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Prevalence and Economic Significance of Cystic Hydatidosis: Bovine at Kombolcha Elfora Industrial Abattoir, North Wollo, Ethiopia

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ABSTRACT

A cross-sectional study design was conducted out from July 2014 to September 2015 Kombolcha ELFORA industrial abattoir to assess the prevalence of hydatid cyst in slaughtered cattle through post mortem inspection procedure of visualization, palpation and incision of vital organs. During study period there were 384 cattle examined by random sampling data collection method. Among 384 examined slaughtered in the abattoir 53 (13.8%) were found harboring hydatid cyst. There were variation in prevalence rate among different geographical location could be do to strain difference of echinococcus granulosus that exist in different geographical location, culture of people, social activities and probably physiological activities of cattle, health condition and duration of exposure time were contributed for infestation. Hydatid cyst were predominantly in lung and liver representing 10% and 6% respectively, because the lung and liver posses greater capillary field which allows these organs efficiently filter the ingestion oncospher from blood liver and lung undergo sequential which is followed by pulmonary filtration action before other are invaded. Higher percentage of hydatid cyst in the lung compared to liver because lung tissue has soft consistency relatively lower reticulo endothelial cell and less abundant connected tissue.

Keywords: Abattoir, cattle, hydatid cyst, prevalence

Hydatid diseases have been recognized since ancient time and have a worldwide distribution. Berlot in 1790 in accereditd with the first description of a splenic hydatid cyst as an autopsy finding Hydatidosis also known as Echinococcus, is a parasitic infection of liver and other organs by flat worm, hydatid cysts. Most Hydatid cysts are acquired in childhood a latent period five to twenty years occurs before the diagnosis is made. The growth of hydatid cyst remains indolent yet unremittent by character. As a very crude estimate hydatid cysts increase their diameter by about two to three to centimeter each year the rate of growth of hydatids appeared the to be dependent not only on

immunologic relation-ship b/n the parasites and humans but also on the resistance offered by the enveloping structure (Urguhart *et al.* 1996).

The incidence of hydatid cysts has decreased in the endemic area when public health measures and livestock handling procedures have been enacted. Public education about the diseases and its transmission canine species, elimination of vegetable growth at ground level from the diet and discontinuation of the practice of feeding the entrails of slaughtered animal to dogs, has proven to be of value in decreasing the occurrence of hydatidosis (Bretagne *et al.* 1993). The degree of infectivity and availability of the eggs in the environment



and the feeding behavior of the intermediate hosts determine the number of infective organisms entering the host. However the number of parasites of infective organisms entering the host However the host is strictly controlled by both natural and acquired immunity of the host to infection (Gemmell and Roberts, 1995). The economic signification of hydatidosis in the meat sector is due to condemnation of liver. Other organs or even whole carcasses in severe infection, the parasite may cause retarded performance and growth, reduced quality and yield of meat, milk or wool. Hydatidosis in live stock leads to considerable economic liver lung and decreased in carcass weight. Hence present research project was undertaken with the aim to determine prevalence and economic significant of Hydatid cyst in bovine at Kombolcha ELFORA industrial abattoir.

MATERIALS AND METHODS

Study area

The study area was conducted in kombolcha town which is located at 375km north-east direction from Addis Ababa. The approximate geographical location of the area is between 11m 08 north and 39n 75 east with the altitude 1840 masl. Area coverage has different geographical climate ranging from 1500 to 2600 masl. average daily temperature is 11.5 to 27.5°C. The mean annual rain fall of the area is 1150mm. the vegetation of the area range from free bushes to shrubs. The estimated animal population in the area is 10,8803 bovine, 58,182 caprine, 25,957 ovine, 10,530 equine, 79,669 poultry and 2,769 camel (South Wollo Agriculture Bureau, 2000).

STUDY ANIMALS

Total 384 cattle for slaughtered at Kombolcha abattoir were examination hydatid cyst. The study cattle include about both sexes that were slaughtered during the study period. Most the cattle slaughtered at the abattoir adult male of local and cross breed type which the animals come from every corner of neboughring kebeles or woreda.

Study design

A cross-sectional study design under take to determine the prevalence of hydrated cyst in different organ (lung, liver, kidney, heart and spleen, mesentery) of cattle the in of each of organ examined by inspection, palpation and incision deeply and longitudinal for each organ. The total number of hydatid cyst was count and recorded in each intact organ.

Study methodology

Anti-mortem inspection conducted in the lairage of the abattoir by use produce before the cattle fit for slaughterer inspect at rest and at movement behavior, body condition, sign of disease and abnormality in lairage. Post mortem examination for the presence of hydatid cyst the follow the routine in meat inspection produce from based on anti-mortem examination follow by second examination inspection, palpation and incision the visceral organ. If the cysts were found from the lung, liver, heart, kidney, spleen, mesentery then count and recorded intact organ of by hydatid cysts.

Sample size

The sample size will be determined based on the formula by thrusfield (2005) for random sampling.

$$N = \frac{z^2 (1-p)}{d^2}$$

$N = z^2 (1-p)$ where n=sample size require

$d^2 z =$ take from the level for 95% (1.96)²

p= prevalence (5%)

d= the level of prevalence (5%)

$$\begin{aligned} N &= \frac{(1.96)^2 \times 50\%(1-50\%)}{5\%^2} \\ &= 3.84 \frac{0.5(1-0.5)}{0.05^2} \\ &= 3.84 \frac{3.84 \cdot 0.5(0.5)}{0.0025} = 384 \end{aligned}$$

Therefore at 50% of expected average prevalence of which is of the prevalence rate and the absolute precision of 95% are considered accordingly a total of 384 cattle for this study. The cause use 50% of are considered there is no reported before at this time in Kombolcha ELFORA industrial abattoir.

Sampling method

Sampling methods are collect organ (liver, lung, heart, kidney, spleen and mesentery use by random sampling methods

Data analysis

Data collected during inspection will be entered in to excel spread sheet (Microsoft excel, 2007). Descriptive statistics will be used to determined hydatidosis prevalence rate of age, organ abnormalities by Pearson's

spastically chi-Square (χ^2) and different were required statistic SPSS significant if p value is less than 0.05.

RESULTS

Out of the total 384 cattle were examined at Dessie municipal abattoir (50%) was found harboring one or more hydatid cyst. The result obtained from post mortem examination indicates that different organs were affected with hydatid cyst. Among the different organs affected lung and liver constituted highest infestation rate. This results was indicate the overall prevalence of hydatid cyst in the study area as shown in (Table 1).

The prevalence of hydatid cyst in the lung was higher than male due to sample size more old age culled cow and different physiological activity of cows (pregnancy, lactation and parturition especially during long draught season all were described above caused for immune suppression of cows result more infestation in female than male (Table 2).

The prevalence of hydatid cyst in liver and lung was more infestation based on body condition (Table 3)

DISCUSSION

The prevalence of hydatidosis in the current study was (14.1%) in slaughtered cattle at Dessie municipal abattoir which was very low comparable with the results have been reported from certain parts of Ethiopia by various authors. The prevalence rate of cattle which disagree with 25.87% in Arbaminch (Mohammed, 1988) this is

due to changed in cultural and believes of society was do not allow the presence of large population of dog in the study area. Slaughtering of animals at backyard practice might be decreased in the study area. In Dessie municipal abattoir condemned organs and carcasses were properly disposal and buried in the hole. Good fence of the abattoir and immediately response by stray dog. This is the reason for the decreased prevalence of hydatidosis in current study. Conceived to the previous study in different areas of the country could be due to lower dog population and proper disposal of the condemned organ. The prevalence of hydatidosis increases due to some number of dogs and wild carnivores which enough to maintain the life cycle of *E. granulosis*. The wide spread tradition of offering un cooked offals to pet animals around home stead, absence of proper treatment for adult *E. granulose* in dog, Poor public awareness about the disease, the absence of proper fencing (when dog and other carnivores get an easy access), Absence of proper meat inspection procedures in every back yard slaughtered area, The bad habit of disposing dead wild or domestic animals un buried and left open for scavenging carnivores create favorable condition for environmental contamination by maintain the life cycle and *E. granuloses* in stray dogs and wild carnivores.

The finding of the current study prevalence of hydatid cyst was (14.1%) which was higher than the previous finding of 7.2% Debrebrehan abattoir by (Tsegaye, 1995). This is probably due to the total sample size number

Table 1. The total prevalence of hydatid cyst in infected cattle based on sex slaughtered at Kombolcha ELFORA industrial abattoir based on sex

Sex	No of examine cattle	Positive cases	Prevalence
Female	3	1	33.3%
Male	381	53	13.6%
Total	384	54	14.1%

Table 2. The prevalence of hydatid cyst in organ of infected cattle slaughtered in Kombolcha ELFORA industrial abattoir

Sex	No. of examined cattle	Organs examined			
		Liver	Lung	Kidney	Heart
		No. of +Ve cases	No. of +Ve cases	No. of +Ve cases	No. of +Ve cases
Female	3	1(33.3%)	2(66.7%)	0.0	0.0
Male	381	21(5.5%)	34(8.9%)		
Total	384	22(5.7%)			
		36(9.4%)			

**Table 3. Prevalence of hydatid cyst based on body condition**

Body condition scores	Number of cattle examined	Prevalence of hydatid cyst				
		liver	Lung	spleen	Heart	kidney
Medium	291	16(5.5%)	24(8.2%)	—	—	—
Good	93	6(6.5%)	12(12.9%)	—	—	—
Total	384	22(5.7%)	36(9.4%)	—	—	—

and origin of slaughtered cattle and long draught season in the study period may cause immune suppression of cattle causes easily infestation by oncosphere, therefore some good body condition and longer aged cattle easily infested with diseases.

The difference prevalence rate among different geographical location due to the strain difference and *E. granulose* that exist in different geographical location (Fasihi *et al.* 2002) additionally this is probably in endemic area of liver disease like fasciolosis cause damage parenchyma of liver tissue which favorable cysts development in the liver and the new hatching oncospher doesn't damage by the liver cell that comes from intestine.

In the current study hydatid cyst are most commonly found in the lung (22%) and liver (36%) (Hubbent *et al.* 1975). This could justified by the fact lung and liver posses grater capillary field which allow this organ to efficiently filter the ingested oncospher from the blood liver and lung undergo sequential from portal veins which is followed by pulmonary filtering action before other organs are invaded only those oncospheres which travels then will reach the systemic circulation and other tissue (Mathis *et al.* 1996).

The current study includes both sex and gbody condition cattle those were come from different sites. The prevalence of hydatid cysts in the lung of female than male the prevalence probably sample size most cattle slaughtered at Dessie municipal abattoir adult male local zebu type and medium and good body condition and reproductive problems, in the country farmers give more attention for male cattle than female because male used for different agricultural activity so this condition cause losses body weight in the cow and this lead to immunosupresion physiological activities like pregnancy, lactation, parturition specially during drought season (shortage of feed and water and any other stress. Factors decrease the body condition of the cow. Generally those factors described above were probably pre condition (exposure) for increasing infestation rate of hydatid cyst in female than male. Due to soft consistency of lung tissue, relatively lower endothelial cell reaction and connective tissue than

liver tissue. Therefore the above factors cause low immunological response of the animals which might preclude expansion of cyst life (Thompson and Allsopp, 1998; Zhang *et al.* 2000)

CONCLUSION AND RECOMMENDATIONS

The aim of the present work in short is to determine the prevalence rate of hydatidosis in cattle to see the epidemiology role of dogs and the public health hazard the disease posses. *Ehydatidosis* is an important disease condition particularly in cattle of Dessie administrative region. The roaming stray dogs, there close association with livestock, the attitude of people inhabiting the area towards their dog favours the propagation and spread of the disease. The common practice of back yard slaughter, poor inspection and careless condemnation in the abattoir present in the area needs timely action to lower the hazard.

Therefore, based on the above conclusions, the following recommendations are forwarded:

- Mass and individual education on hotel owners and other people of town to get their animals slaughtered in slaughter houses.
- Equipping the present abattoir with pertinent facilities and see that is professionally staffed.
- Prevention of accessibility of dogs and wild carnivores to the abattoir.
- Collaboration between veterinarians, medical officers and the people in exercising preventive and control measure.
- Health education geared to the widest representative of human population concerning the risk of Hydatidosis.

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