

Clinical and Epidemiological Profile of Hydatid Cyst in Baghlan Province, Afghanistan

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ABSTRACT

Background: Hydatid cyst is a neglected zoonotic disease caused by the larval stage of the tapeworm *Echinococcus granulosus*. While Afghanistan is a known endemic country, detailed epidemiological data from specific provinces remain scarce. We aimed to describe the demographic, clinical, and cyst-related characteristics of patients diagnosed with hydatid cyst in Baghlan Province, Afghanistan

Methods: This retrospective study reviewed the medical records of 26 patients with confirmed hydatid cyst disease, treated at four hospitals in Baghlan Province from March 2022 to December 2025. Information on demographic characteristics (including age, sex, and place of residence), cyst localization, and clinical manifestations was collected and assessed using descriptive statistical methods.

Results: Among 26 patients, the majority were female (n=17, 65.4%). The mean age was 32.5 years (range 7–80 years old). The liver was the predominant site of involvement, either as a single organ or as part of multiple organ involvement (n=25, 96.2%). Among liver cysts, the right upper quadrant was the most frequent location (n=24, 92.3%). The most common symptoms included abdominal pain (n=24, 92.3%), fever (n=20, 76.9%), nausea (n=5, 19.2%), and anorexia (n=4, 15.4%). Unusual cyst locations were observed in three patients: lung (n=1), spleen (n=1), and uterus (n=1). No patient had documented central nervous system or orbital involvement.

Conclusion: Hydatid cyst in Baghlan Province predominantly affects young to middle-aged females and most frequently involves the liver. The presence of extra-hepatic localizations, albeit rare, underscores the need for a high index of suspicion in endemic regions. Public health interventions should target rural farming communities where livestock rearing is common.

Keywords: Hydatid cyst, Echinococcosis, Afghanistan, Zoonosis, Liver cyst

Introduction

Hydatid cyst, or cystic echinococcosis (CE), is a parasitic zoonosis caused by the larval stage of the tapeworm *Echinococcus granulosus* (1). The parasite's life cycle involves canids, especially domestic dogs, as definitive hosts and herbivorous livestock such as sheep, goats, and cattle as intermediate hosts. Humans become accidental intermediate hosts by ingesting parasite eggs from contaminated food, water, or soil (2).

Hydatid cyst remains a significant global health problem with a substantial socioeconomic impact. The disease is responsible for an estimated annual economic burden of approximately 3 billion USD worldwide, accounting for both healthcare treatment costs and livestock production losses (2,3). In Central Asia, an estimated 270 million people are at risk of hydatid cyst, with annual surgical incidence rates reaching as high as 25–27 cases per 100,000 population in some countries such as Uzbekistan and Tajikistan (4). Despite these alarming figures, control efforts in the region remain largely fragmented and uncoordinated.

The epidemiology of hydatidosis in Afghanistan has remained largely understudied. In neighboring Iran, extensive research has provided a clearer picture of the disease burden, with the overall seroprevalence of human hydatid cyst estimated at 4% in the general population (5). The seroprevalence is significantly higher among individuals younger than 40 years of age (7%) and among rural populations and nomads (6%) (2,3). In Urmia, northwest Iran, the seropositivity rate among rural inhabitants was reported at 1.1%, with significantly higher rates observed in patients who had con-

sistent dog contact or consumed unwashed raw vegetables (6). Furthermore, a meta-analysis of pediatric hydatid disease reported an overall incidence of 3.37 per 1,000 children globally, with substantially higher rates observed in rural areas (14.84 per 1,000) compared to mixed geographic regions (7). These figures highlight the vulnerability of rural agricultural communities to this zoonotic infection.

Baghlan Province, located in northern Afghanistan, has a population of approximately one million people including both urban centers and extensive rural, agricultural areas. Despite its size and mixed urban-rural population, no previous study has systematically described the clinical and epidemiological features of hydatid cyst in this province.

This study fills that gap by analyzing patient data from four different hospitals in Baghlan Province, Afghanistan.

Methods

Study design and setting

A retrospective study was conducted medical records of patients diagnosed with hydatid cyst from March 2022 and December 2025 at four hospitals (Rohani, Haidari, Sarwari, and Nasir Dost Hospitals) in Baghlan province, Afghanistan (Figure 1). Situated in northeastern Afghanistan, Baghlan is one of the country's key industrial and agricultural provinces. It covers an area of 21,112 km². According to the national population estimate for 2022, the province has roughly 1,053,200 inhabitants (8).

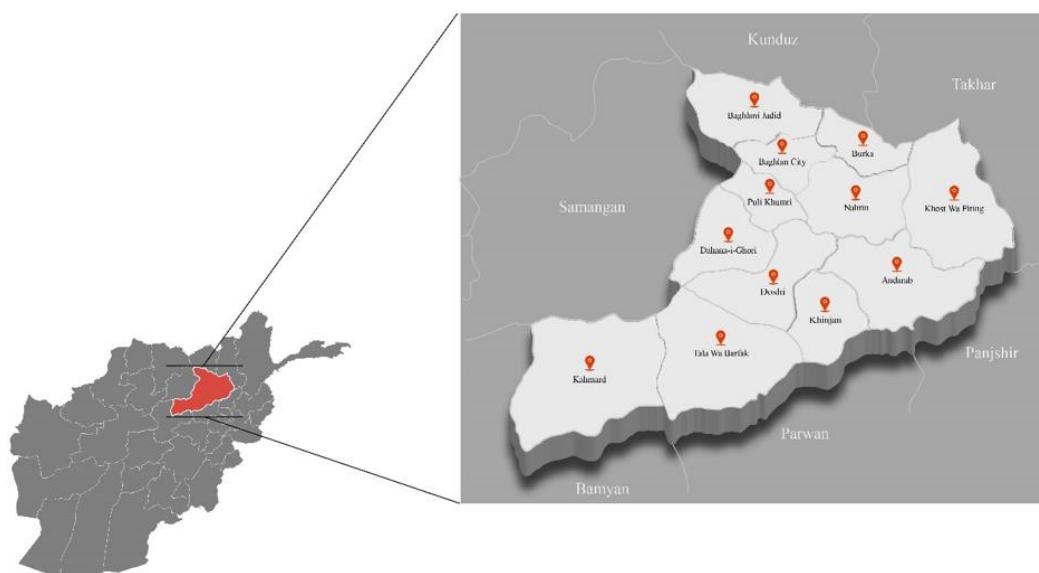


Figure 1: Map of Baghlan Province, northern Afghanistan

Patients

All patients with a medical record diagnosis of hydatid cyst (liver, lung, spleen, uterus, or other sites) were enrolled. Diagnosis was based on clinical presentation, imaging (ultrasound or computed tomography), and/or serology according to the standard of care at each hospital.

Data collection

The following variables were extracted: age, sex, name (anonymized), address/locality, location of cyst (e.g., liver, multiple in liver, lung, spleen, uterus), presence of symptoms (fever, abdominal pain, abdominal pain, vertigo, chest pain, cough, back pain, nausea, anorexia, vomiting, pelvic pain, right upper quadrant pain, and left upper quadrant pain). All symptom variables were coded as binary (1 = present, 0 = absent).

Data analysis

Descriptive statistical analysis was performed using Microsoft Excel. Continuous variables (age) are presented as mean and range. Categorical variables (sex, cyst location, symptoms) are presented as frequencies and percentages.

Results

Demographic characteristics

A total of 26 patients were enrolled. The mean age was 32.5 years old (range 7–80 years old) (Table 1).

Table 1: Age distribution of patients diagnosed with hydatid cyst.

<i>Age Group (yr)</i>	<i>No. patients (%)</i>
<10	2 (7.7)
11–20	4 (15.4)
21–30	5 (19.2)
31–40	4 (15.4)
41–50	3 (11.5)
51–60	1 (3.8)
61–70	4 (15.4)
>70	3 (11.5)

The largest age group was 20–30 years ($n=5$, 19.2%). The youngest patient was a 7-year-old child and the oldest patient was 80 years old, both with a liver cyst. Female patients constituted the majority ($n=17$, 65.4%), while male patients accounted for 34.6% ($n=9$). The primary water sources for all patients were wells and rivers. Regarding occupation, excluding

housewives and children, the majority of patients were engaged in agriculture and livestock farming.

Cyst location

The liver was overwhelmingly the most common site of cyst involvement (Table 2). Among 26 patients, the liver was involved either as a single organ or as part of multiple organ disease in 25 patients (96.2%). Among these, 24 patients (92.3%) had a liver cyst that specifically involved the right upper quadrant.

Multiple cysts in the liver (i.e., “multiple in liver”) were noted in one patient (3.8%). Unusual localizations were observed in three patients: one patient had a right lung cyst (3.8%), one patient had a spleen cyst (3.8%), and one female patient had a uterine cyst (3.8%). No patient had documented central nervous system or orbital cysts.

Table 2: Frequency and location of hydatid cyst by each organ among patients.

Cyst location	No. Patients (%)
Liver (including right upper quadrant)	24 (92.3)
Multiple in liver	1 (3.8)
Right lung	1 (3.8)
Spleen	1 (3.8)
Uterus	1 (3.8)
Any extra-hepatic	3 (11.5)

Clinical presentation

The most frequent symptoms are summarized in Table 3. Abdominal pain was the leading symptom, present in 92.3% of patients (24/26). Fever was reported in 76.9% of patients (20/26). Other gastrointestinal symptoms included nausea (19.2%, 5/26), anorexia (15.4%, 4/26), and vomiting (7.7%, 2/26). Chest-related symptoms such as cough (3.8%, 1/26) and chest pain (3.8%, 1/26) were rare. Vertebral/back pain was reported in 11.5% (3/26) of patients.

Most patients with liver cysts presented with right upper quadrant pain (n=24, 92.3%). Pelvic pain occurred only in the patient with a uterine cyst (n=1, 3.8%). Left upper quadrant pain was noted in only one patient, who had a spleen cyst.

Table 3: Frequency of symptoms of hydatid cyst in patients.

Symptom	Frequency (%)
Abdominal pain	24 (92.3)
Fever	20 (76.9)
Nausea	5 (19.2)
Anorexia	4 (15.4)
Back pain	3 (11.5)
Vomiting	2 (7.7)
Cough	1 (3.8)
Chest pain	1 (3.8)
Pelvic pain	1 (3.8)

Discussion

This study provides the first detailed clinical and epidemiological description of hydatid cyst in Baghlan Province, Afghanistan. Several key findings emerge and warrant discussion.

The female predominance observed is consistent with previous studies from Afghanistan. In Herat, women comprised 72.9% of hydatid cyst inpatients (3), and in Khost, women accounted for 67.5% of cases (9). A study from Mashhad, Iran, similarly found that housewives were the most commonly affected occupation (31.95%) (10). The predominance of women might reflect greater exposure to household activities that bring them into contact with contaminated soil or water, such as vegetable washing and gardening, as well as the higher number of female patients seeking healthcare more readily for chronic abdominal symptoms (11,12).

A significant proportion of infected individuals are housewives, with figures ranging from 29% to 52.7% (13–15), and a large multi-country study identified being a housewife as a significant risk factor for infection (AOR = 3.11) (16). Furthermore, a meta-analysis from Iran reported that the seroprevalence of hydatid cyst was 1.3% in females compared to 0.8% in males, supporting the notion of a genuine sex-related difference in exposure or susceptibility rather than solely a healthcare-seeking bias (6).

The mean age of 32.5 years, along with the highest frequency observed in the 20–30-year age bracket, is consistent with previously reported findings. For example, an Iranian study reported that the highest seroprevalence of cystic echinococcosis occurred among individuals aged 20–40 years (17). Another meta-analysis reported that prevalence was significantly higher in patients younger than 40 years of age (18). The presence of two children (aged 7 and 8) in our study points to ongoing transmission in the young community, given that pediatric infections are attributable to recent contact with the parasite rather than long-term cyst maturation (19).

Hepatic localization represented the majority of cases, which aligns with the known pathophysiology of hydatid disease, in which the majority of embryos are trapped in the hepatic sinusoids upon portal circulation (20). The right upper quadrant was the most common liver sub-location, which agrees with the tendency of hydatid cysts to localize to the right lobe of the liver (21). This anatomical preference is extensively supported in the existing literature; for example, a recent Afghan study (3) reported right lobe involvement in up to 84.38% of cases. It is also conceivable that pulmonary cysts are underdiagnosed in our context, as chest X-ray has lower sensitivity than abdominal ultrasound, which is more widely accessible.

Extra-hepatic involvement (lung, spleen, and uterine) was observed in this study. Lung involvement is the second most common site, oc-

ccurring in 10–25% of cases. Splenic hydatid cyst is rare but has been reported in the literature. In our study we observed one case of splenic hydatid cyst. Splenic hydatid disease accounts for less than 2% of all CE cases globally and represents only 0.5% to 4% of abdominal hydatid cysts (22,23). A recently published case report of a 23-year-old woman with primary splenic hydatid cyst noted that the infrequency of this condition, coupled with its often-indistinct clinical picture, tends to delay timely diagnosis and heighten the likelihood of severe adverse outcomes. Consequently, the authors advised clinicians practicing in endemic regions to maintain a high index of suspicion for splenic hydatid cyst when evaluating patients with abdominal discomfort, regardless of the subtlety of symptoms (22). Similarly, a case of isolated splenic hydatid cyst in a 5-year-old girl from Palestine was recently reported, underscoring that splenic involvement can occur even in young children (24).

The occurrence of a uterine hydatid cyst in our study is exceptionally rare. Uterine hydatid cyst is extremely rare and sporadically reported in literatures. Our case of uterine cyst in a young woman highlights the need for a high index of suspicion when evaluating pelvic cystic masses in endemic regions. A case report from Nepal described a 76-year-old menopausal woman with a primary solitary uterine hydatid cyst mimicking an intra-myometrium cyst (25). More recently, a case of spontaneous disseminated hydatidosis with uterine involvement in an 8-year-old Afghan girl was reported, in which imaging revealed multiple hydatid cysts in the liver, peritoneal cavity, and uterus, all without prior history of hydatidosis or known exposure (26). A systematic review of rare anatomical localizations of hydatid cysts published between 2020 and 2025 identified the brain, bone, and heart as the most commonly reported rare sites; urogenital involvement was mentioned but remained exceptionally infrequent (27). These cases underscore the importance of

maintaining a high index of suspicion for hydatid disease when evaluating cystic pelvic masses in women from endemic regions, as the diagnosis may be overlooked in favor of more common gynecological conditions.

Compared to neighboring Iran, the burden of hydatid cyst in Baghlan appears substantial. The annual incidence of CE in Iran ranges from 0 to 61 per 100,000, depending on the region, with a seroprevalence of 5–6% in the general population (17,28). In Mashhad, lung involvement (52.6%) actually surpassed liver involvement (40.3%) in a large surgical series, which contrasts with our liver-predominant findings (10). This difference may be due to differences in diagnostic approaches or referral patterns.

The transmission of *E. granulosus* in Central Asian countries, including Afghanistan, is closely linked to social and behavioral factors that facilitate the dog-livestock cycle. Key risk factors include limited community knowledge of echinococcosis, small-scale household animal production, home slaughtering of livestock, and the common practice of feeding dogs with uncooked offal (4). A systematic review and meta-analysis research in Iran, as a neighboring country with Afghanistan showed that seropositivity for human hydatid cyst was significantly associated with the presence of dogs at home or on farms, rural residence, and inadequate hygienic practices such as consuming unwashed vegetables (5).

In our study population, all patients relied on well water or river water for domestic use, and most were farmers or livestock breeders. These factors are consistent with known risk factors for cystic echinococcosis, including close contact with dogs and livestock, as well as potential contamination of untreated water sources with *Echinococcus* eggs (29–32).

These findings suggest that similar risk factors likely operate in Baghlan, where livestock farming is widespread and close contact between humans, dogs, and livestock is common. A radiological and serological screening study

from an Afghan state hospital reported that among 214 individuals sharing the same living environment as confirmed hydatid cyst patients, cysts were detected radiologically in the liver, lung, and spleen in eight, two, and one patient, respectively, while serology was positive in 22 individuals, indicating ongoing household and community transmission (33).

Within Afghanistan, several hospital-based studies have documented the clinical features of hydatid disease in various provinces. A descriptive study from Herat Regional Hospital, conducted over a 12-month period in 2022, reported a prevalence of 3.65% for hepatic hydatid cyst among inpatients, with female predominance (72.87%) and rural residency (72.32%) being the most affected. Notably, 83.56% of patients were farmers, and the majority of cysts were localized to the right lobe of the liver (84.38%) (3).

Similarly, a case series from Khost Province, which included 40 patients with liver hydatid cysts over a one-year period, found that women constituted 67.5% of cases and that most patients were under 30 years of age (59.5%). In that study, 72.5% of the patients originated from rural districts (9). Additional case reports from Afghanistan have documented unusual presentations, including disseminated hydatid disease involving multiple organs in a 7-year-old child from Kabul (34), orbital hydatid cysts in pediatric patients (2), and uterine involvement in an 8-year-old Afghan girl (26). These reports underscore the diverse clinical manifestations of hydatid disease in the country and emphasize the need for comprehensive epidemiological assessments at the provincial level.

Several limitations of the current study should be acknowledged. First, the small sample size limits the statistical power for subgroup analyses and the generalizability of the findings to all of Baghlan Province. Second, data on treatment modality (surgical vs. medical), cyst stage, and follow-up recurrence rates were not

available. Third, the dataset lacks information on potential risk factors such as dog ownership, occupation (farming, shepherding), and water source. Finally, the use of four different hospitals with possibly different diagnostic standards may have introduced variability.

The presence of hydatid cyst in Baghlan's young, mostly rural population underscores the need for targeted control measures. Prevention programs should include regular deworming of dogs, safe slaughtering practices for livestock, and public education about the risks of feeding raw offal to dogs. In addition, improving access to diagnostic imaging (ultrasound) in district health centers would enable earlier diagnosis and reduce the burden of complicated, symptomatic disease.

Conclusions

Hydatid cyst in Baghlan Province is a significant health problem that predominantly affects young- to middle-aged women and most frequently localizes in the liver. Extra-hepatic involvement, though rare, does occur and requires careful diagnostic consideration. This first description of hydatid cyst in this province can serve as a baseline for future epidemiological and clinical studies. Health authorities in Baghlan should implement preventive interventions that target rural, agricultural communities and should enhance diagnostic capabilities for early detection of the disease.

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Ethics

This study underwent review by the Ghalib University Institutional Review Board

(GUIRB) and received approval from the Ethics Committee in Biomedical Researches (AF.GUIRB.ECBBR.1405.003). Ethical clearance was formally obtained to conduct a retrospective analysis of anonymized patient medical records, in compliance with the committee's regulations for hospital-based observational research in Afghanistan.

Conflicts of interest

The authors declare no competing interests.

Data availability statement

The data supporting the findings of this study are available from the corresponding author upon reasonable request.

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