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Investigation of Hydatid cyst in Animals in Erbil City

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Abstract *Echinococcus granulosus* larvae produce cystic echinococcosis, also known as hydatidosis. It is one of the most important zoonotic parasitic infections in livestock globally. This study aimed to: To determine the prevalence of the infected herbivorous animals with hydatid cyst within Erbil City. A cross-sectional investigation was carried out in Erbil City to ascertain the risk variables linked to the incidence of the illness and to estimate the prevalence of hydatidosis in animals (cows, goats, and sheep). A minimum of two vets examined every animal that was slaughtered. Records from the Erbil City abattoir show that 583 cows (0.9%) and 1505 sheep and goats (1.24%) have hydatid cyst illness during the 10 months (3/1/2023 – 19/10/2023), The majority of affected animals were adults, while some young animals were also infected. Erbil City still has an endemic hydatid cyst. Sheep play a crucial part in the maintenance of the *Echinococcus granulosus* life cycle because they have a higher prevalence, intensity, and fertility of hydatid cysts than other species.

Key words: *Echinococcus, Hydatidosis, Hydatid Cyst, Protoscolices, Erbil City*

Introduction Cystic echinococcosis (CE), a global disease brought on by the tapeworm larva, is one of the most significant zoonoses in the world (1). By contaminating the environment with their eggs, domestic dogs—the definitive hosts of adult *Echinococcus granulosus*—are the primary cause of infection in Middle Eastern nations. However, in Iran, Iraq, Jordan, Lebanon, Syria, Kuwait, and Saudi Arabia, hydatid cyst infections have been often investigated in sheep, goats, cattle, camels, buffalo, pigs, and donkeys (2). Hydatid cysts are still quite common around the world and can cause a number of health issues for people, including the possibility of death (3). Hydatid cysts are still quite common around the world and can cause a number of health issues for people, including the possibility of death (4). Hydatid cysts have the potential to burst into the surrounding tissues as they enlarge. Hepatic hydatid cysts can burst into the stomach, duodenum, or small intestine, which are uncommon side effects. Cholangitis, biliary colic, jaundice, and the excretion of germinative membranes in the feces can all result from a rupture into the biliary tree (5). When the cysts burst, the hydatid fluid's allergic inflammatory reaction in the circulation might result in abrupt death (6). Usually, the disease has no symptoms. On the other hand, it may present clinically as a complex cyst. Compression or rupture of pericystic structures is the most common consequence (7). Humans become infected when they consume embryonated eggs through their hands, food, beverages, or other items tainted with parasite eggs; the larvae then enter the bloodstream and lymphatic system and go to the liver, lungs, and other organs (8). Almost any area of the body can develop cystic hydatid disease. The liver (60%) and lung (30%) are the most often affected organs (9). The disease known as human cystic echinococcosis/hydatidosis is brought on by an

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infection with the tapeworm *E. granulosus*. After people consume infected vegetables that contain parasite eggs, the liver is where well-defined spherical primary cysts form most often (around 65% of cases), followed by the lung (25%). Cysts also less frequently affect the kidneys, spleen, brain, bones, glands, and muscles (10). Since there are presently no medications that effectively cure hydatid cysts, the chemotherapeutic therapy of cystic echinococcosis remains unresolved (11). The only recognized course of treatment up to this point is surgically excising the cyst (12). The initial course of treatment is surgery. Whenever feasible, it must be taken into consideration. Surgery is contraindicated in general. Additionally, patients with many cysts may find surgery more challenging, and patients with calcified, dead, or extremely tiny cysts may question the need of surgery (13). The best course of therapy for hydatid cysts is still surgical excision. Albendazole 10–15 mg/kg daily for one month or mebendazole 50–150 mg/kg daily for three months may be used in situations of inoperable hydatid cysts or when the patient's overall health prevents surgery, albeit the outcomes are uncertain. Additionally, albendazole is advised to avoid recurring secondary illness (14). Due to diseases of many organs, hydatid disease has resulted in a considerable loss of cattle. Northern Europe is not prone to echinococcosis. The Mediterranean nations, the Middle East, the southern region of South America, Iceland, Australia, New Zealand, and the southern regions of Africa are the endemic areas; the last five are places with intense endemicity. Additionally, China and Central Asia are endemic regions (15).

Material and Methods

Ethical Approval

The project was approved (Ref. No. 45-264 in 24/6/2025) by the Committee for Research Ethics at the College of vet. medicine, University of Al-Salahaddin, Iraq.

Study Area

The current study was conducted in Erbil, which has an average elevation of 36.2 north and 44 south, and covers an area of around 15,345 km². About 1,600,000 people live in the area, with the majority of them residing inside the city. Outside the city is the slaughterhouse. Additionally, some butchers engage in unregulated house slaughter within the city, which takes place in little markets or locations that are not dedicated to animal slaughter and is carried out without official approval or veterinary supervision.

Animal Selection

At the time of slaughter, hydatid cysts were checked for in the liver, lungs, and other organs of cows, goats, and sheep. To determine if the hydatid cysts were fertile or sterile based on the presence or lack of protoscolices in the cysts, the organs containing the cysts were also collected and transported to Animal Physiology Lab.

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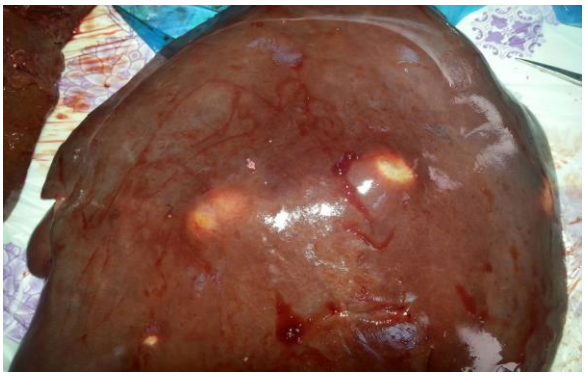

Figure 1: Cows' lung & liver infected with hydatid cyst
Sampling and inspection of slaughtered animals

Sampling and inspection of slaughtered animals

Between March 1, 2023, and October 19, 2023, a total of 1505 sheep, goats, and 583 cows were inspected at the Erbil city slaughterhouse for the presence of hydatid cyst disease. While some young animals were infected, the majority of the infected animals were adults, and each animal that was slaughtered was examined by at least two veterinarians.

Methods

In the laboratory disposable syringes were used to draw the fluid from the infected liver and lung about 2 ml and put it in a test tube then the test tube placed in the centrifuge at 3000 rpm for 5 minute then after centrifugation is done the tube has taken out and got rid of the fluid except the bottom which contains the precipitant, and then one drop was taken on the slide covered with the cover slip and examined under the microscope for the presence of the protoscolices.

In accordance with FAO/UNEP/WHO guidelines, a comprehensive visual inspection, palpation, and methodical incision of every visceral organ—especially the liver and lung—were performed during the post-mortem examination with the assistance of veterinarians (16). Organs that were infected were sent to the College of Science Department of Medical Microbiology.

Results

A total of 67,500 cows (121,500 sheep and goats were inspected for the presence of hydatid cyst, and (1505) sheep and goats were found to be infected (Table 1).

Table 1: The number of infected animals with *Echinococcus granulosus* in Erbil City

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sepr	Oct	Total
Sheep &Goats	135	139	123	161	183	198	201	163	134	68	1505
Cows	68	44	46	56	61	105	55	68	51	29	583

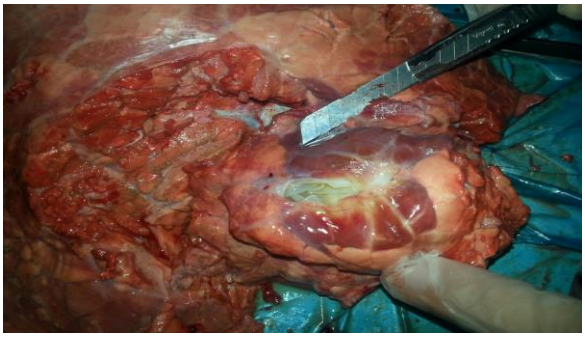

Figure 2: Infected lung and liver during processing, using a sharp lancet.

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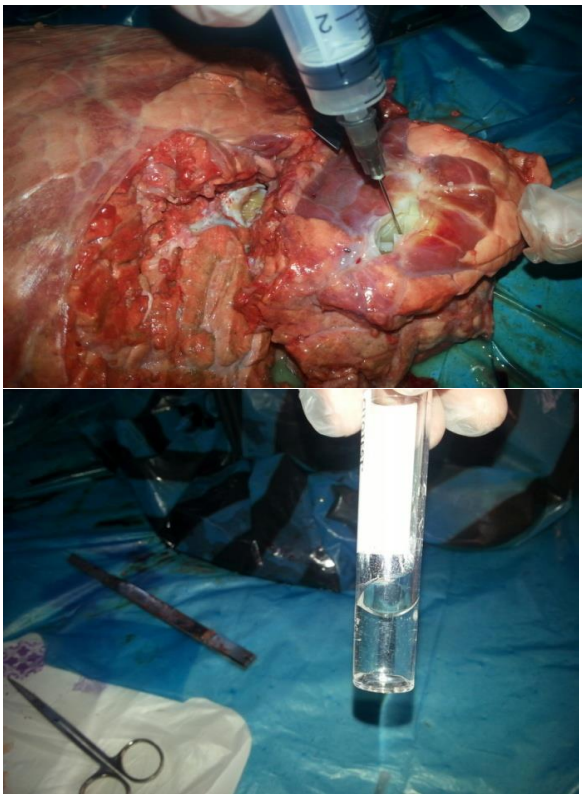

Figure 3: Drawing the Hydatid cyst fluid (HCF) from the infected organs.

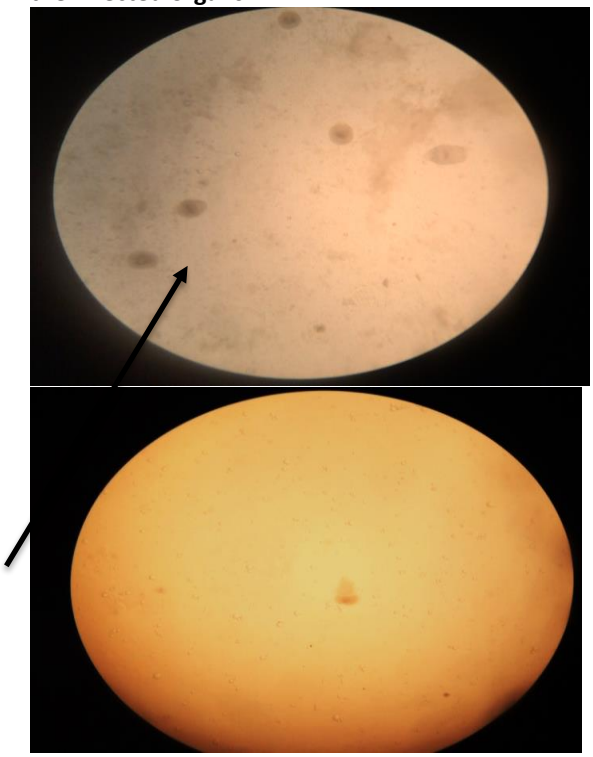

Figure 4: illustrating the cysts and protoscolices under 100x magnification

The number of infected cows was found to be highest during June (105 out of 6750) and the lowest during February (44 out of 6750) by ignoring the last month (October) which is not finished yet during the study period (Chart 1).

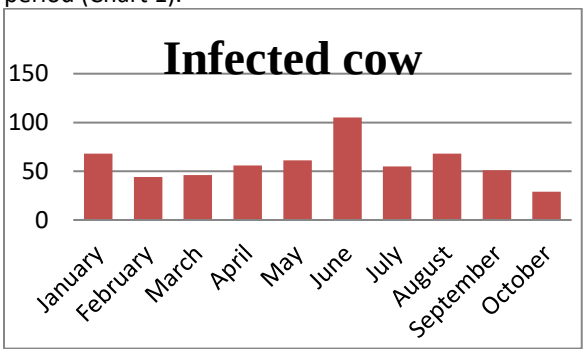

Chart 1: The number of infected cows with *Echinococcus granulosus* in Erbil City

The number of infected sheep and goats was found to be highest during July (201 out of 12,150) and the lowest during march (123 out of 12,150) by ignoring the last month (October) which is not finished yet during the study period (Chart 2).

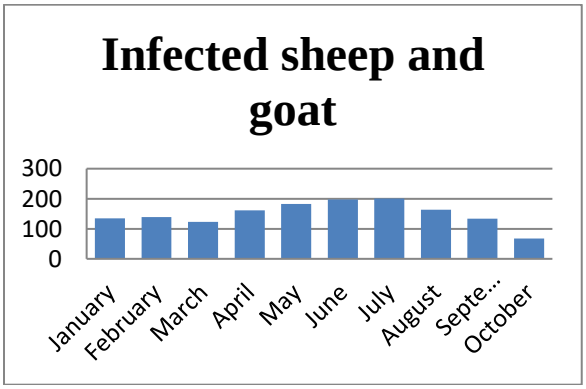

Chart 2: The number of infected sheep and goats with *Echinococcus granulosus* in Erbil City

The number of infected sheep and goats (72%) was found to be higher than the number of infected cows (28%) (Chart 3).

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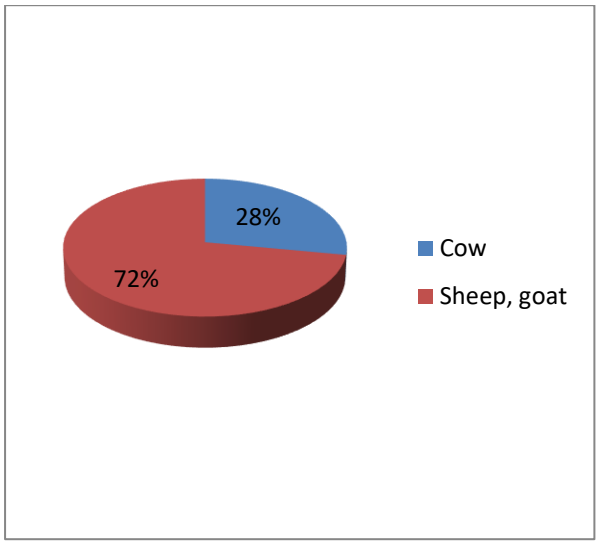

Chart 3: The percentage of infected animals with *Echinococcus granulosus* in Erbil City

Discussion

The percentage of the infected animals from the uninfected for the cows (200-300) animals slaughtered daily during this period is 0.9%, while the percentage of infected sheep and goats from the uninfected (400-500) animals slaughtered daily is 1.24%. Hydatid cyst important medical and veterinary problem in the Middle East (17). The current study was conducted to evaluate the prevalence of this disease on livestock in Erbil City. In present study, hydatidosis was more common in sheep and goats than in cows. Although the incidence of infection varies, the disease mostly strikes all of them in old age, increasing the danger of coming into contact with *E. granulosus* eggs. Additionally, younger animals (cattle, sheep, and goats) are slaughtered at a younger age than older ones. Compared to cattle, which had an infection rate of 0.9%, sheep and goats had a higher prevalence of 1.24%. Similar outcomes were found in earlier research (18). The epidemiology of hydatidosis, is heavily influenced by a number of variables. The prevalence of echinococcosis in Sudan, particularly in the Southern, Western, and Central Regions, has probably increased recently as a result of a rise in dog ownership, even though effective mass chemotherapy and control measures against the parasite's larval and adult stages have not yet been formally adopted. This problem is sometimes exacerbated by dogs' close connection to people and domesticated animals. Furthermore, societal structures, cultural practices, land use, human behavior, and other groups' lives and customs can all have an effect (19). Alternatively, because wild animals prey on domestic animals, they may enter the parasite's life cycle. Examples include the hyena-sheep-goat-prey and lion-camel/cattle-prey partnerships in western Sudan and maybe elsewhere (20). Human and animal hydatidosis were both common in the Sudan (21). Further research is still necessary to determine the true extent of the disease in Sudan's domestic animals, wild animals, and people, despite all the studies. Slaughtered animals may go through many owners on route to the slaughterhouse, making it challenging to identify the origins of illness. The incidence of hydatidosis in this study is thought to be caused by improper disposal of condemned afflicted organs, uncontrolled animal slaughter, and inadequate meat hygiene measures. In several investigations, hydatidosis was more common in cattle than in sheep. This discrepancy may be explained by the fact that small ruminants are killed at a relatively young age (usually less than three years old) in contrast to cattle, which are slaughtered at an older age (usually older than seven years old), increasing the risk of exposure to *E. granulosus* eggs. The prevalence of hydatidosis in cattle was 0.9% in the current study, which is less than the 6.42% prevalence found in cattle analyzed in Southern Darfur State by the authors. Prevalence rates in cattle were 6.2% and 7.6%, according to other research (22). In contrast, Equatoria province cattle analyzed showed a high prevalence rate of 25%. They cited the high prevalence rate of dogs in the region (86.5%) as an explanation for this high prevalence rate. Similarly, a high prevalence rate in cattle (24.8%) was reported by others in western Sudan (23). Nonetheless, Sudan reported a low incidence percentage of bovine hydatidosis (3.84%). In this investigation, the majority of ovine hydatid cysts were found in the liver, whereas bovine cysts were equally distributed between the liver and the lungs. In both situations, the bulk of the cysts seen in this investigation are the result of the accumulation of lung and liver cysts. These outcomes were consistent with those reported by regarding the liver and the lung. This may be because the migrating *Echinococcus oncosphere* (hexacanth embryo) uses the portal vein route and primarily navigates the hepatic and pulmonary filtering systems sequentially before any other peripheral organ is involved. The lungs and livers have the first great capillary sites that the embryo encounters. Furthermore, the lungs had

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more hydatid cyst infections than any other organ, most likely as a result of the lungs' larger capillary beds than those of other organs (24). The least impacted organs in the animals under study include the kidney, mesentery, and skeletal muscles. However, oncospheres that escape into the general systemic circulation might occasionally cause the formation of hydatid cysts in other organs and tissues (25). Animal hydatid cysts can in significant financial losses (26). This issue still exists in Erbil City and requires addressing. For slaughterhouses to avoid infecting stray dogs, condemned offal must be properly managed.

Conclusion

The recent investigation indicates that there is still an endemic hydatid cyst in Erbil City. Since sheep have a higher frequency, severity, and fertility of hydatid cysts than other animals, they are essential to the maintenance of the *Echinococcus granulosus* life cycle. Therefore, the careful disposal of infected offal especially that of sheep, will significantly reduce the transmission of cysts from slaughterhouses to potential hosts in this area. In areas where echinococcosis is endemic, workers must address the problem of early detection since this might assist prevent the distressing effects of the infection.

Recommendations

Regular monitoring of hydatid cyst cases in slaughtered animals should continue in Erbil City to control the spread of infection. Public awareness on safe slaughtering practices and proper disposal of infected organs is essential. Deworming of stray and domestic dogs should be implemented regularly, as they are key hosts in the parasite's life cycle. Further molecular studies are recommended to identify circulating Echinococcus strains for better control strategies.

Limitations

This study was limited to animals slaughtered within Erbil City abattoirs, which may not represent all livestock in the region. Molecular identification of *Echinococcus* species was not performed, and seasonal variations in infection rates were not assessed.

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Conflicts of interest

There are no conflicts of interest.

References

1.Deplazes P, Rinaldi L, Rojas CA, Torgerson P, Harandi M, Romig T, et al. Global distribution of alveolar and cystic echinococcosis. Advances in parasitology. 2017;95:315-493. https://doi.org/10.1016/bs.apar.2016.11.001.

2.Joanny G, Cappai MG, Nonnis F, Tamponi C, Dessì G, Mehmood N, et al. Human cystic echinococcosis in Lebanon: a retrospective study and molecular epidemiology. Acta Parasitologica. 2022;67(1):186-95. 10.1007/s11686-021-00453-w.

3.AL-Ubaide A, AL-Jeboori T, Juma A. S. ADAlevel in patients with hydatid disease (Echinococcus granulosis). Iraqi J Med Sci. 2003;2(1):25-8.

4.Abdybekova A, Sultanov A, Karatayev B, Zhumabayeva A, Shapiyeva Z, Yeshmuratov T, et al. Epidemiology of echinococcosis in Kazakhstan: an update. Journal of helminthology. 2015;89(6):647-50. https://doi.org/10.1017/S0022149X15000425.

5.Al-Jawabreh A, Dumaidi K, Ereqat S, Nasereddin A, Al-Jawabreh H, Azmi K, et al. Incidence of Echinococcus granulosus in domestic dogs in Palestine as revealed by copro-PCR. PLoS neglected tropical diseases. 2015;9(7):e0003934. https://doi.org/10.1371/journal.pntd.0003934.

6.Haleem S, Niaz S, Qureshi NA, Ullah R, Alsaid MS, Alqahtani AS, et al. Incidence, risk factors, and epidemiology of cystic echinococcosis: a complex socioecological emerging infectious disease in Khyber Pakhtunkhwa, Province of Pakistan. BioMed research international. 2018;2018. https://doi.org/10.1155/2018/5042430.

7.Zhang W, Zhang Z, Wu W, Shi B, Li J, Zhou X, et al. Epidemiology and control of echinococcosis in central Asia, with particular reference to the People's Republic of China. Acta tropica. 2015;141:235-43. https://doi.org/10.1016/j.actatropica.2014.03.01.

8.Rokni M. Echinococcosis/hydatidosis in Iran. 2009.

9.Baker F. A Fatal Myocardial Hydatid Cyst as a Cause of Sudden Natural Death. A Paper Presented in the First Arab International Forensic Sciences and Forensic Medicine Conference (12-14 November 2007) at Naif Arab University for Security Sciences. Ryad, KSA. 2007.

10.Elmajdoub LO, Rahman WA. Prevalence of hydatid cysts in slaughtered animals from different areas of Libya. Open Journal of Veterinary Medicine. 2015;5(01):1. 10.4236/ojvm.2015.51001.

11.Schurer JM, Rafferty E, Farag M, Zeng W, Jenkins EJ. Echinococcosis: an economic evaluation of a

veterinary public health intervention in rural Canada. PLOS Neglected Tropical Diseases. 2015;9(7):e0003883. https://doi.org/10.1371/journal.pntd.0003883.

12.Vaidya V, Zende R, Paturkar A, Gatne M, Dighe D, Waghmare R, et al. Cystic echinococcosis in animals and humans of Maharashtra State, India. Acta Parasitologica. 2018;63(2):232-43. 10.1515/ap-2018-0027.

13.Garjito TA, Mujiyanto M, Sudomo M. Echinococcosis: past and present situation in Southeast Asia. Overview on echinococcosis: IntechOpen; 2019. 10.5772/intechopen.89908.

14.Craig P, Mastin A, van Kesteren F, Boufana B. Echinococcus granulosus: epidemiology and state-of-the-art of diagnostics in animals. Veterinary parasitology. 2015;213(3-4):132-48. https://doi.org/10.1016/j.vetpar.2015.07.028.

15.Amer S, Helal IB, Kamau E, Feng Y, Xiao L. Molecular characterization of Echinococcus granulosus sensu lato from farm animals in Egypt. PLoS One. 2015;10(3):e0118509. https://doi.org/10.1371/journal.pone.0118509.

16.Organization WH. Report on FAO/UNEP/WHO meeting on research requirements in echinococcosis/hydatidosis and taeniasis/cysticercosis, Geneva, 29 April-1 May 1981. World Health Organization, 1982.

17.Daryani A, Alaei R, Arab R, Sharif M, Dehghan M, Ziaei H. The prevalence, intensity and viability of hydatid cysts in slaughtered animals in the Ardabil province of Northwest Iran. Journal of Helminthology. 2007;81(1):13-7. https://doi.org/10.1017/S0022149X0720731X.

18.Saida LA, Nooraldeen KN. Prevalence of parasitic stages in six leafy vegetables in markets of Erbil city, Kurdistan region-Iraq. Zanco Journal of Pure and Applied Sciences. 2014;26(2):25-30.

19.Craig P, Hegglin D, Lightowlers M, Torgerson PR, Wang Q. Echinococcosis: control and prevention. Advances in parasitology. 2017;96:55-158. https://doi.org/10.1016/bs.apar.2016.09.002.

20.Amarir FE, Saadi A, Marcotty T, Rhalem A, Oukessou M, Sahibi H, et al. Cystic echinococcosis in three locations in the Middle Atlas, Morocco: Estimation of the infection rate in the dog reservoir. Vector-Borne and Zoonotic Diseases. 2020;20(6):436-43. https://doi.org/10.1089/vbz.2019.2538.

21.Dán Á, Rónai Z, Széll Z, Sréter T. Prevalence and genetic characterization of Echinococcus spp. in cattle, sheep, and swine in Hungary. Parasitology Research. 2018;117(9):3019-22. 10.1007/s00436-018-5977-5.

22.Mirzaei M, Rezaei H, Nematollahi A. Role of ruminants in the epidemiology of Echinococcus granulosus in Tabriz area, Northwest of Iran. Tropical Biomedicine. 2015;32(2):269-75.

23.Ahmed AME. Experimental and Clinical Studies on Cystic Echinococcosis at Tamboul, Gezira State, Sudan: University of Gezira; 2016.

24.Getaw A, Beyene D, Ayana D, Megersa B, Abunna F. Hydatidosis: prevalence and its economic importance in ruminants slaughtered at Adama municipal abattoir, Central Oromia, Ethiopia. Acta tropica. 2010;113(3):221-5. https://doi.org/10.1016/j.actatropica.2009.10.01.

25.Otero-Abad B, Torgerson PR. A systematic review of the epidemiology of echinococcosis in domestic and wild animals. PLoS neglected tropical diseases. 2013;7(6):e2249. https://doi.org/10.1371/journal.pntd.0002249.

26.Issa AR, Arif SH, Mohammed AA, Santolamazza F, Santoro A, Mero WMS, et al. Insights into human cystic echinococcosis in the Kurdistan Region, Iraq: characteristics and molecular identification of cysts. Pathogens. 2022;11(4):408. https://doi.org/10.3390/pathogens11040408.