

**Prevalence, economic impact analysis and viability of Hydatid cysts in Bovine slaughtered  
in selected abattoirs within Kaduna metropolis, Nigeria.**

Economic impact analysis pose a problem here. The cost of the organs as per the market value is okay but must be done in a tabular form with indices if need be. But using weight loss as indicator of economic losses resulting from the echinococcosis (hydatidosis) is completely out of visible and unacceptable at international for a. because there lots of causes of weight lost in cattle that has nothing to do with the disease condition in focus. Most times, mix infections do cause a considerable weight lost in cattle.

**Abstract**

A cross sectional study aimed at determining the prevalence, cyst characteristics and estimating the financial loss due to cystic echinococcosis (hydatidosis) in cattle slaughtered at Tudun-wada abattoir, Kakuri (Makera) abattoir, Kawo abattoir and Sabon-Tasha abattoir, all within Kaduna metropolis, was carried out from January to July, 2019. Out of the 160 cattle examined (40 from each abattoir), 21 (12.2 %) were found to harbor visible hydatid cysts. Significantly higher infection ( $p < 0.05$ ) was detected in cattle with moderate body conditions than animals with **forward and fat body condition score**. No significant variation was observed with regards to sex of animals. Cysts were found to be distributed in the lung, liver, kidney, spleen and heart as follows 42.9%, 38.0%, 4.76%, 9.50% and 4.76% respectively. Out of 36 hydatid cysts examined, 17 (47.22%), 14 (38.88%) and 5 (13.88%) were found to be small sized, medium-sized and large- sized respectively. Likewise, out of 36 cysts assessed, 18 (50%) were fertile, 4 (11.11%) sterile and 14 (38.8%) were calcified. Of the 18 fertile cysts subjected for viability test, 12 (27.7%) were viable while, 8(22.2%) were non-viable. Moreover, assessment of annual economic loss due to bovine hydatidosis in Kaduna metropolis from organ condemnation and carcass weight loss was estimated at 17,862,348 (NGN). Despite the moderate magnitude of

infection detected currently, there seems to be an existing socio economic situation favorable for hydatidosis and hence it remains one of the most important diseases warranting serious medical and veterinary attention.

**Keywords:** Echinococcosis, cysts, abattoir, fertile, viability, organs.

The abstract section was written as per the journal style of sub-sections or divisions into aim, methodology, results and conclusion.

No anybody score condition table was presented either in the materials and methods section or in the results section as used in the abstract section.

Keywords: It is in order.

**Abbreviations:** NGN: Nigerian Naira; NAHIS: National Animal Health Information System;

**SPSS:** Statistical Product and Service Solutions.

## 1. Introduction

Hydatidosis is a parasitic zoonotic disease caused by the metacestode of the tapeworm *Echinococcus*spp[1]. It is one of the limiting factors in food animal production and hampers the realization of adequate meat supply to meet the ever increasing demand of animal protein by human population [2]. Three broad morphological forms of *Echinococcus*spp are recognized clinically; *Echinococcus granulosus* which causes cystic Echinococcosis; *E. multilocularis* which causes alveolar Echinococcosis and *E. oligarthrus* which cause polycystic Echinococcosis. The definitive hosts of *E granulosus* are the dogs while, the intermediate hosts are the domestic ungulates and man [3].

The adult hydatid worm which resides in the small intestine of a definitive host produces gravid proglottids, which release eggs that are passed out in feces of the host (mostly dogs). The eggs are then ingested by an intermediate host (cattle). The eggs then hatch in the small intestine of the cattle, releasing an oncosphere that penetrates the intestinal wall and moves through the circulatory system into organs such as lungs, liver, kidney, spleen and the heart where they develop into cyst which then slowly enlarges, creating protoscolices and daughter cyst

[4][5](The information therein is correct but it is fairly lengthy. It could be broken into two for ease of assimilation). Hydatidosis has a worldwide distribution, and causes considerable

economic losses and public health problems in many countries including Nigeria and other pastoral range and areas of the world [6] [7].

Lack of adequate control policy, uncontrolled movement, trading of animals, and their products and difficulties in early diagnosis enhance the distribution of the disease [8]. Infection is often associated with economic losses due to livestock mortality, morbidity, and organ and meat condemnation at the meat inspection. It also poses a serious threat to public health where close association exists between dogs, man and food animals [9]. Many tropical countries are hydatidosis endemic and this poses a threat to development. There is paucity of information on hydatidosis in domestic livestock and most of the documented reports are based on postmortem findings from abattoirs, thus mitigating public health intervention measure in this regard (This sentence is to be broken into two for ease of understanding and avoidance of grammatical errors).

The aim of this research is to determine the prevalence of cystic hydatidosis in bovine slaughtered in four selected abattoirs within Kaduna metropolis.

## 2. Materials and methods

This study was conducted in four selected abattoirs within Kaduna metropolis: Tudun Wada, Kakuri, Sabon Tasha and Kawo. The animals comprise of cows slaughtered in the abattoirs. The information on the breed of the cow, age, sex and body count score were obtained through the administration of questionnaires. Sample size was determined using the formula of [10] as follows:

$$N = \frac{(1.96)^2 (p_{exp})(-p_{exp})}{d^2}$$

Where Pexp = expected prevalence

N= Total number of sample size

D = Required precision.

A total of 160 that is 40 from each abattoir were randomly sampled and examined for the presence of the hydatid cysts(The sentence to be reframed. A total of what isn't written and doesn't make a complete sense of it?). All organs harboring hydatid cysts were partially or totally condemned and judged according to guideline on meat inspection for developing countries. According to their size, hydatid cysts were then classified as small (<4cm), medium (4-8cm) and large (>8cm).

economic loss due to hydatidosis(This sentence to be dived into as it deals with different issues).

The direct loss was calculated based on the condemned organs (lungs, liver, heart, spleen and kidney) and the indirect loss was obtained on the basis of the live weight reduction due to hydatidosis. All data obtained were subjected to statistical analysis using SPSS(Version of it should be stated) and Chi Square. All value of ( $P < 0.05$ ) is considered significant.

There should be section of Data analysis. This constitute all tools used in the analysis of data obtained from the research.

### 3. Results

The result of relative distribution of the cysts in different organs of the cattle is shown in Table 1. The relative prevalence of the cysts is more in the lungs followed by the liver with 42.9% and 38.0% respectively. The least occurrence was in the heart and spleen with 4.76% each.

Each table to be followed by its summary of the results for ease of understanding and per international standard. And the results section to be sub-numbered as per the each parameter carried out.

The status of cysts from different organs of the cattle slaughtered in the four abattoirs is presented in Table 2. In the lungs, there were eight cases of fertile viable cysts, which represent 47.05%, non-viable were six, which represents 35.2%, two cases of sterile cysts, which represent 11.76% and one case of calcified cysts which represent 5.8%. Only one case of viable cysts in the liver occurred which represent 7.14%. No case of non-viable and sterile cyst was found in the liver. There were 13 calcified cases which represent 92.8%. All the cases occurred at 33.3 % in the kidney with the exception of the calcified(This sentence to be reframed. Is it 33.3% of the

cases are in the kidney). In the spleen and heart, one case each of non- viable and sterile occurred respectively

The economic loss due to *Echinococcus* spp infestation was estimated to be N17, 862,348. This was as a result of organs condemnation and weight loss by animal (Could you explain explicitly how weight loss was used to determine the economic loss considering the fact that other disease conditions could lead to the weight lost in cattle?). In this study, a total of 17 lungs averaging 1.2kg; 14 livers with average of 3.5kg; three kidneys with an average of 0.6kg and one heart with an average of 0.7kg were discarded due to infestation with hydatid cysts. These constitute a loss to the livestock farmers as the average cost of 1kg of meat in the market was N1350.00.

**Table 1: Relative distribution of cysts indifferent organs of the cattle**

Organ	No positive (Positive number)	% Percentage
Lung	9	42.9
Liver	8	38.0
Spleen	1	4.76
Kidney	2	9.50
Heart	1	4.76
Total	21	100

In the Table 1, No positive isn't standard. It could be misinterpreted. It should have been No. of Positive or Number of Positive.

**Table 2: Status of cysts indifferent organs of the cattle slaughtered in the four abattoirs.**

Organs	No. of cysts examined	Viable cysts (%)	Non-viable cysts (%)	Sterile cysts (%)	Calcified cysts (%)
Lung	17	8(47.05)	6(35.2)	2(11.76)	1(5.8)
Liver	14	1(7.14)	-	-	13(92.8)
Kidney	03	1(33.3)	1(33.3)	1(33.3)	-
Spleen	01	-	1(100)	-	-
Heart	01	-	-	1(100)	-
Total	36	10(27.8)	8(22.22)	4(11.11)	14(38.9)

#### 4. Discussion

The prevalence of hydatidosis of 12.2% in this study is closer to the 15.4% reported by [11]. However lower than the findings of 20.5% reported in Kano by [12] and 24.3% reported from southwest Nigeria by [13]. Differences in the culture, social activity, animal husbandry systems, lack of proper removal of infectious carcasses, and the attitude to dogs in the different region could be factors that contributed to the variations in the prevalence in different areas of the country. The higher prevalence of cysts in the lungs and the liver in this study agree with the work of [14] and [15] who observed hydatid cysts in the domestic animals. This could be due to possession of great capillaries which is usually encountered by the migrating Echinococcus oncosphere which adopt the portal vein route, and primarily negotiate hepatic and pulmonary filtering system sequentially before any other peripheral organ is involved. It is also possible that the hexacanth embryo can enter the lymphatic circulation and be carried through the thoracic duct to the lungs in such a way that the lungs may be infected before the liver. The fertile cyst of 50% observed in this study is in agreement with the study by [9]. This higher fertility rate highlights the hazard that these animals perpetuate in the cycle of hydatidosis when

slaughtered, and the raw offal fed to dogs and other wild carnivores. The economic loss of N17, 862,348 due to hydatidosis is enormous and could be curtailed to boost the profit merging farmer. (This sentence to be reframed. The meaning isn't understood completely.)

From this study, hydatidosis is an important disease of cattle in Kaduna metropolis and its surroundings, causing substantial losses due to condemnation of organs and weight loss in the infected livestock. Much attention and resources should be channeled to research in order to curtail the mode of transmission of this parasites from definitive host to intermediate hosts and vice-versa.

## 5. Conclusion

Health workers should be empowered to enlighten the abattoirs operation on the claim of hydatidosis transmission. They should also increase inspection visits and monitoring of abattoirs activities to avoid illegal consumption of hydatid infected organs. Anti-helminthic drugs should be made available to the bovine farmers in order to eliminate the parasites.

## Ethical Approval

The management of experiment, Animal care and handling were approved by the Department of Biological Sciences, Nigerian Defence Academy Kaduna.

## References

1. Magaji AA, Oboegulem SI, Daneji AI, Garba HS, Salihu MD, Junaidu AU. Incidence of hydatid cyst disease in farm animals slaughtered at Sokoto central abattoir, Sokoto State, Nigeria. *Vet. World.* 2011; 4(5): 197-200.
2. Ogunsan EA, Umar IO, Bannor TT, Majyagbe KA. Hydatidosis in slaughtered camels in Sokoto State Nigerian. *Nigerian Vet. J.* 2000; 21: 1-9.
3. Luka SA, Ajogi I, Nock I, Kudi C, Umorh J. Evaluation of enzyme linked immunosorbent assay (ELISA) and western blotting for the immunodiagnosis of hydatid diseases in sheep and goats. *Internet J. Vet. Med.* 2009; 5(2): 3-5.
4. Schantz PM. Parasitic zoonosis in perspective. *Int. J. Parasitol.* 1990; (2): 165-166.

5. Biu AA, Abagwe SA. Prevalence of hydatidosis among food animals in semi-arid North-Eastern Nigeria. *Bioscience Research Community*. 2002; 14(1): 85-91.
6. Tijjani AO, Musa HI, Atsanda NN, Mamman B. Prevalence of hydatidosis in sheep and goats slaughtered at Damaturu abattoir, Yobe state Nigeria. *Nigerian Vet. J.* 2010; 31(1): 71-75.
7. Jenkins JD. Hydatidosis; a zoonosis of unrecognized increasing importance. *J. Med. Microbiol.* 1998; 47: 282-282.
8. National Animal Health Information System (NAHIS). Echinococcosis. Animal Health Australia. 2004. <http://www.aahc.com.au/nahis/disease/dislist.as>. Retrieved January 28, 2020.
9. Kebege N, Mitiku A, Tilahun G. "Hydatidosis of slaughtered animals in Bahir Dar Abattoir North-western Ethiopia" *Trop. Anim. Health Prod.* 2009; 4: 43-50.
10. Thrusfield MV. *Veterinary Epidemiology*, (3<sup>rd</sup> edition). Wiley 2005; 584.
11. Dada BJO. Taeniasis, cysticercosis and echinococcosis/hydatidosis in Nigeria: III-prevalence of bovine and porcine cysticercosis, and hydatid cyst infection based on joint examination of slaughtered food animals. *J. Helminthology*. 1980; 54: 293-297.
12. Luka SA, Ajogi I, Nock IH, Umoh JU, Kudi AC. Serodiagnosis of hydatidosis in camels slaughtered in Kano abattoir, northern Nigeria. *Pan-African J. Series*. 2011; 39: 1.
13. Oyedutan AA, Temitope UK, Emmanuel CU. *Echinococcus granulosus* prevalence in dogs in Southwest Nigeria. *J. Parasitol. Res.* 2014; 2014.
14. Njoroge E. M., Mbithi P. M., Gathum J. M. and Zeyhle E (2002). A study of cystic echinococcosis in slaughter animals in three selected areas of northern Turkana Kenya. *Veterinary Parasitology*: 104 (1): 85-89.
15. Eckert J, Gotstein B, Health D, Liu FJ. Prevention of echinococcosis in humans and safety percussion. In: WHO/OIE Manual on Echinococcosis in humans and animals; a

public health problem of global concern. Eckert J, Gemmell MA, Meslin FX, Pawlowski ZS. (Editors). World Organization for animal Health, Paris, Price 2001; 238-247.

UNDER PEER REVIEW