and breeds were mainly white Fulani, red Bororo and Sokoto gudali.

The post mortem meat inspection was performed by a team of veterinary surgeons and meat technologies. It was carried out via visual inspection, palpation and incision throughout the muscles of the arm, thigh, masseter, heart and internal organs of the carcasses (lungs, livers and tongues).

On incision, cyst found were excised and placed in sample bottles and classified either as viable, dead and necrotic cyst. Viability of the cyst was determined by fluid translucency with visible white scoleces and dead cyst as bluish-green caseous masses, necrotic cyst seen as dark patches (Thornton and Gracey, 1976).

**Parasitological Examination:** Viable cysts were placed in a Petri dishes containing normal saline, 30% of bovine bile was added and incubated at 37°C for two hours. The evaginated scoleces were each examined for absence or presence of hooks and suckers thus confirming *C. bovis* as described (Falake and Ogundipe, 2003).

**Data Analysis:** The data in the study was analyzed using mean average and percentage frequency to know if, relationship exists between the age, sex, breed of the cattle and the prevalence of organ infestation by *C. bovis*. Prevalence is determined by the number infested by the total number of animals examined. Monthly distribution of *C. bovis* was determined by the frequency of occurrence of *C. bovis* over the carcasses examined. Not the sex, age, and breed of the distribution of *C. bovis* but those of the cattle studied.

### RESULTS

A total of eighty six thousand four hundred cattle were slaughtered during the period under study.

Table 1 showed the distribution of the cattle slaughtered according to their source of supply and breeds of animals (from Jan. 1997 – Dec. 1999).

**Table 1: Distribution of cattle slaughtered according to sources and breeds in Jos modern abattoir (1997 – 1999)**

Sources	Breeds			Total
	WF	RB	SG	
Bauchi	5700	550	5100	16,300
Benue	4900	6000	6700	17,600
Kaduna	5800	5900	5900	17,600
Nasarawa	6,300	4000	6,300	16,600
Plateau	6,500	7000	4800	18300
<b>Total</b>	<b>29,200</b>	<b>28,400</b>	<b>28,800</b>	<b>86,400</b>
<b>Mean</b>	<b>5,480</b>	<b>5680</b>	<b>5760</b>	<b>17,280.</b>

The mean prevalence rate of bovine cysticercosis at the slaughter in Jos modern abattoir (as represented in Table 2), over a period of twenty four months (Jan. 1997 – Dec. 1999) revealed 2.25 % of the total fourteen thousand three hundred and seventy two examined cattle, from Jan. 1997 – Dec. 1999, with a prevalence rate of 13.4 % (1924) positive to bovis cyst.

**Table 2: Mean prevalence of bovine cysticercosis in Jos modern abattoir (1997 – 1999)**

Year	No. cattle slaughtered	No. infected	Percentage (%)
1997	32,400	644	1.988
1998	28,800	641	2.225
1999	25,200	639	6.749
<b>Total</b>	<b>86,400</b>	<b>1924</b>	<b>6.749</b>
<b>Annual mean</b>	<b>28,800</b>	<b>641.3</b>	<b>2.250</b>

The age and sex distribution of the slaughtered cattle infected with *C. bovis* in Jos modern abattoir as shown in Table 3.

**Table 3: Age and sex distribution of cattle slaughtered in Jos modern abattoir infected with *C. bovis***

Age (years)	Sex (% Frequency)		Total
	Males	Females	
< 2	50 (67.6)	24 (32.4)	74
2.5 – 4.5	250 (62.5)	150 (37.5)	400
> 5	1130 (77.9)	320 (22.1)	1450
<b>Total</b>	<b>1430 (74.3)</b>	<b>494 (25.7)</b>	<b>1924</b>

Generally males cattle greater than five years of age constituted the larger number of the slaughter rate and also were mostly infected than the young females' animals. The frequency and type of *C. bovis* obtained during meat inspection is presented in Table 4. Apparently viable cyst 72.5 % was most frequently recovered than the nonviable cyst. The frequency of distribution and occurrence of cyst in different organs of the carcasses. These were a positive correlation between the organs of infestation and the percentage infestation ( $P < 0.05$ ). Generally musculatures of the heart and tongue are more infected than the visceral organs (lungs, livers, esophagi etc).

After post mortem of the slaughtered cattle 1400 (72.80 %) viable, 500 dead (26.0 %) and 24 necrotic cyst (1.20 %) were recovered, there was significant difference between viable and non viable cyst ( $P < 0.05$ ). There was a positive relationship between the organ of the infestation and percentage infested (%).

**Table 4: The frequency and type of *C. bovis* obtained during the meat inspection in Jos abattoir**

Type of cysticerci	Number	% frequency of cysticerci recovered
Apparently viable	1400	72.8
Dead	500	26.0
Necrotic	24	1.20
<b>Total</b>	<b>1924</b>	<b>13.4</b>

**Table 5: The frequency and occurrence of cyst in different organs/ part of the carcasses**

Location of cyst	No. infested (X)	% infested (Y)
Heart	48	30.0
Tongue	40	25.0
Masseter	28	17.5
Muscles of the arm	16	10.0
Muscles of the thigh	8	5.0
Diaphragmatic pillars	8	5.0
Livers	4	2.5
Lungs	4	2.5
Esophagi	4	2.5
<b>Total</b>	<b>160</b>	<b>100</b>

## DISCUSSION

The prevalence rate of 13.4% (1924) of the *Cysticercus bovis* in cattle slaughtered in Jos modern abattoir is of public health significance in Nigeria where gross inadequacy of ethical slaughters, meat inspection procedures and facilities exist of *C. bovis*, the consumer is undoubtedly exposed to the risk of infestation. The prevalence is lower than that reported by Belino (1980) as 16.0% in Northern Nigeria. The decrease in the rates could be due to possible an increase in sanitary measures in Jos abattoir. Also the results were higher than Ajogi *et al.* (1995). This might be attributed to the inefficiency and lack of integrity by meat inspectors. It is still lower than that recorded by Dada and Belino (1990) in Sokoto with a prevalence rate of 11.1%. The possible reason for the difference in the prevalence could be due to improved hygienic and sanitary measures in Sokoto abattoir as compared to Jos. The age and the sex distribution of the slaughtered cattle with *C. bovis* showed that aged male cattle were more affected than the females ( $P < 0.05$ ). 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). Most of the times older males are being culled because younger ones are kept to serve as herd replacement stock. Post mortem examination revealed 1400 (72.8%) viable cyst as compared to others.

There was significant difference between number of viable and non viable cysts ( $P < 0.05$ ). The frequency and occurrence of the cyst showed that the heart was most infected and there was significant difference ( $P < 0.05$ ) as compared with other organs. Also Belino (1980) reported that muscle had been mostly affected but heart had higher infection. The presence of viable cysts in all infected carcasses examined suggested a serious threat to the beef consumers who are at risk of contracting the disease. The average internal temperature of roasted meat locally called "suya" is  $45.5^{\circ}\text{C}$  as reported by Falake and Ogundipe (2003). This implies that the heat is not enough to destroy the cysts in infected muscles and hence will constitute a source of human infection. The control measures to curtail zoonosis through the consumption of contaminated beef from infected animals by the public (meat handlers, processors and inspectors among others), must be enforced. *C. bovis* infestation might lead to death of both livestock and humans so must be ethically controlled in all abattoirs and slaughter slabs. This will lead to reduction in cattle death, carcass condemnation and higher protein availability for the teeming populace. In conclusion, the overall prevalence rate was lower than earlier studies which suggested an increase awareness of the public that has lead to improvement in personal hygiene, medical health of the animals, proper sewage disposal and better health care of animals. However, proper cooking of meat before consumption and improved environmental and personal hygiene will go along way in reducing and or eliminating bovine cysticercosis.

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