

Prevalence of Hydatid Disease in Iraq: A Statistical Study (2023)

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ABSTRACT

Objective: Hydatid disease (cystic echinococcosis), caused by the larval stage of *Echinococcus granulosus*, remains a persistent public health concern in Iraq, particularly in areas with suboptimal livestock management and healthcare infrastructure. This study aimed to assess the national prevalence of hydatid disease across various demographic and geographic dimensions using recent official data.

Method: A retrospective descriptive analysis was conducted using epidemiological data from the Iraqi Ministry of Health's Division of Infectious Diseases, encompassing 478 confirmed cases reported in 2023. The dataset was analyzed based on age, gender, and governorate of residence using frequencies and percentages. **Results:** Females represented 64.9% of infections, with the 20–44 age group being most affected. The highest prevalence was found in Al-Muthanna province (1.12 per 10,000 population), indicating potential epidemiological hotspots driven by ecological and sociocultural factors. **Novelty:** This study provides an up-to-date national epidemiological snapshot of hydatid disease in Iraq using 2023 data, highlighting gender- and age-based vulnerability and identifying geographic clusters. The findings offer valuable insights for region-specific public health interventions and contribute new empirical evidence to the limited literature on zoonotic disease distribution in Iraq.

INTRODUCTION

Hydatid disease, also referred to as cystic echinococcosis, is a parasitic zoonotic disease of major concern in many regions of the world, particularly in developing countries with extensive livestock populations [1]. It is caused by the larval stage of *Echinococcus granulosus*, a small tapeworm that resides in the intestines of definitive hosts, primarily dogs [2]. Humans serve as accidental intermediate hosts, becoming infected through ingestion of eggs excreted by infected canines, commonly via contaminated water [3]. In Iraq, the disease is considered hyper endemic and has been attributed to the presence of large numbers of stray dogs infected with adult *Echinococcus granulosus*. These dogs discard eggs containing the hexacanth embryo, which go on to infect humans as intermediate hosts. Studies in Iraq have shown that the life cycle of this parasite lasts between dogs that are the final host for the adult worm, sheep, goats, camels, and cows that are intermediate hosts that carry the larval stages [4]. Injury from cattle members strapped to bags to dogs, the latter being the main source for transmitting the injury to humans, directly or indirectly [5].

The transmission of the disease in Iraq and its spread may be attributed to the trade of sheep, cows, goats or camels, which may be infected with the disease from those countries, and its legal or illegal entry into Iraq and its subsequent transfer to the country, Especially in recent times as a result of the instability of the security situation and the

deterioration of the strategy, of controlling the border separating Iraq and the neighboring countries as well as not taking the necessary and necessary preventive measures in examining the livestock exported to the country, which allows the opportunity to transmit the disease to Iraq and increase its spread, which would increase the possibility of an increase Incidence rates. Economic implications are also significant, affecting both human health systems and the livestock sector. Surgical intervention is the primary method of treatment, with pharmacological options being largely adjunctive. This increases the financial burden on both individual patients and the national healthcare system. In 1998, economic losses in Iraq's northern provinces alone were estimated to be in the hundreds of millions of dinars annually [6].

This study was initiated to understand the demographic and geographic distribution of hydatid disease in Iraq, focusing on 2023 data from the Ministry of Health [7] ,[8], [9]. The aim is to provide an epidemiological snapshot that can inform public health officials and healthcare providers in devising focused actions.

RESEARCH METHOD

This research is a quantitative, descriptive, retrospective study based on data compiled from the Iraqi Ministry of Health's Division of Infectious Diseases for the year 2023. The dataset comprised 478 confirmed cases of hydatid disease reported from various governorates across Iraq.

Research Sample:

The whole population of hydatid disease cases reported in 2023 was taken from the Ministry's official records. In addition to ensuring thorough nationwide coverage, this reduced sample bias.

Data Collection Tools:

The primary source of data was the annual statistical report issued by the Ministry of Health. This report includes demographic variables (age, sex), as well as geographical data (distribution by governorate). Data were extracted manually and compiled into spreadsheets for further analysis.

Statistical Analysis:

The statistical tools employed included frequencies and percentage distributions. Microsoft Excel and SPSS were used to analyze and graph the data. Figures and tables were generated to visualize trends across age, gender, and geographic locations. Due to the retrospective and observational nature of the study, inferential statistical tests such as Chi-square or logistic regression were not applied.

Limitations:

Data from private and popular clinics were not included due to lack of standardized records. This may have led to an underestimation of the actual burden of disease. Furthermore, the absence of case-specific clinical data limited our ability to analyze outcomes and treatment modalities.

Ethical Considerations:

Since the study relied exclusively on publicly available aggregated data with no individual identifiers, ethical clearance was not sought. However, the research was conducted in accordance with the ethical standards of public health reporting and epidemiological research.

RESULTS AND DISCUSSION**Results**

The statistical data collected from the Iraqi Ministry of Health's 2023 report revealed several noteworthy trends regarding hydatid disease in Iraq.

Gender Distribution:

Out of the total 478 cases recorded, females constituted a significantly larger proportion of infections. Specifically, 310 females (64.9%) were infected compared to 168 males (35.1%) that show in table 1 and Figure 1.

Table 1. Shows the statistics of hydatid disease according to the gender

Gender	No. Of Cases	Infection %
Male	168	35.1%
Female	310	64.9%
Total	478	100

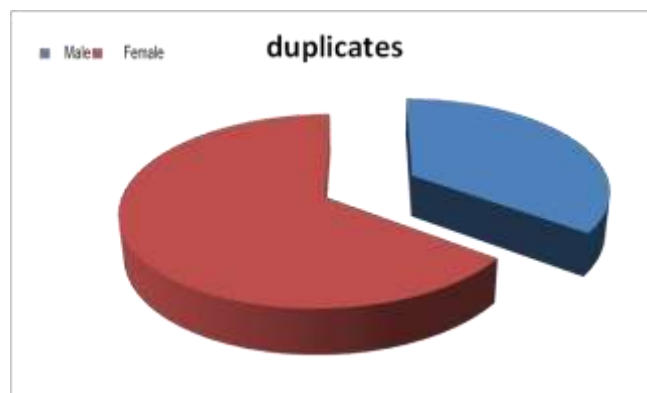


Figure 1. Shows the distribution of infected patients according to the gender

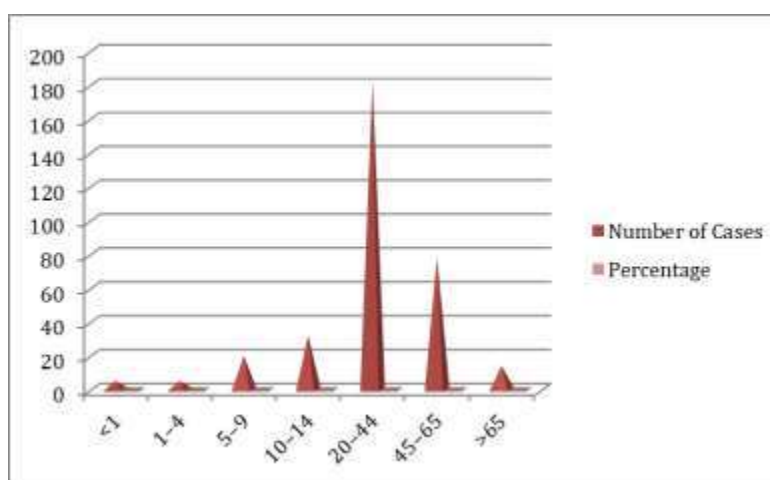
Age Distribution:

The distribution of infections across age groups showed that the age group of 20–44 years experienced the highest infection rate, accounting for 38.3% (n=182) of the total. The second most affected group was 15–19 years, representing 29.5% (n=141). Together, these two age groups comprise nearly 68% of all recorded cases.

In contrast, the lowest infection rates were observed among children under the age of 5 (1.05%) and individuals older than 65 (2.9%) that show in table and Figure 2.

Table 2. Age-based distribution of infections

Age group	Number of cases	Infection %
>1 years	5	1.05%
1-4	5	1.05%
5-9	02	4.2%
10-14	20	6.7%
15-19	141	29.5%
20-44	182	38.3%
45-65	78	16.3%
<65	14	2.9%
Total	478	122

**Figure 2.** Shows the distribution of the injured according to age**Geographic distribution:**

The disease prevalence varied significantly between governorates. The highest prevalence was recorded in Al-Muthanna with 90 cases, equivalent to an incidence of 1.12 per 10,000 people. Other high-incidence areas included Thi Qar (66 cases), Karbala (47), and Najaf (59). Conversely, provinces such as Baghdad Karkh, Anbar, and Salahaddin reported 0 cases each, indicating much lower transmission intensity, as shown in the table and Figure 3.

Table 1. Shows the statistics of hydatid disease according to the province

Province	No. of Male	No. of Female	Total	Prevalence/1 0,000 population
Baghdad Karkh	0	0	0	0.00
Baghdad Rusafa	4	1	5	0.01
Basra	14	5	19	0.07
Ninewah	8	3	11	0.03
Maysan	8	11	19	0.17
Diwanayah	12	21	33	0.26
Diyala	16	15	31	0.19
Anbar	0	0	0	0.00

Province	No. of Male	No. of Female	Total	Prevalence/10,000 population
Babylon	2	9	11	0.05
Karbala	21	26	47	0.39
Kirkuk	5	5	10	0.06
Wasit	2	36	38	0.28
Thi Qar	22	44	66	0.32
Al-Muthanna	28	62	90	1.12
Salahaddin	0	0	0	0.00
Najaf	20	39	59	0.40
Kurdistan region	6	33	39	0.10
Total	168	310	478	0.13

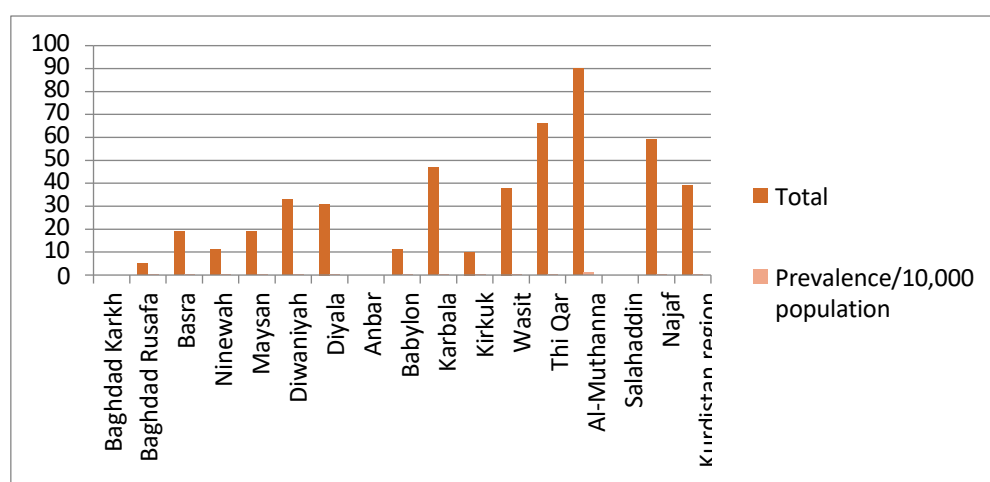


Figure 1. Shows the distribution of infected patients according to province

Visual Data Interpretation:

Bar charts were used to illustrate infection rates across gender, age groups, and governorates. These visuals clearly highlighted gender imbalance and regional clustering of infections (Figure 2).

Discussion

The findings from this study highlight the continued public health burden of hydatid disease in Iraq, particularly in southern governorates where animal husbandry is widespread [10]. The high infection rates among women and young adults reinforce the need to consider sociocultural roles and exposure behaviors in crafting disease prevention strategies [11]. The marked gender disparity observed may not be entirely biological. Women's roles in domestic food preparation, livestock care, and exposure to environmental contamination may significantly elevate their infection risk [12]. Educational campaigns focused on hygiene, safe food handling, and animal interaction should therefore target this demographic specifically [13]. The gender disparity may be linked to physiological, hormonal, and possibly social or occupational factors [14]. It has been suggested that hormonal fluctuations in females might influence susceptibility

through immune modulation. Furthermore, in traditional Iraqi society, women often handle food preparation and animal care, potentially increasing their risk of exposure to parasite-contaminated materials [15]. The age-related infection trend suggests that individuals in their most economically productive years are at heightened risk [16]. This not only affects public health but has broader socioeconomic implications, potentially undermining workforce productivity and increasing healthcare burdens [17].

The distribution of infections across age groups showed that the age group of 20–44 years experienced the highest infection rate, accounting for 38.3% of the total. This demographic is typically more active socially and professionally, often working in environments where exposure to animals and unsanitary conditions is more likely [18].

In contrast, the lowest infection rates were observed among children under the age of 5 (1.05%) and individuals older than 65 (2.9%). These extremes of age are less likely to engage in activities that increase the risk of exposure to the parasite, such as agriculture or animal husbandry [19]. From a geographic perspective, provinces like Al-Muthanna, Najaf, and Thi Qar stand out as disease hotspots. These areas typically report limited healthcare infrastructure and weak enforcement of veterinary control measures such as dog deworming and slaughterhouse regulation. Such findings underscore the need for geographically tailored interventions [20]. This result suggests a localized endemic focus likely due to environmental conditions and high contact rates between dogs and livestock [21]. These provinces are characterized by significant rural populations engaged in farming and livestock rearing, activities closely linked to hydatid disease transmission.

In contrast, low prevalence in urbanized provinces may reflect better public health infrastructure or a lack of comprehensive reporting from non-governmental facilities. This may reflect either lower exposure levels or underreporting in urban areas [22], [23], [24]. Preventive strategies must focus on interrupting the parasite's lifecycle. This includes deworming dogs regularly, controlling stray dog populations, educating livestock owners about safe disposal of offal, and improving diagnostic and reporting systems in both public and private clinics [25]. In summary, hydatid disease remains a neglected yet significant health issue in Iraq. Effective disease management requires a multi-sectoral approach that integrates veterinary services, healthcare systems, and community participation. Only through coordinated efforts can the cycle of infection be broken and the disease brought under control [26].

CONCLUSION

Fundamental Finding : This study identifies a clear demographic and geographic pattern in the prevalence of hydatid disease in Iraq, with a notably higher infection rate among women and individuals aged 20–44, and distinct regional hotspots such as Al-Muthanna province. These trends reflect both biological and sociocultural risk factors, particularly in areas with insufficient public health infrastructure and high levels of human-animal interaction. **Implication :** The findings underscore the urgent need for localized public health strategies, including improved veterinary control, health education, and targeted surveillance. Integrating these efforts within a One Health

framework could significantly mitigate the spread and burden of this zoonotic disease.

Limitation : The study's reliance on retrospective governmental data, with exclusion of records from private clinics and absence of clinical outcome information, may underestimate the actual disease burden and limits broader clinical inference. **Future Research :** Further studies should incorporate inferential statistical modeling, clinical data, and longitudinal follow-ups to better understand disease dynamics and evaluate the impact of intervention programs over time.

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