

# Prevalence, organ distribution, viability and socioeconomic implication of bovine cysticercosis/teniasis, Ethiopia

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## Keywords

Cattle – *Taenia saginata* – *Cysticercus bovis* – Cysticercosis – Abattoir – Morbidity – Ethiopia.

## Summary

A cross-sectional study was conducted from November 2009 to March 2011 to determine the prevalence of cysticercosis/teniasis and to estimate the treatment cost of the disease in Yirgalem, Ethiopia. Abattoir findings, a questionnaire survey and inventories of pharmaceutical shops were used in the study. Of the 400 inspected animals, 48 (12%) had varying numbers of *Cysticercus bovis*. The anatomical distribution of the cysts showed that the highest proportions of *C. bovis* cysts were in the tongue, followed by the masseter muscle, liver, shoulder and heart. Of a total of 190 *C. bovis* collected during meat inspection, 89 (46.84%) were alive. Viability tests revealed that the tongue harbored the highest number of viable cysts (63.16%), followed by the masseter (44.23%), the liver (41.38%), and the heart (40%). Of the 170 interviewed respondents, 119 (70%) had contracted a *Taenia saginata* infection, and among them 85% reported using modern drugs, whereas the rest (15%) used traditional drugs. The majority of the respondents consumed raw meat as part of traditional or religious practices. Human teniasis prevalence showed significant differences ( $p < 0.05$ ) in relation to sex, religion, occupational risk, marital status and raw meat consumption. Thus, men ( $p = 0.001$ ), Christians ( $p < 0.001$ ), occupationally high-risk groups ( $p < 0.001$ ), married persons ( $p = 0.016$ ) and raw meat consumers ( $p < 0.001$ ) were at higher risk of being affected by teniasis than women, Muslims, occupationally low-risk groups, unmarried persons and cooked-meat consumers, respectively. In this analysis, no statistically significant difference was observed in relation to the age and educational background ( $p > 0.05$ ). An inventory of pharmaceutical shops revealed the purchase of 472,013 adult teniacidal drug doses for a cost of 1,416,039 Ethiopian Birrs (about 88,500 USD) during a five-year period (2005 to 2009). Mebendazole and niclosamide were the most frequently drugs sold for teniasis treatment, whereas praziquantel was the least sold one. In conclusion, the study revealed a high prevalence of *T. saginata* metacestodes in the organs at the abattoir, and highlighted the deeply rooted tradition of raw meat consumption. Authorities should focus on this disease to preserve public health and consequently promote the beef industry in the country.

## INTRODUCTION

Bovine cysticercosis refers to the infection of cattle with metacestodes of the human tapeworm (9). It is a major problem for producers in sub-Saharan Africa. The clinical effect of cysticercosis on infected animals is generally not significant, however, similarly to the effect on human health. Many cases of teniasis in humans are asymptomatic, except for some anal pruritus due to emerging tapeworm segments but with severe infection human beings may experience loss of weight, anorexia, abdominal discomfort, and digestive upset (6). Economic losses may be high due to the condemnation of heavily infected carcasses and the necessity to freeze or boil infected meat;

losses may also occur from export restrictions. *Taenia saginata* occurs in the small intestine of humans and the metacestode (*Cysticercus bovis*) is found in cattle. Most incidents in cattle arise as a result of direct exposure to proglottids shed from farm workers, but there have been some reports of large scale outbreaks resulting from sewage-contaminated feed or forage (13).

Even developed countries, where the disease has a very low prevalence, have to face the problem of egg surviving in sewage (4). Globally, there are 77 million carriers of bovine teniasis and about 40% of them live in Africa. The teniasis prevalence of 64.2% reported by Abunna et al. (1) and of 51.1% reported by Regassa et al. (10) based on questionnaire surveys revealed that it is a well-known disease in Ethiopia. On the other hand, the prevalence of cysticercosis in cattle was reported to be 26.25% at Awassa's abattoir (2), 13.3% at Wolaita Sodo's abattoir (10), and 4.4% at Jimma's abattoir (8). No study had been conducted in Yirgalem with regard to bovine cysticercosis/

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teniasis. Therefore, the objectives of the present study were to determine the prevalence of *Cysticercus bovis* in cattle slaughtered at Yirgalem's municipal abattoir and assess the socioeconomic implications of *T. saginata* in Yirgalem and its surroundings.

## ■ MATERIALS AND METHODS

### Study area

The study was conducted from November 2009 to March 2011 in Yirgalem, located at about 310 km south of Addis Ababa, capital of Ethiopia, at 7° 13' and 8° 56' N latitude and 35° 52' and 37° E longitude. The altitude of the area ranges between 880 and 3358 m above sea level. The total population is about 43,000. Annual rainfall ranges between 1200 and 2000 mm, with 7 and 30°C minimum and maximum annual temperatures, respectively.

### Study methodology

A cross-sectional study was conducted on randomly selected animals slaughtered at Yirgalem's abattoir. A total of 400 cattle were sampled and routinely inspected for *T. saginata* cysticercosis. The study animals originated from the highland sedentary farming system of Arsi and Sidama areas, and Borana and Guji lowland pastoral production system. The breeds of the animals were the local zebu, and the zebu crossbred with Holstein-Friesian. Prior to sampling, each selected animal was given an identification number and data on each animal concerned sex, age, breed and origin. During meat inspection, the identified animals and their respective organs were examined strictly separately to avoid mixing the organs. Meat inspection was made in accordance with the procedures of the Ethiopian Ministry of Agriculture's Meat Inspection Regulation (1972) for the detection of *T. saginata* cysticercosis.

Visual inspection followed by multi-incisions of 0.5 cm in each organ (heart, shoulder, tongue, liver, kidney, lung and masseter muscle) were made to examine the cysts of *T. saginata*. Lesions of cysticerci were 5-8 by 3-5 mm, translucent and filled with brownish fluid. *T. saginata* metacestode samples were transported to the laboratory of Yirgalem Health Centre and Veterinary Clinic. Cyst viability was ascertained by placing the cysts in a normal saline

solution with 30% ox bile and incubated at 37°C for 2 h. The cysts were regarded as viable if the scolex evaginated after the incubation period. Examination of the scolex was performed microscopically to determine whether it was *C. bovis* or *C. cameli* based on the size of the cysticercus and the absence of hooks on the rostellum of the evaginated cyst (6, 14).

A questionnaire survey was administered to 170 randomly-selected volunteer respondents from whom pre-informed consents were obtained. The interviews were conducted personally. The potential risk factors of teniasis, i.e. age, sex, religion, occupation, educational level, raw meat consumption, and marital status, were considered. Occupationally high-risk groups were those who were highly in contact with meat, meat products and animals, such as abattoir workers, butchers, meat inspectors, cooks and farmers. Low-risk groups were arbitrarily selected as those who were not as highly in contact with meat and meat products, i.e. students, teachers, other civil servants and private workers.

An inventory was conducted on eight randomly-selected volunteer pharmaceutical shops from a total of twelve. The annual adult dose of teniacidal drug sales (based on prescriptions and patient complaints) were retrieved from 2005 to 2009 records and analyzed for the socioeconomic significance of teniasis.

### Data management and analysis

The abattoir survey, questionnaire and drug inventory data were recorded and a preliminary analysis was carried out with Microsoft Excel. The abattoir data were summarized and prevalences calculated. Anatomical distribution and viability of metacestodes of *T. saginata* were tabulated. The questionnaire data were also summarized and analyzed to assess the association of potential risk factors of teniasis among different respondents, using Stata logistic regression, version 9, special edition. Inventory data of pharmaceutical shops were summarized with a frequency table.

## ■ RESULTS

Of the 400 inspected cattle, 48 (12%) had varying numbers of metacestodes of *T. saginata*. No significant difference ( $p < 0.05$ ) was

Table I

Logistic regression analysis of factors associated with the occurrence of metacestode of *Taenia saginata* in organs inspected at Yirgalem municipal abattoir from November 2009 to March 2011

Variables	Num.	Cases	Prevalences	P	Odds ratio (95% CI*)
Age					
≤ 10 years	65	12	18.46		1
>10 years	335	36	10.75	0.086	0.53 (0.26, 1.09)
Sex					
Male	357	43	12.04		1.22 (0.44, 3.34)
Female	43	5	11.63	0.703	1
Body condition					
Poor	491	31	6.31	0.991	0.99 (.53, 1.89)
Good	139	37	26.62		1
Breed					
Exotic	32	7	21.88		1
Local	368	41	11.14	0.080	0.44 (0.178, 1.10)

\* Confidence interval

observed in the prevalence of cysticercosis in relation to the risk factors age, sex, body condition and breed (Table I). Analysis of the abattoir survey showed a significant variation in the anatomical distribution of cysticerci in the organs inspected. Table II shows that the highest proportions of *T. saginata* cysts were found in the tongue, followed by the masseter muscle, the liver, the shoulder and the heart for a total of 190 cysts detected during inspection. Of these 190 metacestode cysts, 89 (46.84%) were found to be alive, whereas the others 101 (53.16%) were degenerative cysts (Table II).

Among the 170 interviewed volunteer respondents, 119 (70%) had contracted tapeworm infection in the course of their lives. The majority of the respondents consumed raw meat as a result of traditional or cultural practices. The logistic regression analysis of the risk factors showed a statistically significant difference ( $p < 0.05$ ) in the prevalence of teniasis with regard to sex, religion, occupational risks, marital status and raw meat consumption. In this analysis there was no statistically significant difference ( $p > 0.05$ ) between the age, religion and educational level (Table III).

An inventory of pharmaceutical shops (pharmacies, drugstores and rural drug vendors) was conducted in the town. Estimates of yearly adult teniacidal drug doses and their costs were recorded through personal interviews with individuals in charge of their sales, using their records for the years 2005–2009. A total of 472,013 adult teniacidal drug doses were sold for a total of 1,416,039 Ethiopian Birrs (about 80,500 USD) (Table IV). Mebendazole (Vermox®) and niclosamide were the most frequently sold drugs for the treatment of teniasis, and praziquantel was the least sold drug.

Table II

Anatomical distribution and viability of cysts among inspected organs of 400 animals

Organs	% positive	Total cysts	Viable cysts (%)
Tongue	11.25	57	36 (63.16)
Masseter	6.5	52	23 (44.23)
Liver	4	29	12 (41.38)
Lung	0	0	0
Heart	3.25	25	10 (40)
Shoulder	2.5	27	8 (29.63)

## DISCUSSION

The results of the present study reflected both the economic and zoonotic importance of this disease, which is in agreement with the above statements. The prevalence of metacestodes of *T. saginata* among the carcasses inspected at Yirgalem's abattoir was 12%, which is higher than findings by Dawit (4.9%) at Gondor (3), Tembo (3.1%) in Central Ethiopia (12), and Megersa et al. (4.4%) in Jimma (8), whereas it was lower than findings by Abunna et al. (26.3%) in Awassa (2), and Hailu (17.5%) in East Shoa (7). Finally, the prevalence was similar to those reported by Getwchew (13.8%) in Debre Zeit (5), and Regassa et al. (13.3%) in Wolaita

Table III

Potential risk factors for the prevalence of teniasis among the interviewed respondents

Variables	Num.	Cases	Prevalences	P	Odds ratio (95% CI)*
Age					
≤ 25 years	73	55	75.34		0.79 (0.57, 1.11)
> 25 years	97	64	65.98	0.189	1
Sex					
Male	102	81	79.41	0.001	3.05 (0.13, 6.65)
Female	68	38	55.88		1
Religion					
Christian	126	98	77.78	< 0.001	3.83 (0.13, 7.54)
Muslim	44	21	47.73		1
Occupation					
Low risk	103	57	55.34		1
High risk	67	62	92.54	<0.001	10.00 (3.72, 26.95)
Education					
Illiterate	74	56	75.68	0.158	1.28 (0.91, 1.79)
Literate	96	63	65.63		1
Marital status					
Single	81	64	79.01	0.016	2.33 (1.17, 4.62)
Married	89	55	61.79		1
Raw meat consumption					
Infrequent	70	32	45.71		1
Frequent	100	87	87	< 0.001	7.95 (3.76, 16.80)

\* Confidence interval

Table IV

Annual teniacidal drugs sold at eight different pharmaceutical shops

Drugs	2005	2006	2007	2008	2009	Total	Total cost*
Niclosamide	16,267	16,503	15,382	16,697	16,131	80,980	242,940
Mebendazole	69,502	66,759	69,736	68,671	68,717	343,385	1,030,155
Praziquantel	9,943	9,797	9,975	9,753	8,180	47,648	142,944
Total	95,712	93,059	95,093	95,121	93,028	472,013	1,416,039

\* 1 USD = 16 Ethiopian Birrs

(10). The majority of the findings in Ethiopia were based on surveys carried out on carcasses subjected to routine meat inspection. Hence, the same limitations shared globally with meat inspection were reflected in this study. Accordingly, the lower prevalence of bovine cysticercosis in this study might be attributed to variations in personal and environmental hygiene, religion, culture, and feeding habits, including beef breeds and their production systems.

The most frequently affected organ with the highest number of cysts was the tongue. The viability test of the cysts also revealed that the tongue harbored the highest number of viable cysts (63.16%), followed by the masseter (44.23%), the liver (41.38%), and the heart (40%). The proportion of tongues affected with metacystodes of *T. saginata* was higher than that found in Hawassa (10.4%) (2) but agrees with that found in Jimma (40.43%) (8). Generally, the method of meat inspection, the ability of meat inspectors to identify cases, differences in management, the sample size and sampling method, the number of cuts, and other factors can contribute to prevalence variations in bovine cysticercosis.

Of the 170 respondents of the questionnaire survey, 70% had contracted teniasis, which illustrates the significance of teniasis in the population of Yirgalem and agrees with other authors' findings: 64.2% (1), 79.5% (7) and 69.2% (3). A well-formulated questionnaire is an important tool for the detection of *T. saginata* in the carrier population, in individual cases as in mass investigations (4). The respondents who were questioned in this study disclosed findings of proglottids in their feces, underwears, and a laboratory diagnosis at a health institution indicated the presence of *T. saginata*. WHO's guidelines (14) state that *T. saginata* is known by its more frequent anal expulsion than *T. solium*. The supporting evidence of the occurrence of *T. saginata* rather than *T. solium* among the respondents was that none of the residents of the town ate pork for religious reasons, confirming the presence of *T. saginata* and ruling out a possible differential diagnosis of *T. solium*.

With a 70% prevalence, human teniasis has been a widespread health problem in the study area. In the present study, the prevalence of human teniasis showed significant differences ( $p < 0.05$ ) according to sex, religion, occupational risk, marital status and raw meat consumption. Men, Christians, occupationally high-risk individuals, married persons and persons who consumed raw meat were at higher odds of contracting teniasis than women, Muslims, occupationally low-risk groups, unmarried persons and cooked-meat consumers, respectively. Thus, infection of humans by *T. saginata* is mainly due to the habit of eating raw (*Kurt*) or semi-raw (*Kitifo*) meat dishes in Ethiopia and raw meat consumption in Cuba (11). In Ethiopia, even professionals aware of the situation (veterinarians and medical professionals) often consume *Kurt* or *Kitifo* because of deeply rooted traditions. Similarly to other reports (1, 7, 12), the prevalence of teniasis was higher among Christians than among Muslims, because raw meat consumption is not common among

some Muslims, whereas Christians in Ethiopia consume raw meat during several religious celebrations. Also, high-risk groups are of course more prone to infection than low-risk groups because they come into contact with meat and meat products (1, 14).

Similarly, no variation was observed ( $p > 0.05$ ) between people with different educational backgrounds, perhaps because of the deeply rooted tradition of raw and undercooked meat consumption regardless of the educational level. The importance of human teniasis is both socioeconomic and health related. However, evaluation of the economic aspects is very difficult, particularly in developing countries such as Ethiopia, where infected people treat themselves with traditional herbal drugs. One of the possible sources of information to evaluate the financial loss is to carry out inventories of pharmaceutical shops, which may not reflect the actual economic impact of the disease. However, inventories of pharmaceutical shops in Yirgalem that covered five years' records (2005–2009) indicated that 472,013 adult teniacidal drug doses were sold for a total of about 88,500 USD. This shows the teniasis impacts on household financial resources, which could be easily avoided by eating well-cooked meat and using toilets.

This study revealed that bovine cysticercosis/teniasis is a major disease both with regard to public health and socioeconomic aspects. The disease results in financial losses caused by the condemnation of infected organs and downgrading of carcasses, and the considerable costs of human treatments. Therefore, strict routine meat inspections should be conducted so that infected carcasses and organs would be condemned accordingly. Populations should be made more aware of general, personal and environmental hygiene, and means of disease transmission, so that all consumers avoid consumption of raw meat and are encouraged to use toilets for the control of human teniasis and cattle cysticercosis.

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#### REFERENCES

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 Afr. J. Public Health*, **4**: 73-79.
2. ABUNNA F., TILAHUN G., BERSISSA K., MEGERSA B., REGASSA A., 2008. Bovine cysticercosis in Awassa, Southern Ethiopia: Prevalence, risk factors and cyst viability. *Zoonoses Public Health*, **55**: 82-88.
3. DAWIT S., 2004. Epidemiology of *T. saginata* taeniasis and cysticercosis in north Gonder zone. DVM thesis, Faculty of Veterinary Medicine, Debre Zeite, Northwest Ethiopia.

4. FRALOVA A., 1985. Taeniasis. In: Lysenko A., Ed., Zoonoses control, Vol. 2. Moscow, Russia, UNEP, p. 192-235.
5. GETACHEW B., 1990. Prevalence and significance of *C. bovis* among cattle slaughtered at Debre Zeit abattoir. DVM Thesis, Faculty of Veterinary Medicine, Addis Ababa University, Ethiopia.
6. GRACEY J.F., COLLINS D.S., HDEY R.J., 1999. Meat hygiene, 10th Edn. London, UK, W.B. Saunders.
7. HAILU D., 2005. Prevalence and risk factor for *T. saginata* cysticercosis in three selected areas of Eastern Shoa. MSc Thesis, Faculty of Veterinary Medicine, Addis Ababa University, Ethiopia.
8. MEGERSA B., TESFAYE E., REGASSA A., ABEBE R., ABUNNA F., 2011. Bovine cysticercosis in cattle slaughtered at Jimma municipal abattoir, South Western Ethiopia: Prevalence, cyst viability and its socio-economic importance. *Vet. World*, **3**: 257-262.
9. OLADELE O.M., GRACEY S., BRAD G., STANNY J.B., 2004. Bovine cysticercosis: Preliminary observations on the immuno histochemical detection of *T. saginata* antigens in lymph nodes of an experimentally infected calf. *Can. Vet. J.*, **45**: 852-855.
10. REGASSA A., ABUNNA F., MULUGETA A., MEGERSA B., 2009. Major metacestodes in Wolaita Soddo municipal abattoir, Southern Ethiopia: Prevalence, cyst viability, organ distribution and socioeconomic implication. *Trop. Anim. Health Prod.*, **41**: 1495-1502.
11. SUAREZ H.M., SANTIZO R.M., 2005. Epidemiology of the *Taenia saginata* complex and *C. bovis* in Ciego de Avila, province of Cuba. *Rev. Patol. trop.*, **34**: 43-52.
12. TEMBO A., 2001. Epidemiology of *Taenia saginata* and cysticercosis in three selected agro climate zones in central Ethiopia. MSc Thesis, Faculty of Veterinary Medicine, Addis Ababa University, Free University of Berlin.
13. LEES W., NIGHTINGALE J., BROWN D., SCANDRETT B., 2002. Outbreak of *Cysticercus bovis* (*Taenia saginata*) in feedlot cattle in Alberta. *Can. Vet. J.*, **43**: 227-228.
14. WHO, 1983. Gemmell M.Z., Matyas Z., Powlowski E., Soulsby J.L. Eds, Guidelines for the surveillance, prevention and control of taeniasis/cysticercosis. Geneva, Switzerland, WHO.

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## Résumé

**Abunna F.** Prévalence, répartition dans les organes, viabilité et implication socio-économique de la cysticercose bovine / téniasis en Ethiopie

Une étude transversale a été menée de novembre 2009 à mars 2011 afin de déterminer la prévalence de la cysticercose / téniasis et d'estimer le coût du traitement de cette maladie dans la ville de Yirgalem en Ethiopie. Les résultats à l'abattoir, une enquête par questionnaire et les inventaires de magasins pharmaceutiques ont été utilisés dans l'étude. Sur les 400 animaux examinés, 48 (12 p. 100) ont présenté un nombre variable de *Cysticercus bovis*. La répartition anatomique des kystes a montré que les plus fortes proportions de kystes de *C. bovis* se trouvaient dans la langue, ensuite dans le muscle masséter, le foie, les épaules et le cœur. Sur un total de 190 *C. bovis* collectés lors de l'inspection des viandes, 89 (46,84 p. 100) étaient vivants. Les tests de viabilité ont révélé que la langue contenait le plus grand nombre de kystes viables (63,16 p. 100), ensuite le masséter (44,23 p. 100), le foie (41,38 p. 100) et le cœur (40 p. 100). Sur les 170 personnes interrogées, 119 (70 p. 100) ont contracté une infection à *Taenia saginata* et, parmi elles, 85 p. 100 ont déclaré utiliser des médicaments modernes, alors que les autres ont eu recours aux médicaments traditionnels. La majorité des personnes interrogées consommaient de la viande crue pour des raisons traditionnelles ou religieuses. La prévalence de la téniasis humaine a montré des différences significatives ( $p < 0,05$ ) en fonction du sexe, de la religion, des risques professionnels, de l'état matrimonial et des habitudes de consommation de viande crue. Ainsi, respectivement les hommes ( $p = 0,001$ ), les chrétiens ( $p < 0,001$ ), les groupes professionnels à haut risque ( $p < 0,001$ ), les personnes mariées ( $p = 0,016$ ) et les consommateurs de viande crue ( $p < 0,001$ ) étaient davantage exposés au risque d'être affectés par une téniasis que les femmes, les musulmans, les groupes professionnels à faible risque, les personnes non mariées et les consommateurs de viande cuite. Dans cette analyse, aucune différence statistique significative n'a été observée pour ce qui concerne l'âge et le niveau d'instruction ( $p > 0,05$ ). Un

## Resumen

**Abunna F.** Prevalencia, distribución en órganos, viabilidad e implicación socioeconómica de cisticercosis/teniasis bovina, Etiopía

Con el fin de determinar la prevalencia de cisticercosis/teniasis y de estimar los costos del tratamiento de esta enfermedad en el pueblo de Yirgalem, Etiopía, se llevó a cabo un estudio transversal entre noviembre 2009 y marzo 2011. El estudio utilizó hallazgos de matadero, una encuesta con cuestionario e inventario de los comercios farmacéuticos. Entre los 400 animales inspeccionados, 48 (12%) presentó un número variable de *Cysticercus bovis*. La distribución anatómica de los quistes de *C. bovis* se encontró en la lengua, seguida del músculo masetero, hígado, hombro y corazón. De un total de 190 *C. bovis* recolectados durante la inspección de carnes, 89 (46,84%) estaban vivos. Tests de viabilidad revelaron que la lengua hospedó el mayor número de quistes vivos (63,16%), seguida por el masetero (44,23%), el hígado (41,38%) y el corazón (40%). Entre los 170 participantes interrogados, 119 (70%) habían contraído la infección por *Taenia saginata* y entre estos, 85% reportó el uso de drogas modernas, mientras que el resto (15%) usó drogas tradicionales. La mayoría de los participantes consumió carne cruda, como parte de prácticas tradicionales o religiosas. La prevalencia de la teniasis humana mostró diferencias significativas ( $p < 0,05$ ) con respecto al sexo, religión, riesgos ocupacionales, estado civil y hábitos de consumo de carne cruda. De manera que, hombres ( $p = 0,001$ ), cristianos ( $p < 0,001$ ), grupos ocupacionales de alto riesgo ( $p < 0,001$ ), personas casadas ( $p = 0,016$ ) y consumidores de carne cruda ( $p < 0,001$ ) presentaron un riesgo más elevado de ser afectados por la teniasis que mujeres, musulmanes, grupos ocupacionales de bajo riesgo, personas no casadas y consumidores de carne cocida, respectivamente. En el presente análisis, no se observó una diferencia estadísticamente significativa en relación a la edad y el nivel educacional ( $p > 0,05$ ). Un inventario de comercios farmacéuticos reveló la compra de 472,013 dosis de drogas tenicidas adultos con un costo de 1,416,039 Birr etíopes (alrededor de 88,500 USD) durante un

inventaire des magasins pharmaceutiques a révélé l'achat de 472 013 doses de médicaments pour adultes contre la téniasis pour un coût de 1 416 039 birrs éthiopiens (environ 88 500 USD) au cours d'une période de cinq ans (2005 à 2009). Mébendazole et niclosamide ont été les médicaments les plus fréquemment vendus pour le traitement de la téniasis, et praziquantel a été le médicament le moins vendu. En conclusion, l'étude a révélé une forte prévalence de métacestodes de *T. saginata* dans les organes à l'abattoir et a aussi mis en évidence la profonde tradition de la consommation de viande crue. Les autorités devraient donner priorité à cette maladie afin de préserver la santé publique et, de là, promouvoir l'industrie de la viande bovine dans le pays.

**Mots-clés :** Bovin – *Taenia saginata* – *Cysticercus bovis* – Cysticercose – Abattoir – Morbidité – Ethiopie.

periodo de cinco años (2005-2009). Mebendazol y niclosamida fueron las drogas más frecuentemente vendidas contra teniasis, mientras que praziquantel fue la droga menos vendida. En conclusión, el estudio reveló una alta prevalencia de meta céstodos de *T. Saginata* en los órganos de matadero, así como subrayar la muy enraizada tradición de consumir carne cruda. Las autoridades deben concentrarse en esta enfermedad para preservar la salud pública y consecuentemente promover la industria de carne en el país.

**Palabras clave:** Ganado bovino – *Taenia saginata* – *Cysticercus bovis* – Cisticercosis – Matadero – Morbosidad – Etiópia.