



Student's Journal of Health Research Africa
e-ISSN: 2709-9997, p-ISSN: 3006-1059
Vol.7 No. 2 (2026): June 2026 Issue
<https://doi.org/10.51168/sjhrafrica.v7i2.2679>

Original Article

Human hydatidosis: A retrospective analysis in Duhok city, Kurdistan region of Iraq.

Arshad Mohammad Abdullah^{1*}, Suzda Salih Abduljabar², Roaa Jasim Muhammedali², Pala Ibrahim Yaaqob², Shahd Rajab Mustafa²

¹Ph.D. College of Pharmacy, University of Duhok, Duhok City, Iraq.

²Bachelor of Science, College of Pharmacy, University of Duhok, Duhok City, Iraq.

Page | 1

Abstract

Background

Human hydatidosis is one of the important zoonotic infections that causes public health concerns among individuals. The present study aimed to study the epidemiological properties of hydatidosis infection in Duhok governorate, Kurdistan Region of Iraq.

Methodology

In the current study, a total of 55 patients with hydatidosis were recorded from January 2025 to February 2026, and all patients' information was tabulated in tables.

Results:

Infected males and females were recorded in 47.3% and 52.7%, respectively, with 58.2% of infection in the liver, 27.3% in the lung, and 14.5% in other organs. The highest infected age group was 16–30 years with 40% of infection, and according to residence distribution, 60% of infection occurred in rural areas, and 40% in urban areas. Regarding occupation, the higher infection rate were shown in unemployed individuals (47.3 %), and higher rate of infected patients were recorded with single hydatid cyst (74.5 %), and about diagnosis, 43% of patients were diagnosed by ultrasound methods and 56.4 % with other diagnostic methods, and according to treatment types, 83.6 % were recorded in surgical method and 16.4 % in Non-surgical methods.

Conclusion

According to this study, we can conclude that there are important points that influence the prevalence of hydatidosis among individuals, which are exposure to transmission factors, socioeconomic status, and the lifestyle of people.

Recommendation

Study the role of stray dogs, vegetables, and water sources in the transmission of parasites. A study about different techniques in the diagnosis of parasites and molecular characterization studies about the *Echinococcus granulosus* parasite.

Keywords: Hydatidosis, Echinococcosis, *Echinococcus granulosus*, Hydatid disease, infection

Submitted: May 26, 2026 **Accepted:** June 11, 2026 **Published:** June 15, 2026

Corresponding Author: Arshad Mohammad Abdullah

Email: arshadzanko@gmail.com

Ph.D. College of Pharmacy, University of Duhok, Duhok City, Iraq.

Background of the study

Cystic echinococcosis (CE) is a zoonotic disease that can be transmitted from infected dogs to humans, caused by a tapeworm known as *Echinococcus granulosus* [1, 2]. It's one of the neglected tropical diseases (NTDs), which can be considered as an umbrella term as it's recognized

by the WHO and considered a public health problem [3]. Hydatidosis greatly affects human health and imposes large expenses on the affected people due to their requiring medication, surgery, or both. Moreover, it is responsible for massive economic losses in the livestock industry [4]. Moreover, cystic echinococcosis has been in



cluded among the seven zoonotic neglected tropical diseases prioritized by the WHO since 2020 [5]. Many studies about the prevalence, diagnosis, symptoms, and treatment of hydatidosis have been carried out [6, 7]. Various studies have been conducted in Iraq as well, and all of these studies reported the major economic and public health concerns [8]. Cystic echinococcosis is common in areas that raise livestock, especially in extremely endemic regions where cultural customs result in the butchering of animals without veterinary supervision and frequently in unsafe conditions [9-11]. This research aimed to study the prevalence of echinococcosis among infected individuals in Duhok city, Kurdistan Region of Iraq, and several factors and characteristics that are related to the disease, such as gender, age, residence, symptoms, and the organ involved in cysts.

Methodology

Study Design and Study Area

This study was designed as a retrospective study among infected patients with hydatidosis in Duhok governorate, which is located in the Kurdistan Region of Iraq. It is known that people in this city have a close relationship with animals since they use animals as a source of dairy foods and meat, especially in villages where they are familiar with sheep, cattle, and goats. Specifically, children, since they place their hands on grass, water, and soil where *Echinococcus granulosus* may be present, which leads to transmission. This makes the region endemic for hydatidosis. This research was designed as a characterization study of human hydatidosis cases that are recorded in Duhok city. The objective of this research is to assess the clinical features and population data of patients who have hydatid disease during a specific period. All data were collected from private and public hospitals in Duhok and the surrounding areas.

Data Collection and Sources

Eligible infected individuals were recorded through a hospital's records and databases and the inclusion samples which worked on include medical records of patients who are infected with hydatid disease, those treated in government and private hospitals in Duhok, which are the main centers for treatment either surgically or by interna-

l medicine for hydatid cyst cases, and to reduce selection and information bias, systematize sample extraction methods were used, and all infected eligible samples were included. All data collected from January 2025 to February 2026. All data and patient information were recorded in questionnaire forms, including age, gender, place of residence, and affected organ. The research was carried out in accordance with ethical principles rooted in the Declaration of Helsinki and was subject to review and approval by the Scientific/Ethics Committee of the College of Pharmacy, University of Duhok, Reference no. 666, November. 17, 2025.

Diagnosis and Case Selection

Specialist physicians identified and confirmed all the cases of hydatid disease in humans that were involved in this study. Patients were diagnosed based on physical examination and confirmed by imaging findings and laboratory results. The main methods used to detect affected organs with hydatid cysts were scanning methods, including ultrasonography (US), computed tomography (CT), and magnetic resonance imaging (MRI). Only patients confirmed to have hydatid cysts by medical diagnosis were included in the study. To make sure the data were accurate and dependable, patients with insufficient medical records, missing essential medical and demographic information, or cases whose diagnosis was not confirmed by a physician were not included in this study.

Statistical Analysis

SPSS version 20.0 was used for the statistical analysis in this study. The chi-square test was used to determine the correlations and noticeable variations between patients infected with Echinococcosis. Frequency and proportions were determined for the categorical factor. A statistically significant p-value was determined as < 0.05 .

Results

In the current study, a total of 55 patients with hydatid cyst disease were recorded in Duhok province. Regarding sex distribution, the infection rate of the female group (52.7 %) was slightly higher than that of the male group (47.3 %), without significant differences (p-value: 0.54) between males and females (Tab. No. 1).

Table 1. Socio-demographic profile of infected individuals with hydatidosis in Duhok City



Variable	Total infection	Liver infection	Lung infection	Other organs infection	p-value
Gender					
Male	26 (47.3 %)	27.3 %	10.9 %	9.1 %	0.54
Female	29 (52.7 %)	30.9 %	16.4 %	5.5 %	
Age groups					
<15	18 (32.7 %)	20 %	9.1 %	3.6 %	0.99
16–30	22 (40 %)	23.6 %	10.9 %	5.5 %	
31–45	8 (14.5 %)	7.3 %	3.6 %	3.6 %	
>50	7 (12.7 %)	7.3 %	3.6 %	1.8 %	
Residence					
Urban	22 (40 %)	23.6 %	10.9 %	5.5 %	0.92
Rural	33 (60 %)	34.5 %	16.4 %	9.1 %	
Occupation					
Employed	10 (18.2 %)	10.9 %	5.5 %	1.8 %	0.67
Student	19 (34.5 %)	20 %	7.3 %	3.6 %	
Unemployed	26 (47.3 %)	27.3 %	14.5 %	9.1 %	
Total	100 %	58.2 %	27.3 %	14.5 %	

According to organ involvement, the liver infection with hydatidosis (58.2 %) showed higher rates than the lung infection (27.3 %) and other organs (14.5 %) infection. The liver (30.9 %) and lung (16.4 %) infection in females were recorded higher than liver (27.3 %) and lung (10.9 %) infection in males, but on the other hand the infection of other organs in the males (9.1 %) revealed higher than females (5.5 %) (Tab. No. 1). Regarding age groups, the higher infection of hydatidosis were recorded in age group of 16–30 years with 40 % of infection, and followed by age group of <15 years (32.7 %), and age group of 31–45 years (14.5 %), and with lower infection in age group of >50 with 12.7 %. The liver infection was recorded in the age group of <15 years old, in 20 %, and the age group of 16–30 years in 23.6 %, and 7.3 % of infection in both age groups of 31–45 and >50 years. In this study, the lung infections were recorded in 9.1 %, among the age group of <15 years, and in the age groups of 16–30 and 31–45 years old, in 10.9 % and 3.6 % respectively (Tab. No. 1). There were no significant differences among age groups in infection (p-value: 0.99). Regarding the residence distribution of hydatidosis, this study were shown the higher infection

among rural individuals (60 %) than that of urban individuals, with 40 % of infection. In the rural areas, liver (34.5 %), lung (16.4 %), and other organs (9.1 %) infection were shown in higher rates than that of urban areas infection, with 23.6 % in liver, 10.9 % in lung, and 5.5% in other organs, with no significant differences among rural and urban individuals (p-value: 0.92). About Occupation, the infections were shown in higher rates in unemployed individuals (47.3 %), followed by students (34.5 %) and employed persons (18.2 %), without significant differences (p-value: 0.67). The liver infection in employed (10.9 %), students (20 %) and unemployed (27.3 %) individuals, were recorded higher than that lung infection in employed (5.5%), Students (7.3%) and unemployed (14.5%) individuals, also the infection in other organs of the body were recorded in low percentages in employed (1.8%), students (3.6 %) and unemployed (9.1%) individuals. As shown in table no. 2, among patients, the majority of individuals were recorded with a single hydatid cyst (74.5 %), and 25.5 % of patients were recorded with multiple hydatid cysts.

Table 2. Clinical Profile of infected individuals with hydatidosis in Duhok City.

Variable	Category	Total
Number of cysts	Single	41 (74.5 %)



Mode of diagnosis	Multiple	14 (25.5 %)
	Ultrasound	24 (43.6 %)
	other methods	31 (56.4 %)
Treatment type	Surgical	46 (83.6 %)
	Non-surgical	9 (16.4 %)

Diagnosis of infection by ultrasound methods (43.6 %) was recorded lower than other diagnostic methods (56.4 %), and regarding treatment types, the surgical method (83.6 %) was shown to be higher than Non-surgical methods (16.4 %) for patients.

Discussion

In this study in Duhok city, Kurdistan Region of Iraq, the results reveal an overview of human hydatidosis infection with clinical characterization and information about this disease within individuals with different genders and age groups. The findings of this research show the infection of individual groups by this pathogenic parasite, and according to the total number of infected individuals, these findings show that the infection occurs in different organs of infected humans. In this research regarding sex distribution, the female infection (52.7 %) with hydatidosis is higher than male infection (47.3 %) slightly, the current study results similar to findings of Al-Saeed and Al-Muftay [12] in Duhok city, Mahood and Shaimaa [13] in Basrah city-Iraq, and Andrabi, Tak [10], in South Kashmir, which female infection was higher than male infection, and this differences maybe as results of some factors such as geographical location and different life style type [14, 15]. Analysis of ages groups in current study show the higher infection in age group of 16–30 years old, and lower infection in >50 age group, which is agree with results of Mahood and Shaimaa [13] in Basrah city-Iraq, and this high rate of infection show that the infection in this age group related to more contact of this age group individual with source of infection and close contact with infected dogs and contaminated vegetables [16]. Regarding the residence of infection, the Rural residents (60%) were reported to be higher than Urban residents (40%). This difference is due to the increase in transmission factors of hydatidosis infection in rural areas, including the presence of a higher number of infected dogs and domestic animals [12]. Also, Shehatha, Alward [17], reported a higher rate of infection in rural people compared with urban, which is in agreement with the current study findings. According to occupation, the present study shows the higher rate of infection in Unemployed individuals (47.3 %), followed by Students

(34.5 %), which is similar to the results of Al-Jobbory [18], and it may be due to the high exposure of Unemployed individuals with infected dogs, contaminated soils, and vegetables [19]. The findings of this study reported the rates of organ involvement, which show the highest rate of infection in the liver organ (58.2 %), followed by the lung, which agrees with findings of Joanny, Cappai [20], Al-Ani, Khan [21], and Al-Jobbory [18]. Liver infection in humans is higher than other organs' infection, because the liver is the first place of blood filtration, and protoscolices of the parasite are trapped in the liver and develop into hydatid cysts [22, 23]. Regarding the number of cysts, the research findings show that most infected individuals were detected with a single cyst (74.5 %), as compared with patients with multiple cysts, which is in agreement with the records of Al-Saeed and Al-Muftay [12], in Duhok city, and Alghoury, El-Hamshary [24]. In diagnosis of hydatidosis in human, the ultrasound method is used less than other methods of diagnosis in this study, because ultrasound method is the first line of imaging method in diagnosis and more accessibility technique, but other methods are high sensitive, good visualization of structure of hydatid cysts, and can determine the size and number of the cysts and the CT Scan, Magnetic Resonance Imaging (MRI) and many other techniques are used for evaluation of the hydatid cyst structure of *Echinococcus granulosus* [24, 25]. In the current study, the hydatidosis surgical treatment (83.6 %) was more than non-surgical methods, and many studies emphasized this method for the removal of hydatid cyst, particularly in large and complicated cases of hydatid cyst [26]. Overall, current results of hydatidosis in Duhok city, particularly in rural areas, are considered a threatening factor in human health, and it is necessary to use special measures to prevent this infection. The study results can be similar to endemic areas, but may not consider non-endemic areas.

Conclusion

Hydatidosis in humans is a public health concern. In this study, which was conducted in Duhok city, the infection rate of females is slightly higher than that of males. The recorded results showed infections in the liver, lungs, and other organs; the liver infection rate was highest, followed by the



lung infection rate, and the lowest was reported in other organs. Regarding age groups, the high prevalence of hydatidosis was recorded in the age group 16-30 years old, followed by the <15 age group, and the lowest infection rate in the >50 age group. The prevalence of this infection is more observed among rural individuals than urban. The highest proportion of infection was recorded in unemployed persons, followed by students and others. Study results show that in the human hydatidosis infection, the demographic, environmental factors, and lifestyle of persons are considered as major elements.

Limitations

The limitation of the study was the short duration of research and the limited number of hospitals and health centers.

Recommendation

According to the study findings, the following points are recommended for future studies: Study the role of stray dogs in the transmission of parasites. Study about the role of vegetables in the transmission of infection. Study about different techniques in the diagnosis of parasites. Molecular characterization studies of the *Echinococcus granulosus* parasite.

Acknowledgment

We thank all the Azadi Teaching Hospital, Hevi Paediatric Teaching Hospital, and all private hospitals in Duhok City, and all the Administrative and laboratory staff who helped us in recording the data.

List of Abbreviations

NTDs: Neglected tropical diseases
CE: Cystic echinococcosis
WHO: World Health Organization
E. granulosus: *Echinococcus granulosus*
US: Ultrasonography
CT: Computed tomography
MRI: Magnetic resonance imaging
SPSS: Statistical Package for the Social Sciences

Author Biography

Arshad Mohammad Abdullah, Ph.D., Assistant Professor, College of Pharmacy, University of Duhok.
Suzda Salih Abduljabar, Roaa Jasim Muhammedali, Pala Ibrahim Yaaqob, Shahd Rajab Mustafa. They graduated from the College of Pharmacy, University of Duhok.

Funding

This study did not receive any external funding.

Conflicts of interest

There are no conflicts of interest associated with this work.

Author contribution

The study's conception and design were carried out by AMA and SSA. Fieldwork contributions came from RJM and AMA. AMA with PIY, analyzed the data. The initial draft of the paper was written by AMA, SRM, and AMA, with all authors participating in discussions about the results and contributing to the final version of the manuscript.

Data availability

Data is available on request.

References

1. Liu T, Li G, Qu H, Li R, Wang X, Tang F. Trends in the global burden of cystic echinococcosis among children and adolescents from 1990 to 2021: An analysis based on the Global Burden of Disease Study 2021. *PLOS Neglected Tropical Diseases*. 2025;19(10):e0013658. <https://doi.org/10.1371/journal.pntd.0013658>
2. Vuitton DA, McManus DP, Rogan MT, Romig T, Gottstein B, Naidich A, et al. International consensus on terminology to be used in the field of echinococcoses. *Parasite*. 2020;27:41. <https://doi.org/10.1051/parasite/2020024>
3. Harada Y, Iwashita H, Moriyasu T, Nagi S, Saito N, Sugawara-Mikami M, et al. The current status of neglected tropical diseases in Japan: A scoping review. *PLOS Neglected Tropical Diseases*. 2024;18(1):e0011854. <https://doi.org/10.1371/journal.pntd.0011854>
4. Ito A, Budke CM. The echinococcoses in Asia: the present situation. *Acta tropica*. 2017;176:11-21. <https://doi.org/10.1016/j.actatropica.2017.07.001>



Original Article

5. [7.07.013](https://doi.org/10.1371/journal.pntd.0011894)
Aregawi WG, Levecke B, Ashenafi H, Byaruhanga C, Kebede N, Mulinge E, et al. Epidemiology of *Echinococcus granulosus sensu lato* in the Greater Horn of Africa: A systematic review. *PLOS Neglected Tropical Diseases*. 2024;18(1):e0011894.
<https://doi.org/10.1371/journal.pntd.0011894>
6. Jenkins D, McKinlay A, Duolong H, Bradshaw H, Craig P. Detection of *Echinococcus granulosus* coproantigens in faeces from naturally infected rural domestic dogs in south eastern Australia. *Australian Veterinary Journal*. 2006;84(1-2):12-6.
<https://doi.org/10.1111/j.1751-0813.2006.tb13116.x>
7. Casaravilla C, Malgor R, Rossi A, Sakai H, Nonaka N, Kamiya M, et al. Production and characterization of monoclonal antibodies against excretory/secretory products of adult *Echinococcus granulosus*, and their application to coproantigen detection. *Parasitology International*. 2005;54(1):43-9.
<https://doi.org/10.1016/j.parint.2004.08.006>
8. Al-Shammary S. Prevalence of *Echinococcus granulosus* in stray dogs and larval stage in humans in Baghdad province. *Iraq J Vet Med*. 2002;18:105-11.
9. Wen H, Vuitton L, Tuxun T, Li J, Vuitton DA, Zhang W, et al. Echinococcosis: advances in the 21st century. *Clinical microbiology reviews*. 2019;32(2):10.1128/cmr.00075-18.
<https://doi.org/10.1128/CMR.00075-18>
10. Andrabi A, Tak H, Lone BA, Para BA. Seroprevalence of human cystic echinococcosis in South Kashmir, India. *Parasite epidemiology and control*. 2020;11:e00172.
<https://doi.org/10.1016/j.parepi.2020.e00172>
11. Eilbigi MM, Hisar KM. Afghanistan'da Bir Devlet Hastanesinde Tedavi Olan Kist Hidatik Hastalarıyla Aynı Yaşam Alanını Paylaşan Bireylerde Radyolojik ve Serolojik Tarama Sonuçları. *Turkish Journal of Parasitology*. 2020.
12. Al-Saeed A, Al-Muftay KSA. Human Hydatidosis in Duhok-Kurdistan Region-North of Iraq. *Medical Journal of Babylon*. 2016;13(1):125-33.
13. Mahood FN, Shaimaa A. Al Samir, Ayat Ibrahiem Al-laeiby (2024). Prevalence of Human Cystic Echinococcosis in Basrah Province/South of Iraq. *South Asian Res J Bio Appl Biosci*. 2024;6(4):108-13.
<https://doi.org/10.36346/sarjbab.2024.v06i04.002>
14. Yang YR, Craig PS, Vuitton DA, Williams GM, Sun T, Liu TX, et al. Serological prevalence of echinococcosis and risk factors for infection among children in rural communities of southern Ningxia, China. *Tropical Medicine & International Health*. 2008;13(8):1086-94.
<https://doi.org/10.1111/j.1365-3156.2008.02101.x>
15. Craig PS, Budke CM, Schantz PM, Li T, Qiu J, Yang Y, et al. Human echinococcosis: a neglected disease? *Tropical Medicine and Health*. 2007;35(4):283-92.
<https://doi.org/10.2149/tmh.35.283>
16. Rao SS, Mehra B, Narang R. The spectrum of hydatid disease in rural central India: An 11-year experience. *Annals of Tropical Medicine & Public Health*. 2012;5(3).
<https://doi.org/10.4103/1755-6783.98624>
17. Shehatha J, Alward M, Saxena P, Konstantinov I. Surgical management of cardiac hydatidosis. *Texas Heart Institute Journal*. 2009;36(1):72.
18. Al-Jobbory S. SeroParasitological Identification of Human Hydatidosis in Space Occupying Lesions in Mosul: M. Sc. Thesis, Coll. Med. Mosul; 2005.
19. Lawn SD, Bligh J, Craig PS, Chiodini



Original Article

- PL. Human cystic echinococcosis: evaluation of post-treatment serologic follow-up by IgG subclass antibody detection. *The American journal of tropical medicine and hygiene*. 2004;70(3):329-35.
<https://doi.org/10.4269/ajtmh.2004.70.329>
20. 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.
<https://doi.org/10.1007/s11686-021-00453-w>
21. Al-Ani AM, Khan FY, Elzouki A-N, Al Hajri M, Ibrahim W. Epidemiology of hydatid disease in Qatar: a hospital-based study from 2000 to 2013. *Asian Pacific Journal of Tropical Medicine*. 2014;7:S85-S7.
[https://doi.org/10.1016/S1995-7645\(14\)60209-1](https://doi.org/10.1016/S1995-7645(14)60209-1)
22. Pedrosa I, Saíz A, Arrazola J, Ferreirós J, Pedrosa CS. Hydatid Disease: Radiologic and Pathologic Features and Complications 1: (CME available in print version and on RSNA Link). *Radiographics*. 2000;20(3):795-817.
<https://doi.org/10.1148/radiographics.20.3.g00ma06795>
23. Polat P, Kantarci M, Alper F, Suma S, Koruyucu MB, Okur A. Hydatid disease from head to toe. *Radiographics*. 2003;23(2):475-94.
<https://doi.org/10.1148/rg.232025704>
24. Alghoury A, El-Hamshary E, Azazy A, Hussein E, Rayan HZ. Hydatid disease in Yemeni patients attending public and private hospitals in Sana'a city, Yemen. *Omani Medical Journal*. 2010;25(2):88.
<https://doi.org/10.5001/omj.2010.26>
25. Buscarini E, Lutz H, Mirk P, Organization WH. *Manual of diagnostic ultrasound*: World Health Organization; 2013.
26. Brunetti E, Kern P, Vuitton DA. Expert consensus for the diagnosis and treatment of cystic and alveolar echinococcosis in humans. *Acta tropica*. 2010;114(1):1-16.
<https://doi.org/10.1016/j.actatropica.2009.11.001>



Student's Journal of Health Research Africa
e-ISSN: 2709-9997, p-ISSN: 3006-1059
Vol.7 No. 2 (2026): June 2026 Issue
<https://doi.org/10.51168/sjhrafrica.v7i2.2679>
Original Article

Student's Journal of Health Research (SJHR)

(ISSN 2709-9997) Online

(ISSN 3006-1059) Print

Category: Non-Governmental & Non-profit Organization

Email: studentsjournal2020@gmail.com

WhatsApp: +256 775 434 261

**Location: Scholar's Summit Nakigalala, P. O. Box 701432,
Entebbe Uganda, East Africa**

