Epidemiology of Hydatid Disease in Iraq: A Study of Hydatidosis Patients in Baghdad Province

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Abstract

Cystic echinococcosis (CE) is a zoonotic disease worldwide caused mainly by the metacestode *Echinococcus granulosus*. Hydatidosis disease is common in all countries of world, especially in the Middle East, in addition to Asia, Africa and Europe. A person becomes infected with this disease through accidental consumption of water, soil or food contaminated with the faeces of infected dogs, which is the most common type of method of infection. This parasite is transmitted to dogs when it ingests the infected organs of other animals that contain hydatid cysts. A study was conducted to study the infection rate between women and men in Baghdad governorate. The results showed a highly significant increase in the incidence of infection with hydatid cyst among females (70.00%) in comparison to males (30.00%). The oldest age of hydatidosis patients was between 31-40 years (30.00%) with a significant differences between age groups and gender, while the lowest percentage was at age 41-50, in addition 51-60 age reached (10.00%). In regard to the profession, the highest value of infection recorded in housewives (60.00%) and the lower percentages (6.67%) in the employees' category. However, the most infection rate was within under primary education level (40.00%), while the lowest percentage was at university education level (3.33%). The incidence of liver infection (100%) is higher than the other organs, Moreover, it is the only affected organ that contains a large number of hydatid cysts, Compared with lung, kidneys and spleen, which each recorded only two cyst for each of these affected organs in hydatid cyst patients, which was represented by significant differences at ($P<0.01$) and ($P<0.05$).

Key word: *Epidemiology, Echinococcus granulosus, hydatid cysts Cystic echinococcosis, Hydatid disease.*

Introduction

Hydatic disease, caused by the larvae of *Echinococcus granulosus*, is a serious disease, which can be fatal and, found anywhere in the world, but particularly in endemic areas such as the Mediterranean Basin, New Zealand, Australia, Eastern Europe, North Africa, the Balkans, South America and Middle East[1]. The intermediate host can be sheep/goat (pastoral hydatidosis) or moose /reindeer/caribou (sylvan hydatidosis). Humans are occasional intermediate hosts. The most common site of occurrence of hydatid cysts in humans is the liver (50%–93%)[2]. People become infected by devour (swallowing) the eggs[2]. Tapeworm larvae may be placed at different locations in the body where they form a fluid-filled sac known as a hydride cyst. The cysts contain immature forms of the tapeworm and can excess in size from 510 cm or more over a period of time, while some cysts may die, others can remain survive for many years. Cysts also contain 'daughter cysts' which, if released, may diffuse to other areas of the body[3] (Heymann, 2015). Many substances have recently been used to activate and modify the host's immune system in order to control the growth and development of the cyst[4]. The aim of the current study is to estimate the epidemiological of hydatid cyst disease in Baghdad governorate, which had a high incidence of infection.

Material and Methods

Patients group

The current study included sixty patients (42 females and 18 males) suffering from hydatidosis disease with ages between (10 - 75 years) by specialized medical surgeons after their conversation with the

surgery department in Private Nursing Home Hospital, The martyr Ghazi Al-Hariri Hospital, and Red Crescent Hospital, during the period from May 2017 to May 2018. All cases have hydatidosis disease according to identification of the parasite's structures by imaging techniques, including ultrasound, x-ray diagnosis and accentuated surgery operation of each patient. Then, the patient's demographic, epidemiologic and clinical data were recorded in a questionnaire sheet including age, sex, educational level, cysts number of infected members, patients job and status of the cyst fluid.

Cysts collection

Collected the specimens (hydatid cysts) after surgery and placed in sterile and refrigerated containers and transferred to the laboratory for analysis.

Statistical Analysis

The Statistical Analysis System- SAS (2012) program was used to detect the effect of difference factors in study percent. Chi-square test was used for significant comparison between percentage (0.05 and 0.01 probability) in this study.

Results and Discussion

Presented study included sixty personnel, suffering from hydrated cyst disease. According to the gender patients group consist of 42 (70%) females and 18 (30%) males (table 1).

Table (1): The percentage of study group (patients) according to the gender

Group	Gender	
	Female	Male
Patients	42 (70.00%)	18 (30.00%)
P-value	0.0023 **	
** (P<0.01).		

The results of the current study showed that the percentage of female infections (70%) was higher than that of males (30%) this is due to females responsible for cooking and preparing food, which makes them in direct contact with the pathogens.

Regarding patients age, the results of the present study showed that the infection rate of hydatid cysts increases in the age group (31-40) years in proportion 8 (13.33%), while the lowest were six patients at the age range (41-50) and (51-60) year. There were a significant difference (P<0.01) between age groups (table 2). From this table it is noticed that the age groups (31-40) years and (21-30) showed the highest number of infected patients. This result may due to the type of social life, because this group is able to work outside the home and thus be more susceptible for infection, with non-compliance with public health rules and indifference to eat foods, as well as spend a long time outside the home, making them more compatible with the causes of infection. These results were similar to the previous results conducted by Al-Qadhi[5], Al-Jobbory[6], Al-Ezzi[7] and Taher,[8] who showed that they age range between (21-40) years had the highest rate of disease incidence, but, in another study conducted by Al-Ubaidi[9] , Al-Shaimary *et al*.[10] and Saida and Nouradin[11] who concluded that the infection increases with age.

Actuality, hydatid cyst is affected youth individual, but occurs the symptoms delayed for many years which may reach decades, in which condition the cyst are formed in the affected organ.

Table (2): The percentage of infection according to the age

Age Groups (Year)	Percentage of infection (%)
10- 20	8 (13.33%)
21-30	14 (23.33%)
31- 40	18 (30.00%)
41- 50	6(10.00%)
51- 60	6(10.00%)
61- 70	8 (13.33%)
Total	60
P-value	0.00709 **
** (P<0.01).	

The nature of the profession practiced by people; a factor may increase the chances of infection rates. Present results recorded highest rate of infection among women (housewives) 36 (60%), while the lowest one 4 (6.67%) among employee

(table 3(. Increasing incidence of hydatid disease has been observed in housewives, this may be due to the daily work of women cleaning, preparing food, farming and washing vegetables, which may be contaminated with parasitic eggs, making contact with the infectious stage more easily.

Freelancers (who are only males) represents 10 percentage of the whole patients counts, due to their lifestyle, which make them spend most of their time in environment exposed to different disease factors, otherwise the most infected of both gender are from very poor environments.

Table (3): The percentage of infection according to the job

Patients with hydatid cysts	
Job	**Percentage (%)**
Housewives	36 (60.00%)
Students	8 (13.33%)
Freelancers	6 (10.00%)
Pensioners	6 (10.00%)
Employees	4 (6.67%)
Total	60(100%)
P-value	0.0001 **
** (P<0.01).	

Other studies indicated that a high incidence of hydatid disease in working classes of people. Therefore, focus on health information programs for all society is important to increase awareness of health, hygiene and avoid eating leafy vegetables, unless they are sure to be washed properly[6,8,12,13].

The role of education level indicates as active factor in the infection of hydatid cyst parasites, as shown in (table 4). The infection rate showed high level in people with uneducated individuals 24 (40.00%), followed by the primary certificate 18(30.00%) and middle school certificate16 (26.67%), while the less proportion of patients with university degree less frequent 2(3.33%).

The results of this study showed the importance of education, a large proportion of patients with low educational level which emphasizes the role of education as an important factor in avoiding infection of hydatidosis, leading to lack of health awareness and failure to follow preventive measures and neglect diagnosis and early treatment of the disease.

Table (4): Percentage distribution of hydatid cyst in patients according to educational level

Education level groups	Percentage of infections (%)
Uneducated individuals	24 (40.00)
Primary certificate	18 (30.00%)
Middle School certificate	16 (26.67%)
University degree	2 (3.33%)
Total	60
P-value	0.0001**
** (P<0.01).	

These results were consistent with Campos-Bueno *et al*.[14], Wang *et al*.[15] and Taher[8] who found the incidence of hydatid cyst infection increased significantly in patients with low education.

Infection can include more than one organ, the present study shows that the infected liver was in 60 patients followed by lung, kidney and spleen with 2 patients (table 5).

The results of the current study were agreed with most studies that proved the liver is the most common infected organ [16,17]. Further studies suggested that the liver is the generality affected organ by hydatidosis,, because liver is the first refinery for oncosphere, which hold these embryos in large numbers and attach by its hooks then begins to form of the cyst, and this is called the initial infection[18], these results correspond to Al-Jobbory,[6]; Al-Ezzi,[7] and Hussain,[13]. Followed by lung, kidney and spleen which were recorded the equal rate (it should be noted that three cases had the liver also infected with these cysts) this may be due to the escape of very few embryos entering the systemic cycle to reach different organs and tissues of the body such as the lung, kidney and spleen.

As well as that all organs of the body are targeted by parasite embryos except teeth, hair and nails[19]. The presence of cysts in more than one organ depends on the host's body resistance to infection, then parasite evasion to escape from the immune system and spread disease[20]. In contrast, Al-Ubaidi,[9] noted that the high rate of infection of the hydatid cysts in the lung compared to the proportion of the liver.

Table (5): The frequency number of infected organs according to the number of cysts.

Number of cysts	Number according to infected organ				
	Liver N=60	Lung N=1	Spleen N=1	Kidney N=1	P-value
One cyst	30	2	2	2	0.0001 **
Two cysts	6	0	0	0	0.0437 *
Three cyst and more	24	0	0	0	0.0001 **
P-value	0.0001**				
**: (P<0.01) , *: (P<0.05)					

The relationship between the number of cysts and the type of infected organ showed that the liver had the highest rate of infected organ in 30 cases, followed by lung, spleen and kidney only two and the liver was the only infected organ with two or three cysts or more. This relationship showed a significant difference at (P<0.01) and (P<0.05) (table 5). This may be due to, the liver is the more influenced organ by oncosphere that carried out via portal vein flow, a first stop on the way of the oncosphere of the small intestine, is the liver[17].

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References

1- Botezatu C., Mastalier B. and Patrascu T. Hepatic hydatid cyst – diagnose and treatment algorithm, Journal of Medicine and Life, 2018;11(3):203-209.

2- Anand S., Col L., Rajagopalan S., Brig B. and Mohan R. Management of liver hydatid cysts – Current perspectives, Med J Armed Forces India, 2017;73(1):104.

3- Heymann D. (2015). Control of Communicable Diseases Manual. (20th edition). Washington, DC: American Public Health Association, pp178 - 183.

4- Ibrahim Z. A. Attenuation of human hydatid cyst protoscolices viability by 1-Hydroxyphenazin (1-HP) pigment: In vitro and in vivo study, Journal of the Faculty of Medicine Baghdad, 2010;52(3): 338-41.

5- Al-Qadhi B. N. Study of some immunological and biochemical aspects of patients infected with hydatidosis., Ph. D. Thesis, Coll. Sci., Univ. Baghdad: 2005; 152.

6- Al-Jobbory S. H. Sero-Parasitological identification of Human hydatidosis in space occupying Lesions in Mosul., M. Sci. Thesis, Coll. Med., Univ. Mosul: 2005;96.

7- Al-Ezzi, M H M. Some immunological aspects of hydatid cyst patients before undergoing surgery. Master Thesis, College of Science, Al-Mustansiriya University: 2006;110.

8- Taher E. Does, the origin of hydatid cyst antigen affect diagnosis of human hydatidosis. J. Appl. Sci. Res., 2012;8(4): 1952-1958.

9- Al-Ubaidi A. Cytogenetic and enzymatic studies on patient with hydatid disease., M. Sc. Thesis, Al-Nahrain Coll. Med., Univ. Al-Nahrain: 2002;70.

10- Al-Shaimary I., Al-Semari M. and Al-Fayadh M. (2010). Epidemiological and immunological findings in human hydatidosis. Med. Pract. Rev., 2010;1(2): 26 – 34.

11- Saida, L.A. and Nouraddin, A.S. Epidemiological study of cystic echinococcosis in man and slaughtered animals in Erbil province, Kurdistan regional. Iraq. Tikrit J. Pur.Sci.,2011;16 (4): 45- 50.

12- Al-Awsi, H B H A. Evaluation of some immunological markers for the inflammatory reactions associated with the infection of the parasite. Master Thesis, College of Education for Pure Sciences, Diyala University: 2014;93.

13- Hussain, L A . Study of some immunological aspects of patients with hydatid cyst disease. PhD thesis, College of Education, Ibn Al-Haytham, University of Baghdad: 2016;118.

14- Campos-Bueno A., Lopez-Abente G. and Andres-Cercadillo A. Risk factor for *Echinococcus granulosus* infection: A case Control study. Am. J. Trop. Med. Hgy., 2000;62(3): 329-334.

15- Wang Q., Oiu J., Yang W., Peter Schantz P., Raoul F., Craig P., Glraudoux P. and Vuitton D. Socioeconomic and behaviour risk facters of human olveolar echinococcosis in Tibetan communities in Sichuan people's republic of China. Am. J. Trop. Med. Hyg., 2006;74(5): 856-862.

16- Manouras A., Genetzakis M., Lagoudianakis E., Papadima A. Triantafillou C., Kekis P., Filis K. and Katergiannakis V. Intact germinal layer of liver hydatid cyst removed after administration of albendazole. J. Med., 2007; 65(3): 112-116.

17- Mandal S. and Mandal M. Human cystic echinococcosis epidemiologic, zoonotic, clinical, diagnostic and therapeutic aspects. Asian Pacific. J. Trop. Med., 2012; 5(4): 235 – 260.

18- Moro P. and Schantz P. (2009). Echinococcosis: a review. Int. J. Infect. Dis., 13 (2): 125–33.

19- Prabhakar M., Acharya A., Modi D. and Jadav B. Spinal hydatid disease: A case series., J. Spin. Cord. Med., 2005; 28(5): 426 – 431.

20- Derbel F., Mabrouk M., Hadj M., Mazhoud J., Youssef S., Ali A., Jemni H., Mama N., Ibtissem H., Nadia A., El Ouni C., Naija W., Mokni M. and Hadj R. Hydatid cyst of the liver diagnosis, complication and treatment. Abdom. Surg., 2012; 5(8): 105-138.