



# Prevalence and characterization of hydatid cysts in sheep slaughtered at Korçë, Albania

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## INTRODUCTION

Hydatid disease (cystic echinococcosis) is a chronic granulomatous zoonotic disease that affects sheep and results from the development of the intermediate larval stage of *Echinococcus granulosus* in various sites at different organs, principally the liver and lungs. Dogs and several other carnivores act as definitive hosts. Sheep are the most known intermediate hosts. This disease causes widespread morbidity and mortality worldwide. Several studies indicated that hydatid disease is an endemic zoonotic disease in Albania affecting both humans and their domestic animals. Hydatidosis is an economic problem because of many condemnations for infected organs. The hydatid cysts grow slowly and take several years to cause symptoms. Liver and lungs are the most common sites of the cysts but could be found in other organs such as the spleen, heart, and kidneys. Several studies indicated that hydatid disease is an endemic zoonotic disease in Albania affecting both humans and their domestic animals. The prevalence of hydatidosis in sheep was 28.5-50%. Therefore, the current study was conducted to evaluate the prevalence of hydatidosis among slaughtered sheep at Korça, Albania.

## MATERIALS AND METHOD

The study on hydatid disease was conducted in Korçë, Albania, between January and December 2024, focusing on detecting hydatid cysts in sheep slaughtered at local abattoirs. A total of 1,072 sheep were inspected biweekly, with grazing being the primary husbandry practice prior to slaughter. The aim was to identify the prevalence and distribution of hydatid cysts in the liver, lungs, heart, kidneys, and spleen using standard meat inspection procedures. During the post-mortem examination, each organ was visually inspected for cysts, and any suspected cysts underwent further examination, including cuts to confirm the presence of hydatid cysts. The cysts were categorized by size (small, medium, or large) based on their diameter, with small cysts measuring less than 4 cm, medium cysts between 4-8 cm, and large cysts greater than 8 cm. Additionally, cyst fertility was assessed by examining the cyst contents. The cysts were divided into four categories: sterile (no protoscolices), calcified/nonviable (with dead protoscolices), and fertile (with live protoscolices). Fertility was confirmed by staining the cyst contents and examining them under a microscope to identify the motility of protoscolices. The collected data were statistically analyzed to determine the infection rate of hydatidosis among sheep. These findings will contribute to understanding the spread of hydatidosis in Korçë and provide valuable information for implementing effective control measures.

## RESULTS

The study was conducted in Korçë, Albania, from January to December 2024 to assess the prevalence of hydatidosis in slaughtered sheep. A total of 1,072 sheep were examined at the slaughterhouse, and 213 (19.8%) were found to be infected with hydatid cysts. The most commonly affected organs were the lungs and liver, while the spleen, kidney, and heart were not infected. These findings are consistent with previous studies in other regions. The prevalence observed in this study was lower than past reports in Albania, where hydatidosis in sheep ranged from 5% to 75%, depending on the region. Earlier studies in Albania found that echinococcosis was most prevalent in southern and western parts of the country, including Vlorë, Tepelena, and Gjirokastrë. Similar studies from other countries showed variable prevalence rates: 4.4–16.8% in Iran, 7.63% in Morocco, 48.7% in Tanzania, and up to 62.9% in Italy. Other reports from Greece and Turkey also indicated high prevalence rates, emphasizing the widespread nature of the disease.

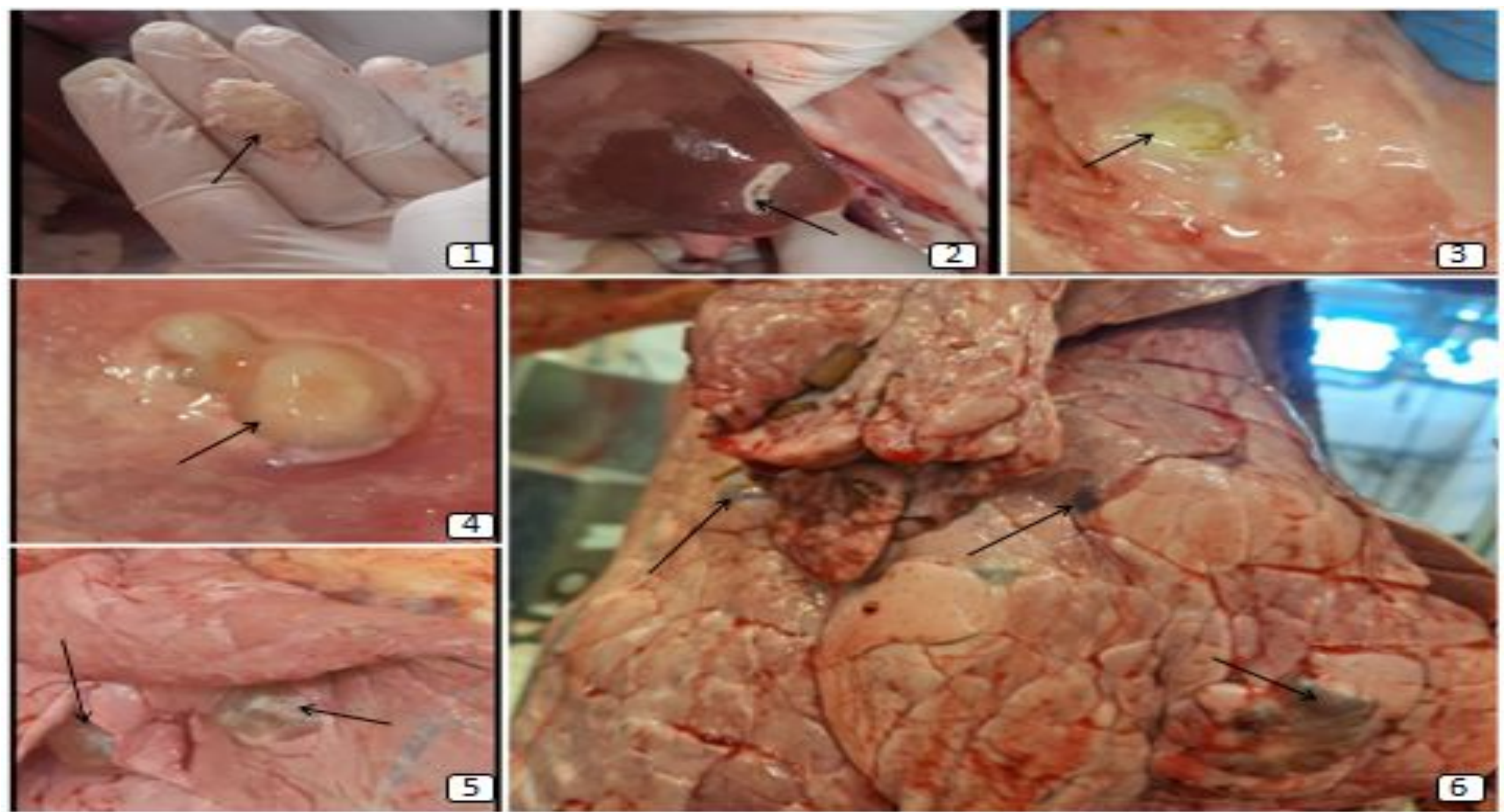
The study confirmed that older sheep were more susceptible to hydatidosis, with infection rates increasing with age. The cysts varied in size and shape, often protruding from or deeply embedded within the affected organs. The lungs were the most frequently infected organ (53.5% of cases), followed by the liver (46.5%). This can be explained by the double blood circulation in these organs, which facilitates the trapping of oncospheres during the infection process. Other researchers suggest that the liver is primarily affected due to the portal vein's role in spreading oncospheres, while the softer lung tissue allows cysts to grow larger than in more compact organs like the liver.

Organs	No.Total	Positive	[%]
Liver	1072	99	46.5%
Lungs	1072	114	53.5 %
Heart	1072	0	0%
Spleen	1072	0	0%

**Table 1.** The overall prevalence of hydatidosis among sheep

Cyst size determination revealed that large cysts were most common (66%), while medium and small cysts were equally distributed (17% each). The cysts were further classified based on fertility: 71% were fertile, 26.7% were sterile, and 2.3% were calcified. The higher number of calcified cysts in the liver was attributed to the organ's immune response and connective tissue reaction. The hydatid cysts observed in the infected sheep were mostly round, soft, and filled with clear or slightly cloudy fluid. However, some calcified cysts were hard, granular, and difficult to cut.

The study also confirmed that cyst size and number increased with the age of the animals, supporting findings from previous research. The lung parenchyma's spongy structure facilitates widespread oncosphere development, providing ample space for cyst growth. The liver, with its dense structure, restricts cyst enlargement. Studies have reported that hydatid cysts in the lungs tend to be larger than those in the liver, a trend also observed in this study.



**Fig. 1** Calcified Hydatid Cyst

**Fig. 2** Hydatid Cyst (Liver)

**Fig. 3** Hydatid Cyst (Lungs)

**Fig. 4** Hydatid Cyst (Calcified)

**Fig. 5** Hydatid Cyst (Lungs)

**Fig. 6** Hydatid Cyst (Lungs)

## CONCLUSIONS

This study found a lower hydatid cyst infection rate in Korçë compared to other Albanian regions, possibly due to urban-rural differences. Hydatid disease remains a significant public health and economic issue, with the lungs being the most affected organ, followed by the liver. The high fertility of cysts suggests ongoing transmission to dogs, sustaining the disease cycle. Effective control measures, including stricter slaughterhouse monitoring, stray dog treatment, and proper disposal of infected offal, are essential to reducing transmission and managing hydatidosis in the region. Increased efforts are needed to limit the environmental and epidemiological risk factors.

The findings from this study contribute to a better understanding of the epidemiology of hydatidosis in Albania, confirming that the disease remains prevalent but at a lower rate than in previous decades. Understanding the infection dynamics and cyst characteristics in sheep can help develop targeted interventions to minimize the economic and public health burden of hydatidosis in endemic regions.