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Original Article

Epidemiological Characteristics of Patients With Hydatid Cysts in Qom Province Hospitals From 2001 to 2019

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Abstract

Background: Cystic echinococcosis (CE), caused by the larval stage of the *Echinococcus granulosus*, is a common human and animal disease that occurs worldwide. This study aimed to investigate the clinico-epidemiological characteristics of patients with hydatid cyst in surgical cases from 2001 to 2019 in Qom hospitals.

Methods: This cross-sectional study was conducted in Qom province, the center of Iran, from 2001 to 2019. The study population included all cases with hydatid cyst who operated in governmental and private hospitals. The participants' characteristics such as age, gender, occupation, place of residence, organ involved, clinical signs and, diagnosis and treatment methods were collected using a questionnaire. The statistical analysis was carried out using SPSS (version 23) software package.

Results: The results revealed that 53.21% and 46.79% of patients were females and males, respectively. Most cases were uban residents (57.69%), and 62.18% of them were housewives. Liver involvement was the most common localization of hydatid cysts reported in 73.7% of patients. The main diagnostic procedures were computed tomography scanning and indirect hemagglutination (IHA). Abdominal pain was reported in 62.2% of cases, and the most common treatment method for the disease was surgical (84.6%). Further, recurrence occurred in 13.47% of patients.

Conclusions: The results of this study showed that the majority of patients with CE were housewives. Therefore, proper washing of fruits and vegetables is very important. To prevent the occurrence of CE, the public awareness level should be increased. In addition, educational programs must be conducted by the Ministry of Health to identify whether the control measures are needed in the high risk population.

Keywords: Humans, Echinococcosis, Epidemiology, Zoonosis, Iran

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Background

Cystic echinococcosis (CE), caused by the larval stage of the *Echinococcus granulosus*, is a common zoonotic disease that has a global distribution (1-3). This disease is one of the oldest parasitic diseases that infects humans and can cause death if not treated properly (4). CE is an endemic disease in the human population which is found in some other countries of the world such as South Australia, South Africa, and the Middle East (5). CE develops in humans after ingestion of *E. granulosus* eggs by eating contaminated water, fruits, and vegetables or direct contact with contaminated dogs infected with parasite egg of this disease. Hydatid cyst usually affects the lung and liver in human. The prevalence of CE in Iran is endemic in most parts of Iran where there is animal husbandry (6). According to a report, about 1% of surgeries in Tehran are related to hydatid cyst (7). Most cases of hydatid cysts are found in the liver in adults, but cysts in the lung and brain of children are more common than those in adults (8). The death is reported to be between 2 and 4%. Symptoms of this disease depend on some factors such as age, gender, infection severity, cyst size, and the involved organ in the body (9).

The social and economic situation of Qom province is moderate or low, and the migration rate of a large number of Iranian people and foreigners to this city is high. In addition, the limited access of these people to specialized doctors and well-equipped private and public medical centers leads to late diagnosis of the disease (10). Livestock farming in the suburbs, illegal slaughter, and livestock supply in different areas of Qom contributed to the high prevalence of this disease. On the other hand, the unsanitary situation of growing vegetables in the suburbs and the unresolved problem of stray dogs in this city and

surrounding villages have increased the prevalence of this disease among urban and rural residents (10).

Epidemiological studies help health policymakers adopt appropriate prevention programs. Considering that limited studies have been conducted in Qom province in this regard, the present study aimed to determine the epidemiological status of surgical patients with hydatid cyst admitted to hospitals in Qom province from 2001 to 2019.

Materials and Methods

Study Area

The study was conducted in Qom, in the center of Iran. Qom is located 140 km (87 mi) to the south of Tehran. It has a hot summer semi-desert climate.

Samples and Data Collection

This cross-sectional descriptive epidemiological study investigated the records of 156 patients with surgical hydatid cyst in governmental and private hospitals in Qom province. The participants consisted of all patients who underwent hydatid cyst surgery at the beginning of 2001 to the end of 2019. After approving the project and obtaining the ethical code (IR.MUQ.REC.1397.172) from the research committee of Qom University of Medical Sciences, the necessary coordination was made with the hospital and the treatment staff to provide access to patients' hospital records.

A questionnaire was used to collect the data, and information about participants' characteristics such as age, gender, place of residence, occupation, organ involved, recurrence of disease, clinical signs, and diagnosis and treatment methods were recorded in the patient information registration form. After collecting the data and extracting them from the questionnaires, the information was recorded and then statistically analyzed.

Statistical Analysis

The statistical analysis was carried out using SPSS (version 23) software package. Absolute or percentages were used to describe categorical variables. For quantitative variables, depending on the distribution, results were expressed as mean ± standard deviations. A *P* value less than 0.05 was considered as statistically significant.

Results

From 2001 to 2019, 156 patients including 73 (46.79%) males and 83 (53.21%) females in Qom province were recorded for hydatid cyst surgery. According to Table 1, the majority of patients were within the age range of 26-35 years (n = 41), while the age range fewer than 15 years had the lowest frequency (4.48%). Among the participants in terms of occupation, housewives had the highest frequency (51.28%, n = 80).

Government employees and ranchers constituted a small number of cases. In terms of residence, 57.69% (n = 90) of patients were urban and 42.31% (n = 66) were rural residents, and urban residents were more infected than rural residents (Table 1).

Right liver involvement was reported in 47.43% (n = 74) of patients, and 2.57% (n = 4) were reported to have simultaneous liver and lung involvement. Furthermore, 75 (48.1%, n = 75) patients were diagnosed by CT scan method and 86.54% (n = 135) by the indirect hemagglutination (IHA)method (Table 2).

As indicated in Figure 1 and Table 3, the most common clinical symptoms in hydatidosis patients were abdominal pain (60.25%, n = 94) and nausea (39.75%, n = 62).

Table 1. Frequency of Patients With Hydatid Cyst

Variables	Sub -group	Hydatid Cyst Frequency	
		No.	%
Gender	Male	74	47.44
	Female	82	52.56
Age group (y)	Up to 15	7	4.48
	16-25	24	15.38
	26-35	41	26.28
	36-45	33	21.15
	46-55	31	19.87
	Over 56	20	12.82
Abundance job	Housewife	80	51.3
	Freelance	31	19.87
	Government job	3	1.92
	Shepherd	9	5.76
	Farmer	7	4.48
	Others	26	16.66
Place of residence	Urban	90	57.69
	Rural	66	42.31
	Total	156	100

Table 2. Frequency of Patients With Hydatid Cyst Based on the Involved Organ and Diagnosis Method

Variables	Sub-group	Hydatid Cyst Frequency	
		No.	%
Involvement organ	Right liver	74	47.43
	Left liver	28	17.9
	Right lung	33	21.15
	Left lung	12	7.69
	Liver and lung	4	2.57
	Other organs	5	3.2
	Total	156	100
Diagnosis method	Sonography	42	26.92
	CT scan	75	48.1
	MRI	1	0.64
	Sonography and CT scan	33	21.15
	Sonography and MRI	2	1.28
	CTS and MRI	1	0.64
	Sono, CT scan, and MRI	2	1.27
	Total	156	100
Serological diagnosis	IHA	135	86.54
	ELISA	21	13.46
	Total	156	100

Note. CT: Computed tomography; MRI: Magnetic resonance imaging; IHA: indirect hemagglutination; ELISA: Enzyme-linked immunosorbent assay

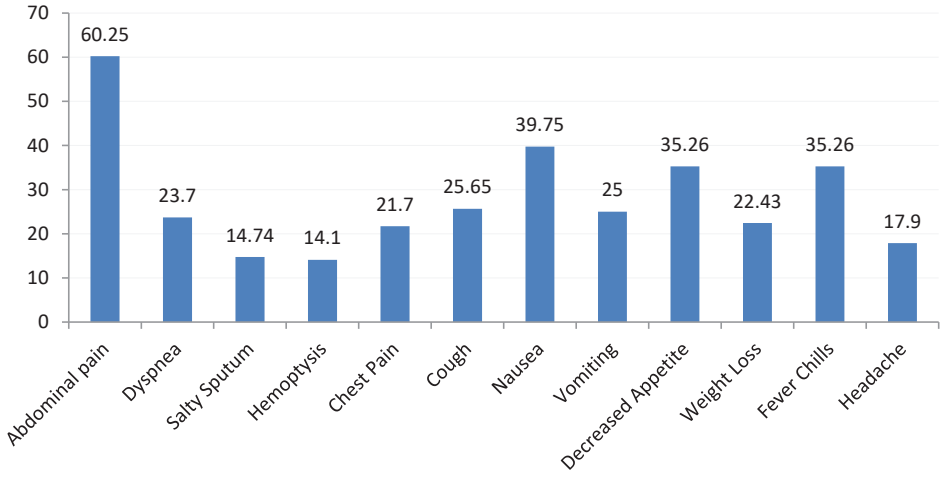

Figure 1. Status of Common Symptoms in Patients With Hydatid Cysts in Qom Hospitals During 2001-2019.

Table 3. Frequency of Patients With Hydatid Cysts Evaluated by Clinical Symptoms

Clinical Sign	Abdominal pain	No	62	39.75
		Yes	94	60.25
	Dyspnea	No	119	76.3
		Yes	37	23.7
	Salty sputum	No	133	85.26
		Yes	23	14.74
	Hemoptysis	No	134	85.9
		Yes	22	14.1
	Chest pain	No	122	78.3
		Yes	34	21.7
	Cough	No	116	74.35
		Yes	40	25.65
	Nausea	No	94	60.25
		Yes	62	39.75
	Vomiting	No	117	75
		Yes	39	25
	Decreased appetite	No	101	64.74
		Yes	55	35.26
	Weight loss	No	121	77.57
		Yes	35	22.43
	Fever chills	No	101	64.74
		Yes	55	35.26
	Headache	No	128	82.1
		Yes	28	17.9
	Eosinophilia	No	97	62.17
		Yes	59	37.83

The alkaline phosphatase liver enzyme levels raised in 25% (n = 39) of patients, and 77.56% (n = 121) of patients underwent both chemical treatment and surgery at the same time. Regarding how albendazole was administered, 55.13% (n = 86) of patients took albendazole continuously. The majority of patients (75.65%, n = 118) were infected with a single cyst, and 4.48% (n = 7) of them had more than 4 cysts, while 13.47% (n = 21) of patients had a recurrence.

Discussion

Hydatid cyst is a common parasitic infection in humans and animals that occurs worldwide and causes basic public health problems and economic damage. This disease is endemic in Iran, and human cases have been reported in almost all provinces across the country (11). The present study aimed to determine the epidemiological status of surgical patients with hydatid cyst admitted to hospitals in Qom province from 2001 to 2019.

Our findings showed that out of 156 patients, 82 (52.56%) were females and 74 (47.44%) were males. The findings of the current study indicated this infection was more frequent in women compared to men. This might be due to the greater contribution of women to agricultural and animal husbandry in this region. This result is consistent with the obtained results of other Iranian studies (12-14) and other countries (15,16). Similar to other studies in Zanjan (17), Isfahan (18), Jordan (19), and Yasuj (20), most patients were in the age range of 26-35 years. It seems to be due to the prevalence of infection in young people which eventually becomes symptomatic at the age of 26 to 35 years owing to the limited and slow growth of the cyst.

The results obtained from this study showed that housewives had the highest proportion of infection (51.28%, n = 80), which is similar to the results of other studies (21,22). It seems that women, especially housewives, are more exposed to the disease due to their main role in preparing and cooking family food, and they are more likely to encounter vegetables and fruits contaminated with parasitic eggs than men.

In a study on surgical cases of hydatid cyst in Ahvaz hospitals during 2004-2014, the highest prevalence of the hydatid cyst was in the right lobe of the liver (26.1%). This is consistent with the results of the present study. Among the imaging methods in Ahvaz, sonography and magnetic reasoning imaging had the highest and lowest use in the diagnosis of the disease, respectively, but in our study, CT scan had the highest percentage (23).

Similar to the current study, most studies conducted

on the prevalence of the hydatid cyst identified the liver as the most involved organ (2,24-27) with a 57.5%, 68%, 74.3%, 77%, and 43% frequency, respectively. Only two studies carried out in the North West of Iran and Bulgaria indicated that lung was affected more than the other organs (28,29), although these studies were conducted among children.

Moreover, the results of this study indicated that the incidence of the disease in Qom during the mentioned period is significant. Further, more comprehensive and up-to-date studies are need to educate and inform the public about this disease and to control and interrupt the parasite cycle. Abandoned and stray dogs seem to play an important role in establishing the parasite cycle; accordingly, a solution must be found to control them.

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Conflict of Interests

The authors declare no conflict of interests.

Ethical Approval

This study was approved by the research committee of Qom University of Medical Sciences (IR.MUQ.REC.1397.172).

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