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Study of the prevalence of echinococcosis (hydatid cyst) in Kirkuk governorate for the period from 2016-2019

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ABSTRACT

The current study was conducted from April 19 to May 29, 2021 Public Health department, Animal Origin Division, in the Kirkuk Health department in Kirkuk city to study the causes and spread of infections recorded for period from 2016-2019 in Kirkuk Governorate, 67 cases were diagnosed according to the months,. The highest infection recorded in 2019 was (26) 38.80% and the lowest infection was (10) 14.92% in each of 2016 and 2017 years. The group of health sectors showed the cyst disease caused by strays dogs, which is one of environmental pollutants, where Kirkuk First sector recorded the highest infection (31) 44.77%, while Hawija First sector recorded the lowest infection (4) 5.97%. The study recorded that the percentage of infection among females was 68.65%, and it was more than males 31.34%. The age group 15-25 years showed the highest number of injuries (46), with a rate of 68.65% of injuries during the years.

Introduction

Zoonoses are infectious diseases that are transmitted from animal to human. Echinococcosis is transmitted between wild animals, pets, or farm animals through harmful germs such as viruses, bacteria, parasites and fungi that need intermediate host to complete their life cycle. These parasite are transmitted to humans either by direct or indirect contact. Directly, by carrier, or through food. Scientists estimate that more than 6 out of every 10 infectious diseases source to humans are transmitted from animals, and the degree of their severity varies between few, medium or severe, and sometimes leads to death [1].

Due to spread of large numbers of stray dogs, which are the final hosts of hydatid cyst parasite, while humans and other animals such as sheep, goats and cows are intermediate hosts, attention to this disease is preventive and curative is one of the things that society must pay wide attention to, especially the costs Operations and economic losses at the human and veterinary level are very large [2].

Echinococcus granulosus (hydrocephalus) is one of the oldest human diseases. It was first described in the Talmud as being caused by a water-filled bladder, and Hippocrates (379 BC) described it as a water-filled liver [2]. It is endemic. *Echinococcus granulosusis* in all of the world except Antarctica, where infection rates reach more than 50 infections per 10,000 people annually, while prevalence rates reach 5-10% in some endemic areas. patients who undergo surgeries amount to 2.2%, while the appearance of watery cysts after surgical operations reaches about 6.5%. [1].

The disease spreads in many neighboring and Arab countries, including Syria, Lebanon, Egypt, Sudan, Libya, Algeria, Iraq in particular, and others, as well as northern, eastern and southern Africa, the Caspian Sea, western and southern Europe, and some South American countries with high endemicity [3].

Echinococcus is present in four: cystic echinococcosis caused by the parasite *Echinococcus granulosus*, alveolar echinococcosis due to infection by the parasite *E.multiocularis*, polycystic echinococcosis due to infection by the parasite *E.vogeli*, and monocystic echinococcosis caused by *E .Erus*. In terms of medical and health importance, the two most prominent forms of this disease are cystic echinococcosis and alveolar echinococcosis [4].

It has many names, including granulocytic echinococcosis, *Echinococcus granulosus*, Cystic Echinococcosis, Hydatidosis, and monophasic hydatid cysts. Uinlocular hydatidosis [5].

Echinococcosis is one of the serious endemic diseases in Iraq, due to the presence of stray dogs in large numbers of infective worms, , which are in direct contact with intermediate host [6]. One of the most dangerous life-threatening parasitic diseases and the main cause of disease is eggs of tapeworm. The worm is small in size 2.5-7 mm. It has a pyramidal head carrying a snout equipped with two rows of hooks and four scolex. The body segments consist of only three segment: immature, mature and segment contains egg which reaches an average of (6000 eggs), and the worm has the ability to survive in intestines dogs for a year or more, which leads to pollution the environment with hydatid disease [7].

The life cycle of the parasite is shared between humans and dogs and includes two types of hosts . Carnivores include dogs and members of the canine family, while herbivores such as sheep, goats and cows represent intermediate hosts, [8].The infection of intermediate host is done by eating of food or drinking water contaminated with eggs (infective stages), and by action of gastric and intestinal juices, the embryo gets rid of the outer wall of egg, and through its secretions, it penetrates the intestinal wall and through the blood vessels reaches to internal organs, including liver or lungs and some parts of body so that the growth of the stages begins .The larvae and the primary heads inside the cysts and remain for several months. It is called the fertilized church larva. Some larvae are sterile heads. [9].

While infection of final host is by eating the fertilized larvae, where the primary heads of the cysts appear in intestine and begin to grow to reach adult stage (mature worms) after about 4-6 weeks of infection, the number of worms may reach several thousand in one host while the cotyledon contains 200-800 eggs.

The epidemiology of the disease depends on the interaction of factors between final and intermediate host and the external environment in which live eggs live. Environmental conditions depend mainly on temperature and humidity. The life of egg in external environment ranges from three days to one year [7].

Materials and methods

A-Study location:

After taking the fundamental approvals., Kirkuk Health Department / Public Health Department / Transmissible Diseases Division (animal and parasitic diseases) was reviewed in order to obtain the number of recorded infections and information related to research data through in department received from the hospitals and sectors affiliated to the Kirkuk Health Department. From archived statistics 19/4/2021 - 9/5/2021 (Kirkuk first sector--Kirkuk second sector - Debs sector - Daquq sector - Hawija first and second sector) for the years from 2016-2019.

B- Statistical analysis: The study was analyzed by statistical messages (frequency histogram and percentage.

Results and Discussion

The results showed that there were 67 cases of hydatidosis in Kirkuk governorate for the years from 2016-2019 according to the months, where the highest infection was recorded for 2019 with a rate of 38.80%, while 2016 and 2017 recorded the lowest infection by 14.92% respectively. It should be noted that the increase The number of injuries 2019 is due to the large number of strays and domestic dogs, whether they are in city or the countryside, spread in Kirkuk governorate. (Table 1).

Table 1: Percentage of hydatid disease in Kirkuk governorate from 2016-2019

Month	2016	2017	2018	2019
January	2	1	0	2
February	1	1	1	2
March	0	0	3	1
April	0	1	2	1
May	1	0	0	1
June	0	1	0	0
July	1	0	1	2
August	0	0	1	4
September	0	1	1	1
October	0	1	3	5
November	4	1	5	2
December	1	3	4	5
Total	%14.92 10	%14.92 10	%31.34 21	%38.80 26

The results showed the number and rate of hydatidosis infection in the health sectors of Kirkuk Governorate, where the first Kirkuk sector recorded the highest percentage (44.77%), while the first Hawija sector recorded lowest infection by (5.97%), and the reason is due to the gathering of the dominant dogs because of household waste and the pollution of residential areas, disposal of household waste, depending on municipal workers and hygiene in city center, while districts are a large area. It should be noted that especially the first and second sectors of Hawija, where no injuries were recorded in 2016 and 2017 due to displacement of people and instability of the region. The registration of injuries in various

districts of Kirkuk governorate means that there are factors that contribute to spreading the infection represented by infected stray dogs and the spread of unlicensed slaughtering places and that the district Kirkuk city recorded highest infection, perhaps due to its being higher in terms of population, as well as the fact that this district brings to it sources of infection such as vegetables from different areas of Kirkuk and its suburbs. (Table 2)

The difference between number of infections in sectors in number of registered cases and the prevalence of hydatidosis infection may be due to the presence and intermediate hosts in residential areas, which contribute to the continuation of life cycle of the parasite, as well as the environmental factors that help in keeping eggs alive and susceptible to infection for long periods. One region to another. This result is close to the study Kalif *et al* [10] in Baghdad ,AL-Yasari *et al* [11] in Babylon.

Table 2: Number and percentage of the injured by sectors

Year	Kirkuk 1	Kirkuk 2	Debs	Daquq	Hawiga1	Hawiga2
2016	6	2	1	1	0	0
2017	5	2	2	1	0	0
2018	8	4	2	3	2	2
2019	11	6	0	4	2	3
Total	30	14	5	9	4	5
%	%44.77	%20.89	% 7.47	%13.43	%5.97	%7.46

The results showed the number and rate of hydatidosis by gender in health sectors of Kirkuk Governorate, where Kirkuk sector recorded the highest percentage in females (26.86%) and in males at (17.91%), while the first Hawija sector recorded the lowest infection in Females with a rate of (4.47%) (table 3)that the results of the study are close to the results of studies conducted in most of the governorates of the country, as they agree with the study Al-Ghazi [12] to the study Al-Mounais [13] in Basra and the study Tufaili [14] in Najaf governorate. The reason may be due to In higher number of injuries in females than in males due to some social customs and traditions that females may be more in contact with sources of infection such as soil, vegetables and dealing with dogs, especially in rural communities, which makes them more vulnerable to infection [15].

Table 3: Number and percentage of people infected with hydatidosis according of sex.

Year	Kirkuk 1		Kirkuk 2		Debs		Daquq		Hawiga 1		Hawiga 2	
	M	F	M	F	M	F	M	F	M	F	M	F
2016	4	2	0	2	0	1	1	0	0	0	0	0
2017	1	4	0	3	0	2	0	0	0	0	0	0
2018	4	4	2	2	1	1	1	2	0	2	0	2
2019	3	8	0	6	0	0	2	2	1	1	1	2
Total	12	18	2	13	1	4	4	4	1	3	1	4
%	17.91	26.86	2.98	19.40	1.4	5.97	5.97	5.97	1.49	4.47	1.49	5.97

The results showed the number and rate of hydatidosis in Kirkuk governorate by age groups, where age group (15-45 years) recorded the highest percentage (64.17%), while the age group (1- 4 years) recorded the lowest infection by (2.98%) (table 4). It was noted that there was no infection in the age group less than a year, and the results of the study agree with the study Yacoub *et al* [16]. The reason is that many studies confirmed that the incidence of hydatidosis increases in adulthood and above, and the incidence decreases in Childhood.

Table 4: The number and percentage of the injured with hydatidosis by age group.

Year	>year	1-4 year	5-14 year	15-45 year	>45 year
2016	0	0	6	3	1
2017	0	1	2	5	2
2018	0	0	2	17	2
2019	0	1	3	18	4
Total	0	2	13	43	9
%	0	%2.98	%19.40	%64.17	%13.43

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انتشار داء المشوكات (الاكياس العدرية) في محافظة كركوك للفترة من 2016–2019

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الملخص

أجريت الدراسة الحالية للفترة من 19 نيسان ولغاية 29 أيار 2021 في قسم الصحة العامة شعبة حيوانية المنشأ صحة كركوك لدراسة اسباب وانتشار الاصابات المسجلة للفترة من 2016–2019 وحسب الاشهر اذ شخصت 67 حالة. ان اعلى اصابة سجلت في سنة 2019 بلغت (26) 38.80 % واقل اصابة كانت (10) 14.92 % في كل من السنين 2016 و2017. أظهرت مجموعة القطاعات الصحية اصابات بداء الاكياس المائية العدرية التي تسببها الكلاب السائبة والتي تعتبر احد الملوثات البيئية حيث سجلت قطاع كركوك الاولى اعلى اصابة بلغت (31) 44.77% بينما سجلت قطاع الحويجة الاولى اقل اصابة (4) 5.97% . سجلت الدراسة الحالية ان النسبة المئوية للإصابة في الاناث 68.65 % كانت اكثر من الذكور 31.34% في كافة القطاعات. وأظهرت المجموعة العمرية 15–25 سنة اعلى عدد بالإصابات (46) وبنسبة 68.65 % خلال السنوات المذكورة اعلاه.