



# Bovine Cysticercus in and Around Anchar Woreda West Hararghe, Oromia, Ethiopia

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**Abstract**

Bovine cysticercosis is economically critical and important parasitic disease due to elegance cestoda, order cyclophyllidea, family taeniidae. Across-sectional survey turned into undertaken with inside the slaughterhouse to look at of the cysticercos bovis in cattle originated from one-of-a-kind localities and to determine the cyst circus bovis in addition to distribution in different organs within infected animals in anchar slaughterhouse. Out of the entire 384 cattle slaughtered and tested at anchar slaughterhouse, seventy nine animals (20.57%) should be positive for C.bovis 20.57%infection. Predilection sites for C. bovis had been observed, and their comparative infestation rates had been recorded. As an end result of this study, highly cysts had been observed on tongue muscle (39.39%) observed through masseter muscle (20.40%) and shoulder muscle (10.41%). The incidence of C. bovis turned into additionally studied primarily based totally at the geographical places of slaughtered livestock. Accordingly, Cattle in which come from low lands and high lands had been confirmed an incidence of 22.58% and 19.04%. In conclusion, C.bovis is time-honored and is one of the predominant parasitic diseases that reasons massive carcass condemnation of slaughter animals and poses high monetary lose with inside the socio-economic system of the look at area. Thus, public fitness attention ought to be created on enhancing private and environmental hygiene for breaking the life cycle of the disease.

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**Keywords:** Cysticercus Bovis; Slaughterhouse; Ethiopia.

**Abbreviations:** AAU: Addis Ababa University; AARDO: Anchar Agricultural and Rural Developmental Organization; FAO: Food and Agriculture Organization; M.S.L: Meters Above Sea Level; RPM: Round Per Minute; FVM: Faculty of Veterinary Medicine; C.Bovis: Cyst Cercus Bovis; GIS: Geographical Information System; C.S.A: Central Statistical Authority; ELISA: Enzyme Liked Immunosor Bent Assay; WHO: World Health Organization; PCR: Polymerase Chain Reaction; U.S.A: United States of America; SHARC: Sheep in Sheno Agricultural Research Center; CFT: Complement Fixation Test; CSF: Cerebrospinal Fluid.

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## Introduction

Livestock is vitally essential agricultural commodity in growing international locations of the world. They are reared below a extensive style of production machine ranging massive scale extensive business companies to traditional stallholders and village manufacturing machine maximum of the growing international locations of the world lie with inside the limits of the tropics of most cancers and Capricorn, particularly the tropics and sub tropics areas of the world. It is right here that the issues of helminthes parasites are unquestionable, much greater than in countries of the extra temperate areas. The surroundings with inside the tropics is favorable constantly at some stage in the 12 months for the free-living levels of the parasite to hatch and develop [43].

Animal production is critical, a part of the rural region of Ethiopian economy. The farm animals' population of the country is the biggest in Africa. However, manufacturing is properly under capability due among different reasons to the manufacturing is properly under capability due amongst different motives to the terrible fitness reputation of the country wide herd [36].

Livestock diseases are extensively allotted and one of the primary reasons of farm animals' mortality, and sub most reliable productiveness in all agro-ecological zones of the country [16] is diminishing the advantages in their excessive reproductive performance. The productiveness losses attributed to helminths parasite in Ethiopia are considerable. Ethiopia has the biggest farm animals' population in Africa with an intended of 44,318,877 farm animals, 23,619,720 sheep and 23,325,113 of goats [10].

Ruminant farm animals are critical reassess of earnings for rural groups and are one of the nation's primaries re assets of overseas forex from export [20]. However, this incredible capability isn't always well exploited because of terrible nutrition, in good enough sickness and parasite control, terrible management, low genetic manufacturing capability of indigenous animals, scarcity of skilled manpower and absence of governmental policies (katagile and mub,1993 [52].

Parasitic and infectious animal illnesses which can be endemic or not unusual place withinside the place motives a whole lot of tremendous unfavorable monetary consequences. Parasitism represents primary disadvantage on farm animals manufacturing in tropics (ogunrinade and adogoke, 1982) diverse research were performed via slaughterhouse indicated parasitic instances together with hydatidosis, fasciolosis and cysticercosis which impose direct and oblique monetary losses on farm animals mainly in farm animals and sheep (Dendin, 2007).

The highly affected organ because of fasciolosis, hydatidosis and cysticercosis are liver, lung, and hearts respectively. In addition to monetary losses, some other measurement is introduced through the reality that numerous helminths' infections might be zoonotic to human. Cysticercosis is due to cyticercus bovis that's the larval level of taenia saginata which boom 3-7m in duration and lives with inside the gut of human. Cattle have become inflamed through grazing on floor and through ingestion of feed infected through human feces. The oncosphere liberated withinside the gut from the egg penetrates the intestinal wall and thru the lymphatic and blood streams reaches the skeletal muscle and hear: In the muscle, oncosphere develops in to the intermediate cysticercus level containing the scolex. The predilection site of cysticercercus bovis is masseter muscle,

tongue, heart, and diaphragm. If ingested through human (the very last host) the scolex attaches it to the intestinal wall-and tapeworm grew and matured (Herenda et al., 1994).

the number one purpose of slaughtered house is to provide healthful meat, entire a few and smooth produce that are secure for human consumption [43]. Bovine cysticercus is a muscular contamination of farm animals and is due to larvae of the human intestinal cestode teania saginata. Its lifestyles cycle is absolutely depending on the hyperlink among guy and farm animals in order that any spoil on this hyperlink can bring about the entire removal of the parasite. Tape worm virus infections were recorded in records from 1500 BC and were diagnosed as one of the earliest human parasites [48].

Cyst of *C. bovis* may be discovered everywhere with inside the carcass or meat and viscera [11]. the distribution of *T.saginata* is wider in growing international locations in which hygienic situations are bad and in which the inhabitants historically devour uncooked meat or insufficiently cooked meat [25] (WHO, 2015). Forty percent (40% of the cases became suggested in africa (fan, 2006); [25].

Researchers suggested that those sicknesses being very not unusual place in growing international locations like Ethiopia. It is related to bad hygiene and neighborhood elements which include cultural background, (consuming uncooked meat Kitfo>> semi cooked meat) monetary situation and non-secular beliefs, proximity of people to farm animals stored with very little difference among partner or application functions [25]. Slaughtering is frequently achieved in outdoors in absence of slaughterhouse [25]. Transmission of the parasite happens maximum normally with inside the surroundings characterized through bad sanitation, primitive cattle husbandry exercise and in ok meat inspection, management, and manage police [35].

Besides, slaughtered residence affords records at the epidemiology of sicknesses on cattle, to kwon to what volume the public is uncovered to positive zoonotic sicknesses and to estimate economic losses in passed off thru condemnation of affected organs and carcasses (jibat et al---2008). Ante-mortem inspection tries to keep away from advent of clinically diseased animals into the slaughterhouse and serves to acquire records so one can be beneficial in making sound autopsy inspection. Nevertheless, right assessment of the monetary losses because of predominant reasons of organ condemnation in distinctive species of animals withinside the international locations of relevance in which monetary realities frequently decide the kind and scope of manage measures to be established (Van long, 1993; Herenda et al, 1994; teka, 1997).

✓ Therefore, the objectives of this research study were:

- To identify the major parasitic disease that causes organ condemnation.
- To estimate direct economic losses due to organ condemned.

## Material and method

### Study area

The study was conducted from April 2017 to end of November 5, 2017 in the west hararghe zone of Oromia regional state of eastern parts of Ethiopia in and around Anchar district which is about 310 km far away from Addis Ababa city as information gained from Anchar Agricultural office (2016) geographi-

cally located between 8.26 N and 36'20'E and of an altitude of 1500-2300m as a.5.1 the woreda have kola =65% waina –dega =24%and dega =13% also the woreda has 8.87 of grazing land, 42 .8 from lands, 7.2 forest, 0.2 swampy and 40 kill the number of weroda population is estimated to be 11980 live in rural and 29358 live in urban. the livestock of woreda 52 197 cattle, 15230 sheep, 11090 goats, 2504 equine 38364 poultry and the production of Animal in the woreda is extensive management system .the mean annual rain fall of the woreda is 1950 mm and the minimum and maximum overage temperature ranges between the 12.4<sup>o</sup>cand 24<sup>o</sup>c respectively (AARD, 2013).

**Study population**

The study population includes bread of cattle under traditional management system.

**Study design**

The cross-section then study was designed to determine the cysticercus bovis in and around Anchar.

**Sampling-Method and sampling size determination**

The simple random sampling techniques were followed to select the animal and study area to be used for the study of the cysticercus bovis to determine the sample size, cysticercus bovis of 50%in Anchar was taken into consideration ,because of any research has not been done before the current study regarding to the problem of cysticercus bovis the desired samples for the study were calculated according formula given by thru field (1995) with 95% confidence interval at 5%obslete precision therefore sample size of 386 was considered for this study formula for sample size determination is given below.

$$N = \frac{(196)^2 * pexe (1 - prxp)}{D^2}$$

Were n = required sample size

Pex = expected prevalence (50%)

D = Absolute precision (5%) since there was no study conducted in this area, 50%expected prevalence is taking. According to the formula, the minimum sample size requirement is 384 from total number of cattle 386 cattle were randomly selected for examination.

**Data collection**

During ante mortem examination ID number was given to animal identified for the study. Then, data on the age, their general behavior, signs of disease, nutritional status, cleanness, body condition score and any type of abnormalities of the animal were recorded on a format prepared for these purposes (Gracey,1986). Animals were classified into two group young (1-3years) and Adult (>3years). Judgment was also done based on procedure given by FAO (1995). Then, during the postmortem examination the livers, tongue, lung, and heart of the animals included in the study, records were kept on the examination results (if the animal was positive for fasciolosis, cysticercosis or hydatodosis).

**Results**

From the total occurrence out of 384 cattle in which examined at slaughter house, 79(20.46%) should be found to positive for Cysticercus bovis occurrence from thus two agro-ecological zone. From 154 cattle examined, in which that comes from low-

lands area, 35(22.58%) of them would be found to positive for cysticercus bovis and from the 230 cattle, examined in which came from highlands areas 44(19.04) would be found as positive (Table-1)

Presence of cysticercus bovis in different parts of organs of cattlemuscles shoulders, tongue muscle; masseter muscle, heart and liver were examined. The predilection site of cyticercus bovis from total 386 cattle were examined at Anchar slaughterhouse (Table 2)

Sameness, in this study importantly showed that from the examined old, aged cattle, mostly affected organ was tongue muscle, secondly by master muscle and shoulder (Table 3)

At the time of this study period, cattle were categorized based on their young age (1-3 year) and greater than (>3years) are Adult. Based on this categorization of animal in age, prevalence of cysticercus bovis was studied in and round Anchar. as it can be shown from the Animal age classification of filed area showed from 154 examined young (1-3years) cattle about 8(5.16) cattle should be positive of C.bovis and from the 230 observed adult (>3 year) cattle 71 (30.73%) of them were positive for C.bovis with an general prevalence of 79 (20.46%).

From the total number of 384 cattle that randomly selected and examined in and around, Anchar woreda, about 184 were male of which 8(4.32%) of them were positive for cysticercus bovis and 200 of them were female from which 71(35.32%) of them are positive for cysticercus bovis (Table 4).

From the 203 examined poor body candy condition cattle about 2[0.98%] cattle were positive of C.bovis and among the 181 examined good body condition cattle about 77[42.30%]cattle ware positive of C.bovis (Table 5).

**Figure 1:** Relative percentage among the positive value (%).

	No of examined cattle	No of positive	No of prevalence%
Low land	154	35	22.58%
Highland	230	44	19.04%
Total	384	79	20.57%

**Figure 2:** Presence of cysticercus bovis different predilection site of examined cattle carcass.

No of examined cattle	Site of examined	No of positive (%)	No of prevalence%
96	Shoulder muscle	10	10.4%
99	Tongue muscle	39	39.39%
98	Master muscle	20	20.4%
91	Liver	10	10.75%
384	-	79	20.57%

**Figure 3:** Comparison of bovine cyst cercus between age categories.

Age	No of examined cattle	No of positive	Prevalence
Young	154	8	5.16%
Adult	230	71	30.73%
Total	384	79	20.57%

**Figure 4:** Comparison of cysticercus bovis prevalence between different sexes.

Sex	No of examined cattle	No of positive	Prevalence%
Male	184	8	4.32%
Female	200	71	35.32%
Total	384	79	20.57%

**Figure 5:** Comparison of bovine cysticercus bovis in body conditions bases.

Body Conditions	Number of examined cattle's	Number of positives	Prevalence [%]
Poor	203	2	0.98%
Good	181	77	42.30%
Total	384	79	20.57%

## Discussion

The current study showed that, from 384 fecal sample analyzed 79 [20.57%] found to be positive using sedimentation technique as diagnostic method which represent of bovine C.bovis in and around Anchar woreda. In the previous studies indifferent part of Ethiopia [21].

A previous study done on cestodes and Meta cestodes of sheeps in sheno agricultural research center [SHARC], Northern shoa, AAU, Debrezeit Ethiopia. The study made by [13]. This is probably due to the variations withinside the reports of meat inspectors in addition to variation in veterinary employment deliveries and peoples. Creations of awareness at the prevention of this sickness in extraordinary localities. Furthermore, with inside the habitual examination of red meat carcasses, there has been reasonable problem to the degree of incision allowable for gross injury that reduced the marketplace capability of this carcass due to that many infestations remained undetected.

Within Ethiopia, numerous research and reviews revealed that the rate of infestation of farm animals via way of means of C.bovis turned into extraordinary and more than the current day study in diverse agro-ecological zones, [37]. A study in Debrezeit Elfora export abattoir said 22.75% [24] in Hawasa municipal abattoir said 26.25%; [31] in Eastern shoa said 17.5%, [3] in Nekemte town municipal abattoir said 21%, [27] in Debrezeit abattoir said 13.8%. lake smart in extraordinary African countries the prevalence is higher: 20% in senegal, 27% in Tanzania, and 38% in kenya, [30]. on this study, the evaluation of prevalence of C.bovis primarily based totally at the starting place of cattle highland and low land were completed and amongst the ones animals submitted to the abattoir and inspected, 231 farm animals [19.04%] have been from highlands and the closing 155 farm animals [22.58%] have been from lowlands. the price of C.bovis incidence with inside the highland animals 19.04% and with inside the lowland farm animals have been 22.58%.

The difference with inside the rate of prevalence in different altitudes is probably associated with the less resistivity of the egg of the parasites of tape worm ova to live on in the cold grazing environmental situations of highlands area for longer periods. C.bovis is in general located in muscle of mastication, especially tongue, shoulder muscle, diaphragm, heart, masseter muscle, and sometimes in fats liver, lungs, and lymph nodes. Even so, with inside the present study, cysts have been founds on parts shoulder [10.4%], masseter [20.4%] and tongue

[39.39%]. From numerous reviews, change and deviation of this cysts localization have been pretty feasible for instance, abattoir found in Addis ababa city, the contamination rate of Cysticercus bovis became as high as 16.3% in for leg. A few reviews from shoa Oromia nearby country confirmed 4.7% in liver and 0.7% in lungs [14]. On the alternative hand, [5,31] indicated that exam of the tongue became the only manner of detection for bovine cysticercosis.

The essential purpose of heart rejection on this study became cysti cercus bovis [10%] that is incredibly better than research by [7] Amen et al. 2012) they said 0.8% and 0.22%, respectively and it became lower than record by [6] in cattle that slaughtered from Tigray. The general direct economic loss happened because of condemnation of organs in active slaughtering house examination with inside the present study became 68,250.00 Ethiopia birr [341.25 USD when IUSD =20 ETB]. This became better than report from Gonder Elfora abattoir 18,973.2ETB became said by Yifat et al., [2011], 24340ETB said from wolaita sodo town municipal abattoir by Fufa and Debele, 2013 and 39,490.00 ETB have been said Gondar by [Genet et al., 2012] and decrease than the document from Jimma municipal abattoirs, 172,664.09 ETB through [Amen et al., 2012]. Higher competitively priced loss on this study became encountered in C.bovis which account 4200 ETB.

## Conclusions and recommendations

This study was conducted on the cysticercus bovis in west hararghe zone of oromia regional state in and around Anchar woreda showed that prevalence of 20.57%. The cysticercus bovis extensive distribution is related with several features including under cooked and raw beef consumption's, bush defecation's and sewage treatment system and poor waste disposal, decreased level of public awareness existence of traditional slaughtering practices. Hence, it is possible to conclude that cysticercus bovis is some prevalent disease in the study area. As compare with above different area study. However, the disease needs attention both from livestock owner and veterinarian in the light of present study. Finally, the following recommendations are forwarded:

- Backyard slaughtering of animals should be prohibited through designing and re in forcing of legislation, construction of slaughterhouses which fulfill the necessary facilities and implementation of proper meat inspection services.
- Improve awareness creations of animals follower, abattoir workers and consumers, about the public health significance and its economic importance of the continuous life cycles of this and other involved parasites.
- Educating consumers' Public health importance to avoid or stop eating of raw meat should be carried on.
- All of the condemned body parts should be disposed carefully, cats and stray dogs should be prohibited from slaughtering house and their numbers should be scientifically decreased.
- Proper and detail meat inspections and examinations at the slaughterhouse should be having to done for further public health importance.
- The management system of Cattles and animals treatment with anti-helminthes drugs should done.

- Combination of control measures including drainage, grazing area management should be used to guarantee satisfactory degree of control of thus parasites in the long run
- Further investigations on the epidemiology of the diseases and ecology of the snail intermediate hosts should be useful in the planning and programming control measures strategies.
- Training should be offered to slaughterhouses workers on the over consideration in due course of production, the condemned organs should be incinerated.
- Finally, the farmers and any stakeholders should be educated and informed well about the information's of this disease control programs and proper management system.

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