



Investigating the Prevalence of Hydatid Cyst Disease in Slaughtered Cows in Al-Diwaniyah Province, Iraq

Asifa M. Almaeahi^{1*}, Hiba R. Al-abodi², Rajwan Jawad Hassan¹

¹Department of Biology, College of Education, University of Al-Qadisiyah, Al-Diwaniyah, Iraq

²Department of Environment, Collage of Science, University of Al-Qadisiyah, Al-Diwaniyah, Iraq

Abstract

Introduction: There are many pathogens, which have made their way as pathogens common to animals of different races and between the human races. A prevalent illness that harms both humans and animals in different ways is hydatidosis. The current study was concerned with the study of this disease in cows according to their different ages and species. The illness is very important from a medical and financial standpoint.

Methods: (735) slaughtered cows were examined in Diwaniyah province, during the period from January to December 2023. The number of males was 449 and the number of females was 286, the affected organs were investigated in the parts of the carcass (liver, spleen, kidneys, lungs, heart). Information was recorded about the slaughtered animals, such as the sex of the animal, its age, and the type of the affected organ.

Results: The results obtained from this study indicated that the rates of infection vary according to the months of the year. The highest rate was in January (36.61%), while the lowest rate of infection was in August. The results showed that the quantity of contaminated female cows is above the number of infected males. The highest incidence was recorded in (liver and lung together) female cows (81.25%) and (67.74%) lung injury only. (9.09%) Liver injury only.

Conclusion: Hydatid cysts disease in cows and ruminants is of great importance and studies should be intensified in this aspect, due to the great damage caused by the parasite to the infected animal. In addition to the economic damage, then the greatest danger is the spread of the illness to humans. Based on all these reasons, the topic must receive great attention from researchers to prevent the spread of the disease.

Keywords: Hydatid cyst, Slaughtered cows, Prevalence, Al-Diwaniyah province, Iraq

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Introduction

There are many common diseases that humans can contract from animals and vice versa, including bacteria, viruses, parasites and tuberculosis. Hydatidosis is a widespread disease that affects not only humans, but also animals such as sheep, goats, cattle, buffaloes, horses, camels, deer, etc. (1,2). The disease results from the formation of various-sized vesicles within the interior organs, the liver and lungs specifically in both people and animals, and the severity of the illness is based on the quantity, size, and location of these vesicles (3,4). The disease has many negative effects on the health and economic scale, as it reduces the value of the quality of beef and milk productivity (5), in addition to the size of the material losses resulting from the tissue damage to the organs of infected animals, they are unfit for human consumption and are a dangerous source of spread of new infections (6,7).

The disease affects different organs in the organs of animals as in humans, and these organs are the liver, heart, lungs, brain, spleen, pancreas, and other organs, and thus cause serious health problems for the animal that may end its life (2,8). Hydatid cysts embody a stage of *Echinococcus*

granulosus larvae worms and can be located in the intestines of carnivores, including dogs, and infection occurs when human or animal food is contaminated with dog feces containing tapeworm eggs, or by contact or contact with an infected dog (2). When humans or animals eat these eggs, these eggs hatch, and a hexagonal embryo emerges from them, reaches the intestines, enters the bloodstream and travels to the liver, lungs and various places in the body, forming the so-called (bladder vesicle) that ranges in diameter between 1 and 15 cm (8,9,10). It is widespread all over the world due to its adaptation to herbivorous species, and inadequate control and treatment measures in developed and developing countries lead to significant economic losses. (11,12).

The disease of hydatid cysts is a serious health problem whose impact is reflected in social and economic aspects, as the spread of infection is expected in cattle and sheep because dogs are abundant in sheep and cattle grazing areas, the disease spreads in many areas globally and locally, as it is a real epidemiological problem, and The ailment is a serious epidemiological problem in the central and southern regions confined between the Tigris and



Euphrates rivers because this area is a suitable area for grazing and agriculture, in addition to the abundance of the host presence the environment, which are all important factors in the spread of the disease. The current study focuses on the prevalence of the aquatic cyst worm parasite in cows because of its great importance in the health, social and economic aspects.

Materials and Methods

(735) slaughtered cows were examined in Diwaniyah province, the number of males was 421 and the number of females was 281, the affected organs were investigated in the parts of the carcass (liver, spleen, kidneys, lungs, heart). Information was recorded about the slaughtered animals, such as the sex of the animal, its age, and the type of the affected organ. All the tissues surrounding the hydatid sac were removed using scissors, forceps and scalpel, and the creatures were divided into three age groups depending on its method (13). The statistical results were analyzed using variance analysis to identify the existence of significant differences between the totals, in addition to using the LSD test to find statistical differences.

Results

The study was concerned with examining (735) cows to investigate their infection in hydatid cysts, and the results obtained from the study recorded the highest rate of infection in January by (26) (36.61%) out of 120 samples examined during the months within which study, while the proportion of an infection was non-existent in the month of August, despite the examined cows (32) by (4.35%) of the head of cows. The highest number of males was for the examined is (71) in January (15.81%) and seven male cows were infection, but during the month of May, July,

August and November no infection was found among the males examined. The highest number of females (49) (17.13%) was examined in January, including (19) (37.25%) infection, while the lowest number of females examined was in August by a number of (5) (1.74%) None of them have been diagnosed with hydatid cysts. It is worth mentioning that the total number of examined cows was (735) of both gender, including males (449) by (61.08%), while females were (286) by (%38.91).

The results of the statistical analysis of the data of Table 1 indicated that there is a significant difference at ($P < 0.05$) between the average values of infected males and infected females during the study period.

The results indicated that the number of infected females is more than males, and the hydatid cysts were distributed between the lung and the liver as single or mixed infection, and the highest incidence was recorded in females (81.25%) 588 hydatid cysts, while in the lung the percentage was (67.74%), in addition to liver infection, which amounted to (9.09%). It is worth noting that the number of hydatid cysts varied greatly between organs, but the organ predominantly impacted is the lung the number of hydatid cysts, whether it is within the single or mixed infection. The incidence rate in males (45.07%) was also distributed between single lung infections (32.25%), mixed liver and lung injuries (18.75%) and single liver injuries (11.26%), as in Table 2.

Table 3 indicates the number of infections in female cows and The quantity of hydatid cysts found in the lung and liver as a single infection or in the liver and lung mixed infection during the study months, the highest percentage of infection for females was in January (37.25%), followed by March (15.68%), while no infection was recorded in August. The highest rate of lung infection was highest in

Table 1. Number and percentage of examined and infected cows under study during the months of the study

Month	Examined cows		Infected cows		Examined males		Infected males		Examined females		Infected females	
	NO.	%	NO.	%	NO.	%	NO.	%	NO.	%	NO.	%
January	120	16,32	26	36,61	71	15,81	7	35	49	17,13	19	37,25
February	29	3,94	4	5,63	19	4,23	1	5	10	3,49	3	5,88
March	92	12,51	10	14,08	52	2,33	2	10	40	13,98	8	15,68
April	26	3,53	4	5,63	5	1,11	2	10	17	5,94	2	3,92
May	71	9,65	3	4,22	54	12,2	0	0	17	5,94	3	5,88
June	63	8,57	6	8,45	41	9,13	2	10	19	6,64	4	7,84
July	35	4,76	1	1,40	19	4,23	0	0	6	2,09	1	1,96
August	32	4,35	0	0	27	6,01	0	0	5	1,74	0	0
September	90	12,24	2	2,81	63	14,03	1	5	24	8,39	1	1,96
October	67	9,11	7	9,85	29	6,45	2	10	31	10,83	5	9,8
November	28	3,8	1	1,40	19	4,23	0	0	11	3,84	1	1,96
December	81	11,02	7	9,85	50	11,13	3	15	22	7,69	4	7,84
Total	735		71	9,65	449	61,08	20	28,16	286	38,91	51	71,83

Infected females/ LSD: 2.2 Average:5.3, Standard error: ± 2.08 , Standard deviation:7.15 Infected male/ LSD:2.2 Average:2, LSD:1.9, Standard error: ± 0.5 , Standard deviation: 2.01

January (38.09%), but it was absent in July and August. The mixed incidence of liver and lung was highest in the secondary month of January (38.46%) and was absent during August, September and November. As for the

liver, the incidence rate is (25%) in January, March, May, December, and it is absent in the rest of the year.

Table 4 indicates the number of infections in males and the number of hydatid cysts recorded as single or mixed

Table 2. Number of Examined and Infected Cows and Number of hydatid cysts for Males and Females

gender	Examined		Infected cows		Total hydatid cysts		Lung infection		Hydatid cysts in the lung		Liver and lung infection		Hydatid cysts in the liver and lung		Liver infection		Hydatid cysts in the liver	
	NO.	%	NO.	%	NO.	%	NO.	%	NO.	%	NO.	%	NO.	%	NO.	%	NO.	%
Female	286	38,91	51	71.83	1214	73.53	21	67.74	621	73.54	26	81.25	588	77.06	4	50	5	9.09
males	449	61,08	20	28.16	437	26.46	10	32.25	212	25.45	6	18.75	175	22.93	4	50	50	90.90
Total	735		71	9.65	1651		31	43.66	833	50.45	32	45.07	763	46.21	8	11.26	55	3.33

Table 3. Female cows examined and infected and organs infected with hydatid cysts.

Month	Examined females		Infected females		Lung infection		Hydatid cysts in the lung		Liver and lung infection		Hydatid cysts in the liver and lung		Liver infection		Hydatid cysts in the liver	
	NO.	%	NO.	%	NO.	%	NO.	%	NO.	%	NO.	%	NO.	%	NO.	%
January	49	17,13	19	37,25	8	38.09	156	53.97	10	38.46	89	44.27	1	25	5	23.80
February	10	3,49	3	5,88	1	4.76	6	2.07	2	7.69	14	6.96	0	0	0	0
March	40	13,98	8	15,68	3	14.28	44	15.32	4	15.38	23	11.44	1	25	7	33.3
April	17	5,94	2	3,92	1	4.76	10	3.46	1	3.84	5	2.48	0	0	0	0
May	17	5,94	3	5,88	0	0	0	0	2	7.69	17	8.45	1	25	3	14.28
June	19	6,64	4	7,84	2	9.52	13	4.49	2	7.69	14	6.96	0	0	0	0
July	6	2,09	1	1,96	0	0	0	0	1	3.84	7	3.48	0	0	0	0
August	5	1,74	0	0	0	0	0	0	0	0	0	0	0	0	0	0
September	24	8,39	1	1,96	1	4.76	7	2.42	0	0	0	0	0	0	0	0
October	31	10,83	5	9,8	2	9.52	23	7.95	2	7.69	13	6.46	1	25	6	28.57
November	11	3,84	1	1,96	1	4.76	9	3.11	0	0	0	0	0	0	0	0
December	22	7,69	4	7,84	2	9.52	21	7.26	2	7.69	19	9.54	0	0	0	0
Total	286	38,91	51	71,83	21	41.17	289	56.55	26	50.98	201	39.33	4	7.84	21	4.10

Infected females:1.6 LSD:1.9, Standard error:±0.3, Standard deviation:2.3. Liver infection rate/Infected females:1.6, LSD:1.9 Standard error:±1.4, Standard deviation:5.6/ Lung injury rate

Table 4. Male cows examined and infected and organs infected with hydatid cysts.

Month	Number of males examined		Number of males affected		Number of lung injuries		Number of hydatid cysts in a lung		Number of liver and lung injuries		Number of hydatid cysts in the liver and lung		Number of liver injuries		Number of hydatid cysts in the liver	
	NO.	%	NO.	%	NO.	%	NO.	%	NO.	%	NO.	%	NO.	%	NO.	%
January	71	15,81	7	35	2	20	14	25	4	66.6	52	77.6	1	25	3	10.3
February	19	4,23	1	5	0	0	0	0	0	0	0	0	1	25	7	24.1
March	52	2,33	2	10	2	20	7	12.5	0	0	0	0	0	0	0	0
April	5	1,11	2	10	2	20	9	16.07	0	0	0	0	0	0	0	0
May	54	12,2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
June	41	9,13	2	10	1	10	4	7.14	0	0	0	0	1	25	11	37.9
July	19	4,23	0	0	0	0	0	0	0	0	0	0	0	0	0	0
August	27	6,01	0	0	0	0	0	0	0	0	0	0	0	0	0	0
September	63	14,03	1	5	0	0	0	0	0	0	0	0	1	0	8	27.5
October	29	6,45	2	10	1	10	6	10.71	1	16.66	8	11.9	0	0	0	0
November	19	4,23	0	0	0	0	0	0	0	0	0	0	0	0	0	0
December	50	11,13	3	15	2	20	16	28.57	1	16.66	7	10.4	0	0	0	0
Total	449	61,08	20	4.45	10	50	56	36.84	6	30	67	44.07	4	20	29	19.07

Lung infection rate/ Infected males:2.08 LSD:1.9 Standard error:±0.35 Standard deviation:1.2. Liver infection rate/ Infected males:4.3, Standard error:±0.17 Standard deviation:0.5.

infection during the months of the current investigation, the greatest infection prevalence among males was recorded in January (35%) followed by December (15%), while the percentage was absent in August, November, Regarding the quantity of lung hydatid cysts, the highest percentage was (28.57%) in December, followed by January (25%) and then April (16.07%), but it was completely absent in each of the February, March, July, August, September, November. The number of hydatid cysts in mixed liver and lung infections in infected males was highest in January (77.6%), followed by December (10.4%) and October (11.9%) and non-existent in the rest of the months. The highest percentage of the quantity of hepatic hydatid cysts was in June (37.9%), followed by September (27.5%), February (24.1%) and January (10.3%) and non-existent in the rest of the months.

Discussion

The Studies have shown that The frequency of hydatid cysts in cows is 10.11%, which is less than the 25% found in a study (14) examining 1264 cows. It is also lower than the percentage found in the province of nationalization before (15), and higher than the rate recorded by the same researcher in Diyala province, and the percentage of 4.9% recorded by (16), and the rate is 10.9% in Erbil governorate, which was recorded (17). This discrepancy in results is as a result of several factors, encompassing a range of ages and types of cows examined, different types and numbers of granulocytes, in addition to control activity in slaughterhouses and outside, in kasaba shops, and campaigns to eliminate stray dogs. The rate of infection of male organs was recorded more than the percentage of female members, and this varies with (18), and may be due to the physiological difference between males and females for advanced ages of production, which increases the chance and rate of infection with age. Lung damage in females was found to be 37.5% higher than 6.25% higher than liver damage, while lung damage in males was 35.9% higher than 10.38% liver damage. This is explained by (19,20), that a large number of embryos may pass through the liver with blood through the heart to reach the lungs and settle there, and also agrees with the diameter of the blood vessels of cattle, (21) that the incidence of granulomatous echinococcus in cattle is concentrated in the lungs, which differs from the results (22,23). The incidence rate in the liver and lung in females was (56.25%) and 48.71% in males, which is consistent with (18) by 40% and higher than (24) by (31.2%).

The results of As demonstrated by the current study, the incidence rate of Females have a higher prevalence of hydatid cysts than males, due to the fact that females are not slaughtered until the end of their useful life, and the age of slaughter is higher than the age of males, and these years of stress and their physiological nature and the fact that they are in pastures increase the likelihood of infection with

granular echinococcus eggs with age, and this is consistent with (17,19,23) and what he mentioned (25,26), the incidence rate increases with the age of the animals, that is, they continue to eat grass contaminated with parasite eggs. The results indicate the need to carry out a campaign to eliminate free dogs and provide monitoring, awareness and education measures, in addition to not getting rid of infected organs, as this constitutes an economic and health hazard to both humans and animals. The study of hydrocystosis in ruminants and livestock is of great importance due to the widespread spread of the disease, its multiple harms, and the risk of its transfer to people (27-29), and studies indicate the widespread spread of the disease in various countries and continents, especially in rural areas (30-33).

Conclusion

Hydatid cyst disease is highly prevalent among cows in AL-Diwaniyah province. Female cows have a higher incidence than male cows. The number of hydatid cysts in female cows is greater than in males as well. The areas of infection vary in the body of cows, and most of them are in the lung, while the least injured body site is the liver. We advise additional research on the prevalence of the disease in cattle and ruminants due to their close connection with humans.

Authors' Contribution

Conceptualization: Asifa M. Almaeahi.

Data curation: Asifa M. Almaeahi.

Formal analysis: Hiba R. Al-Abodi.

Funding acquisition: Hiba R. Al-Abodi.

Investigation: Asifa M. Almaeahi.

Methodology: Rajwan Jawad Hassan.

Project administration: Asifa M. Almaeahi.

Resources: Asifa M. Almaeahi.

Software: Rajwan Jawad Hassan.

Supervision: Rajwan Jawad Hassan.

Validation: Hiba R. Al-Abodi.

Visualization: Hiba R. Al-Abodi.

Writing—original draft: Rajwan Jawad Hassan.

Writing—review & editing: Asifa M. Almaeahi, Hiba R. Al-Abodi.

Competing Interests

The authors have declared that no competing interests exist.

Ethical Approval

The work was carried out within ethical scientific research standards to reduce potential harm as well as to respect the privacy of donors, taking into account the adoption of additional preventive precautions.

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References

1. Roberts LS, Janovy J. Schmidt & Roberts' Foundations of Parasitology. 6th ed. New York: McGraw-Hill International; 2000. p. 670.

2. Corrêa F, Stoore C, Horlacher P, Jiménez M, Hidalgo C, Alvarez Rojas CA, et al. First description of *Echinococcus ortleppi* and cystic echinococcosis infection status in Chile. PLoS One. 2018;13(5):e0197620. doi: [10.1371/journal.pone.0197620](https://doi.org/10.1371/journal.pone.0197620).
3. Bowman DD. Georgis' Parasitology for Veterinarians. 9th ed. Elsevier; 2009. p. 360.
4. Al-Khalidi KA, Al-Abodi HR, Jabbar HK, Hmood BA. *Echinococcus granulosus*. In: Overview on Echinococcosis. IntechOpen; 2020.
5. Melaku A, Lukas B, Bogale B. Cyst viability, organ distribution and financial losses due to hydatidosis in cattle slaughtered at Dessie Municipal abattoir, North-Eastern Ethiopia. Vet World. 2012;5(4):213-8. doi: [10.5455/vetworld.2012.213-218](https://doi.org/10.5455/vetworld.2012.213-218).
6. Kumsa B. Cystic echinococcosis in slaughtered cattle at Addis Ababa Abattoir enterprise, Ethiopia. Vet Anim Sci. 2019;7:100050. doi: [10.1016/j.vas.2019.100050](https://doi.org/10.1016/j.vas.2019.100050).
7. Negash K, Beyene D, Kumsa B. Cystic echinococcosis in cattle slaughtered at Shashemanne Municipal Abattoir, south central Oromia, Ethiopia: prevalence, cyst distribution and fertility. Trans R Soc Trop Med Hyg. 2013;107(4):229-34. doi: [10.1093/trstmh/trt003](https://doi.org/10.1093/trstmh/trt003).
8. Singh BB, Dhand NK, Ghatak S, Gill JP. Economic losses due to cystic echinococcosis in India: need for urgent action to control the disease. Prev Vet Med. 2014;113(1):1-12. doi: [10.1016/j.prevetmed.2013.09.007](https://doi.org/10.1016/j.prevetmed.2013.09.007).
9. Directorate Agricultural Information Service. (). Hydatid disease (Echinococcosis) caused by tape worm. South Africa; 2002. <http://www.nda.agric.za/publications>.
10. Kaufmann J. Parasitic Infections of Domestic Animals. Tehran University Press; 2003. p. 179.
11. Noorjah N. Economic Damages of Hepatic Parasite [dissertation]. University of Tehran; 2004.
12. Abebe A, Beyene D, Kumsa B. Cystic echinococcosis in cattle slaughtered at Gondar Elfora export Abattoir, northwest Ethiopia. J Parasit Dis. 2014;38(4):404-9. doi: [10.1007/s12639-013-0255-z](https://doi.org/10.1007/s12639-013-0255-z).
13. Al-Wahab RMH, Al-Marani WK, Abdel Karim MA. Animal management. Dar Al-Kutub Printing and Publishing Foundation; 1980.
14. Mubarak Sabah Katea. Serological study on *Echinococcus granulosus* cysts in sheep, cattle and camels [dissertation]. Baghdad: College of Veterinary Medicine, University of Baghdad; 1978.
15. Al-Zawi A, Al-Tae S, Al-Zuhairy M. The prevalence of hydatid cyst in slaughtered animals in Iraq. Iraqi J Vet Med. 1988;12:25-30.
16. Al-Abbassy SN, Altaif KI, Jawad AK, Al-Saqr IM. The prevalence of hydatid cysts in slaughtered animals in Iraq. Ann Trop Med Parasitol. 1980;74(2):185-7. doi: [10.1080/00034983.1980.11687329](https://doi.org/10.1080/00034983.1980.11687329).
17. Saeed I, Kapel C, Saida LA, Willingham L, Nansen P. Epidemiology of *Echinococcus granulosus* in Arbil province, northern Iraq, 1990-1998. J Helminthol. 2000;74(1):83-8. doi: [10.1017/s0022149x00000111](https://doi.org/10.1017/s0022149x00000111).
18. Lymbery AJ, Thompson RC, Kruger JG. The geographic distribution of hydatid infection in cattle in Western Australia. Aust Vet J. 1995;72(11):430-2. doi: [10.1111/j.1751-0813.1995.tb06197.x](https://doi.org/10.1111/j.1751-0813.1995.tb06197.x).
19. Himonas C, Frydas S, Antoniadou-Sotiriadou K. The fertility of hydatid cysts in food animals in Greece. In: Geerts S, Kumar V, Brandt J, eds. Helminth Zoonoses. Dordrecht: Springer; 1987. p. 12-21. doi: [10.1007/978-94-009-3341-5_2](https://doi.org/10.1007/978-94-009-3341-5_2).
20. Pandey VS, Ouhelli H, Moumen A. Epidemiology of hydatidosis/echinococcosis in Ouarzazate, the pre-Saharan region of Morocco. Ann Trop Med Parasitol. 1988;82(5):461-70. doi: [10.1080/00034983.1988.11812277](https://doi.org/10.1080/00034983.1988.11812277).
21. Eckert J, Gemmell MA, Meslin FX, Pawlowski ZS. WHO/OIE Manual on Echinococcosis in Humans and Animals: A Public Health Problem of Global Concern. Paris, France. World Organisation for Animal Health; 2001.
22. Al-Mayali HM. A Study on the Spread of Hydatid Cyst Disease in the Diwanayah Region [dissertation]. University of Al-Qadisiyah; 1997.
23. Baban M. A Study on the Epidemiology of Hydatid Cyst Disease in Al-Tamim, Diyala, and Dhi Qar [dissertation]. Salahaddin University; 1990.
24. Islam AW. The prevalence of hydatid cysts in slaughtered cattle in Bangladesh. J Helminthol. 1982;56(3):247-50. doi: [10.1017/s0022149x00034611](https://doi.org/10.1017/s0022149x00034611).
25. Lymbery AJ, Thompson RC. Species of *Echinococcus*: pattern and process. Parasitol Today. 1996;12(12):486-91. doi: [10.1016/s0169-4758\(96\)10071-5](https://doi.org/10.1016/s0169-4758(96)10071-5).
26. Cook BR. The epidemiology of *Echinococcus granulosus* in Great Britain. V. The status of subspecies of *Echinococcus granulosus* in Great Britain. Ann Trop Med Parasitol. 1989;83(1):51-61. doi: [10.1080/00034983.1989.11812310](https://doi.org/10.1080/00034983.1989.11812310).
27. Alvarez Rojas CA, Romig T, Lightowlers MW. *Echinococcus granulosus sensu lato* genotypes infecting humans--review of current knowledge. Int J Parasitol. 2014;44(1):9-18. doi: [10.1016/j.ijpara.2013.08.008](https://doi.org/10.1016/j.ijpara.2013.08.008).
28. World Health Organization (WHO). Echinococcosis. WHO; 2021. <https://www.who.int/news-room/fact-sheets/detail/echinococcosis/>. Accessed March 14, 2021.
29. Khan SN, Ali R, Khan S, Norin S, Rooman M, Akbar NU, et al. Cystic echinococcosis: an emerging zoonosis in southern regions of Khyber Pakhtunkhwa, Pakistan. BMC Vet Res. 2021;17(1):139. doi: [10.1186/s12917-021-02830-z](https://doi.org/10.1186/s12917-021-02830-z).
30. Marhoon IA, Alwan MS, Al-Ibrahimi LA. Promising anthelmintic effects of camphene against protoscoleces and hydatid cysts of *Echinococcus granulosus*. Acta Parasitol. 2025;70(3):113. doi: [10.1007/s11686-025-01049-4](https://doi.org/10.1007/s11686-025-01049-4).
31. Garedaghi Y. Prevalence and fertility of hydatid cyst in slaughtered farm animals of Tabriz city, Iran. Life Sci J. 2013;10(Suppl 5):190-3.
32. Garedaghi Y, Rezaii Saber AP, Khosroshahi MS. Prevalence of bovine cysticercosis of slaughtered cattle in Meshkinshahr Abattoir, Iran. J Anim Vet Adv. 2012;11(6):785-8.
33. Ghorbani A, Jannati R, Garedaghi Y, Tavakoli Pasand S. A systematic review of serological and surgical cases of human hydatid cysts between 2003 and 2023 in Fars province, southern Iran. J Zoonotic Dis. 2024;8(1):413-21. doi: [10.22034/jzd.2023.17333](https://doi.org/10.22034/jzd.2023.17333).

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