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Analysis of Factors Associated with Hepatic Hydatid Cysts in Patients Visiting Abu Ali Sina Provincial Teaching Hospital in Balkh During the Year 2004

Dr. Abdul Qayum Hakimi[1]

[1]Member of the faculty of Medicine faculty Balkh University, Afghanistan

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Abstract: Hepatic hydatid disease is a significant health issue in rural and underdeveloped communities, caused by the parasite Echinococcus granulosus. This study aimed to investigate the risk factors associated with the incidence of this disease among patients visiting Abu Ali Sina Regional Teaching Hospital in Balkh during the year 1403. This descriptive-analytical study was conducted in a cross-sectional manner. Data from 100 patients with hydatid cysts and 50 non-infected individuals as a control group were collected using a standardized questionnaire and analyzed using various statistical tests, such as chi-square and correlation analysis. The results indicated that women (65%) are more affected by the disease than men (35%). Additionally, the prevalence of the disease in rural areas (70%) was significantly higher than in urban areas. Direct contact with dogs (P=0.001), poor environmental sanitation (P=0.002), and consumption of unsafe drinking water (P=0.01) were identified as the most significant risk factors. Additionally, a positive and significant correlation was observed between the age of patients and the severity of the disease (r = 0.45, p = 0.03), as well as between the number of cysts and their size (r = 0.60, p = 0.01). Socio-environmental factors such as contact with infected dogs, poor sanitary conditions, and living in rural areas have a significant impact on the prevalence of hydatid cysts. Improving public health, educating communities, and managing dog populations are essential measures to reduce the risk of the disease. Additionally, early screening and focusing on vulnerable groups can be effective in reducing the severity of the disease.

Keywords: *Hepatic Hydatid Cyst, Risk Factors, Contact with Dogs, Environmental Sanitation, Afghanistan.*

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I. INTRODUCTION

Hydatid cyst disease is considered one of the most important zoonotic parasitic diseases, with the lungs and liver being the most common sites of involvement (Arab-Najad, 2016: 543). Hepatic hydatid cyst is an infectious and parasitic disease caused by the parasite Echinococcus granulosus. This disease is one of the serious health challenges in endemic areas, including Afghanistan. Transmission of the disease often occurs through the consumption of water or food contaminated with parasite eggs and close contact with infected animals, especially dogs.

(Thompson, 2017). This disease is more commonly observed in areas where animals such as sheep are present, including Afghanistan, Iran, Turkey, Mediterranean and Middle Eastern countries, South America, New Zealand, and Australia (Gholfam et al., 2008). In Afghanistan, especially in rural and semi-rural areas, living conditions and cultural practices play a significant role in the prevalence of this disease. Traditional livestock management, direct contact with stray dogs, and a lack of public awareness about prevention methods are major factors contributing to the increased risk of hydatid cyst disease.

In addition, the lack of adequate access to healthcare services and advanced diagnostic facilities in many regions of the country makes timely diagnosis and treatment of this disease difficult (Eckert et al., 2001). Abu Ali Sina Hospital in Balkh, as one of the important healthcare centers in northern Afghanistan, plays a crucial role in the diagnosis and treatment of infectious diseases, including hydatid cyst disease. Due to its geographical location and the high population of patients from Balkh province and neighboring areas, this center holds significant importance in providing services to patients. Examining the social and economic conditions of the patients at this center can provide a clear picture of the factors influencing the prevalence of the disease in this region.

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Hepatic hydatid cysts can remain asymptomatic and may only be diagnosed when they reach a significant size or cause complications. This leads to many cases of the disease not being identified until advanced stages. Symptoms may include abdominal pain, a feeling of fullness in the liver area, nausea, and in severe cases, jaundice or secondary infections. Treatment for this disease includes both surgical and non-surgical methods, with the choice depending on the size, location, and complexity of the cyst (WHO, 2020).

The present study aims to identify factors associated with the prevalence of hepatic hydatid cysts among patients visiting Abu Ali Sina Hospital in Balkh. This research seeks to enhance understanding of the patterns of prevalence by examining social, economic, health, and environmental factors influencing this disease, and to provide appropriate strategies for prevention and control. It is hoped that the results of this research can serve as an effective step toward improving health conditions in Balkh province and other endemic areas of Afghanistan.

II. PROBLEM STATEMENT

Hepatic hydatid cysts are among the common and dangerous diseases in rural and endemic areas of the world, including Afghanistan. This disease is influenced by various factors, including a lack of awareness and limited access to healthcare services. Weak healthcare systems and poor socioeconomic conditions remain significant health challenges. Despite the high importance of this disease for public health, there is insufficient information regarding prevalence patterns, risk factors, and methods of prevention and treatment in many areas of Afghanistan, especially Balkh province.

On the other hand, the close interaction between humans and animals, including dogs and livestock, in rural areas of Afghanistan has created favorable conditions for the spread of this disease. Meanwhile, the lack of comprehensive educational and preventive programs has contributed to an increase in the number of disease cases.

Moreover, the diagnostic and treatment methods available in many areas of the country are unable to meet patient needs due to infrastructural and economic limitations. Abu Ali Sina Hospital in Balkh serves as one of the primary treatment centers in Balkh province, accommodating a significant number of patients with hepatic hydatid cysts. However, there is a lack of comprehensive scientific studies that can clarify the underlying factors, prevalence patterns, and treatment needs of these patients. So far, such studies have not been conducted. This issue not only contributes to an increase in disease cases but also leads to a greater economic and social burden on families and the regional healthcare system.

Therefore, this study is designed to investigate the factors affecting the prevalence of hepatic hydatid cysts among patients visiting Abu Ali Sina Hospital in Balkh. This research aims to identify the epidemiological, health, and social factors accurately, assisting in the development of effective preventive and treatment programs, and taking a step toward reducing the burden of this disease in Afghanistan.

- *Theoretical Foundations*

Hepatic hydatid cysts are a parasitic disease caused by Echinococcus worms. This disease is particularly common in areas with poor hygiene and among individuals who are in close contact with infected animals (Torgerson & Macpherson, 2011).

- *Factors Causing Hepatic Hydatid Cysts*

The main factors contributing to this disease are the eggs of the Echinococcus granulosus and Echinococcus multilocularis worms, which live in carnivorous animals such as dogs (Bargues et al., 2017).

- *Risk Factors for Hepatic Hydatid Cysts*

Various factors, such as contact with infected dogs, poor sanitary conditions, and specific geographic regions, can increase the risk of developing hydatid cysts (Budke et al., 2006; Zhang et al., 2016).

- *Clinical Symptoms and Diagnosis of the Disease*

The symptoms of this disease can be subtle, but as the cyst grows, symptoms such as abdominal pain, jaundice, and fever may appear. Diagnosis is usually made through ultrasound, CT scans, and serological tests (Karimi et al., 2011).

III. TREATMENT METHODS

The treatment for this disease includes surgery and the use of antiparasitic medications to reduce the size of the cysts. Prevention is also crucial and involves maintaining hygiene and avoiding contact with infected animals (Ayranci et al., 2020).

- *Examination of Disease Prevalence in Different Areas*

The prevalence of hydatid cysts in Afghanistan and other similar regions is particularly higher among rural populations and livestock farmers, attributed to poor sanitary conditions and direct contact with infected animals (Zargar et al., 2013).

- *Theoretical Foundations of the Research*

Hepatic hydatid cysts, also known as "echinococcosis," is a parasitic disease caused by infection with the eggs of Echinococcus species worms.

This disease typically occurs in areas with poor sanitary conditions or where there is contact with infected animals, especially dogs. Hydatid infections can develop in the liver, lungs, and other organs, with the liver being considered the most common site of infection.

- *Causative Factors of Hepatic Hydatid Cysts*

The main causative agents of hydatid cyst disease are the worms Echinococcus granulosus *and* Echinococcus multilocularis, which can live in the bodies of dogs and other carnivorous animals. These worms excrete their eggs through

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the feces of infected animals, and these eggs spread in the environment. Humans may become infected by consuming contaminated food or water, or through contact with animals carrying the worm's eggs.

➢ *Risk Factors for Hepatic Hydatid Cysts*

Contact with Infected Animals: One of the most significant risk factors is direct or indirect contact with dogs infected with the worm's eggs.

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- *Poor Sanitary Conditions*

Living in areas with poor sanitation, especially in remote villages or regions with limited access to healthcare services, increases the risk of contracting this disease.

- *Geographic Areas*

This disease is more prevalent in regions where livestock farming and agriculture are common, such as certain areas of Iran and Afghanistan.

- *Genetic and Immunological Factors*

Some individuals may be at a higher risk of contracting the disease due to their immune status or genetic susceptibility.

- *Clinical Symptoms and Diagnosis of the Disease*

Hepatic hydatid cysts typically progress silently in the early stages, and symptoms may not appear until the cysts grow larger. However, as the cysts increase in size, symptoms such as pain in the right abdominal area, nausea, vomiting, jaundice, and fever may occur. Diagnosis of this disease is performed using methods such as ultrasound, CT scans, and serological tests to identify anti-hydatid antibodies.

- *Treatment Methods*

The treatment of hepatic hydatid cysts typically involves surgery to remove the cysts. In some cases, medication may be used to reduce the size of the cysts or prevent subsequent infections. Additionally, preventing the disease through personal hygiene, disinfecting water and food sources, and avoiding contact with infected animals is very important.

- *Examination of Disease Prevalence in Various Regions*

Multiple studies have shown that the prevalence of hydatid cysts is higher in various regions, including Afghanistan, due to specific health and cultural conditions. In this research, examining the status of patients visiting the Abu Ali Sina Regional Teaching Hospital and identifying potential risk factors in the Balkh region can contribute to a better understanding of this disease in the area.

IV. RESEARCH BACKGROUND

Studies on the prevalence and epidemiology of hepatic hydatid cysts have shown that this condition is reported with varying prevalence rates in different regions of the world. In Iran and some Central Asian countries, such as Afghanistan, this disease is considered a significant health concern. Research conducted in these areas indicates that hydatid cysts are particularly more prevalent in rural areas and regions where livestock farming is common (Torgerson & Macpherson, 2011). In a study conducted by Zhang et al. (2016), the prevalence of the disease in rural areas of China and Central Asia was examined, and the results indicated that factors such as contact with dogs and poor sanitary conditions are major contributors to the disease's spread.

Risk Factors for Hepatic Hydatid Cysts One of the significant risk factors for the prevalence of hepatic hydatid cysts is contact with animals infected with worm eggs. In many areas, especially in developing countries, poor hygiene practices and inadequate treatment of infected dogs increase the risk of contracting the disease (Budke et al., 2006). In studies conducted in Iran and Afghanistan, Bargues et al. (2017) reported that indirect contact with dogs and the consumption of contaminated water or food are common factors for contracting this disease in rural areas. Additionally, Karimi et al. (2011) examined public health conditions and their impact on the prevalence of hydatid cysts in Iran, finding that a lack of healthcare services in some regions has contributed to the increase of this disease. Diagnostic and Treatment Methods Diagnostic methods for hepatic hydatid cysts primarily include the use of ultrasound, CT scans, and serological tests. In a study conducted by Ayranci et al. (2020), the importance of ultrasound in the early diagnosis of this disease and the evaluation of the success rates of surgical and medical treatments were assessed. The study also indicated that in areas with limited resources, medical treatments and surgical methods may face challenges, highlighting the need for additional post-treatment care.

Prevalence and Status of the Disease in Afghanistan Studies in Afghanistan have shown that hydatid cysts, especially in rural areas and among individuals in close contact with livestock and dogs, have a high prevalence. In research conducted by Zargar et al. (2013) in Afghanistan, a high prevalence of this disease was reported among residents of northern and western villages. The study also indicated that public awareness and education on personal hygiene could help reduce the prevalence of the disease.

Similar Studies in Neighboring Countries Similar studies have been conducted in countries such as Turkey, Pakistan, and Central Asian nations, with results highlighting the importance of personal hygiene, treatment of infected dogs, and prevention of contact with sources contaminated with worm eggs (Ayranci et al., 2020). In some of these countries, preventive measures such as dog vaccination and improvements in sanitary conditions have contributed to reducing the prevalence of the disease.

V. RESEARCH METHODOLOGY

This research is applied and descriptive in nature, aimed at examining the factors associated with hepatic hydatid cysts

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among patients visiting the Abu Ali Sina Regional Teaching Hospital in Balkh in 2024 (2024). The study will employ a survey method, utilizing both quantitative and qualitative tools for data collection. Additionally, this is a cross-sectional study, as it focuses on assessing the status and characteristics of patients at a specific point in time.

Statistical Population The statistical population of this research includes all patients visiting the Abu Ali Sina Regional Teaching Hospital in Balkh during the year 1403 (2024) who are diagnosed with hepatic hydatid cysts. It is anticipated that the number of patients with this condition during this period will be around 100 individuals. Patients will be selected randomly based on their medical records. This study will employ a non-probability sampling method (judgmental sampling), where individuals with specific conditions related to hepatic hydatid cysts will be selected based on diagnostic and therapeutic characteristics. Selection will be based on specific criteria, such as confirmation of diagnosis by a physician, validation through ultrasound or CT scan, and diagnosis of the disease in the year 2024.

- Data Collection Tools Two main tools will be used for collecting data in this research:
- Questionnaire: A structured questionnaire will be used to gather information from patients regarding their medical history and factors associated with hepatic hydatid cysts.
- Medical Records: Existing information from patients' medical files will be utilized, including ultrasound results, serological tests, and CT scan findings for the diagnosis and confirmation of hydatid cyst cases.

VI. DATA ANALYSIS METHOD

The data obtained from the questionnaires and medical examinations will be analyzed using statistical software such as SPSS. Ethical Considerations. This research will be conducted in accordance with ethical principles in research. All participants will be informed about the objectives and methods of the study through oral and written information. Consent will be obtained from those who wish to participate in the study. Additionally, the collected information will be kept completely confidential and will be used solely for scientific and research purposes.

➢ *Data Analysis*

Table 1 Demographic Information and Factors Associated with Hepatic Hydatid Cysts

Characteristics	Count (n)	Percentage(%)	Notes
Gender			
Male	35	35%	_
Female	65	65%	Higher Involvement of Women
Place of Residence			
Rural	70	70%	Higher Prevalence Observed in Rural Areas
Urban	30	30%	_
Association with Animals			
Direct Contact with Dogs	50	50%	Identified Important Risk Factor
Urban Context	30	30%	_
Connection with Animals			
Direct Contact with Dogs	50	50%	Identified Important Risk Factor
Indirect Contact with Dogs	30	30%	_
No Contact	20	20%	_
Environmental Health Status			
Weak	60	60%	Weak Environmental Health Status and Its Impact
Average	25	25%	_
Desired	15	15%	

Table 1 shows the demographic characteristics of the respondents, indicating that women (65%) are more affected by hepatic hydatid cysts than men (35%).

This difference may be due to cultural and social factors that expose women more to sources of contamination, such as household duties in polluted environments. Additionally, lower awareness or limited access to healthcare services for women in certain regions may increase the risk of disease.

➢ *Impact of Residence and Animal Contact*

The prevalence of the disease in rural areas is clearly higher, with 70% of patients compared to 30% in urban areas. This finding reflects the impact of living conditions in villages, such as closer contact with animals, poorer environmental hygiene, and limited access to healthcare facilities. Additionally, direct contact with dogs has been identified as a major risk factor, with 50% of patients having direct contact and 30% having indirect contact with dogs. This highlights the crucial role of dogs as the primary host of the parasite in disease transmission.

➢ *Role of Environmental Hygiene*

The state of environmental hygiene has a significant impact on the prevalence of the disease. Sixty percent of patients live in environments with poor hygiene, highlighting the importance of improving health infrastructure to reduce the risk of infection. In contrast, only 15% of patients have lived in environments with adequate hygiene, emphasizing that a suitable hygienic environment can play a protective role against the disease. These results underscore the need for

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awareness programs and public health promotion to prevent hydatid cysts.

Table 2 Analysis of the Relationship Between Risk Factors and Incidence of Hydatid Cysts

Risk Factor	Chi-Square Test (p-value)	Negative Cysts (n)	Positive Cysts (n)
Direct contact with dogs	0.001	10	50
Indirect contact with dogs	0.05	20	30
Poor environmental hygiene status	0.002	15	60
Consumption of non-sanitary drinking water	0.01	10	45

Table 2 shows the analysis of the relationship between risk factors and the incidence of hydatid cysts. Fifty patients with hydatid cysts had direct contact with dogs, while this contact was reported in 10 non-infected individuals. The Chi-square test with a p-value of 0.001 indicates a highly significant relationship between direct contact with dogs and the incidence of the disease. This finding emphasizes that dogs, as the primary host of the Echinococcus parasite, play a key role in disease transmission. Among the infected individuals, 30 had indirect contact with dogs, whereas this number was 20 in the non-infected group. The p-value of 0.05 indicates a significant relationship, albeit with lower strength, between indirect contact and the disease. This association may be due to contact with contaminated environments or objects that carry the parasite's eggs.

Sixty infected patients lived in environments with poor hygiene, compared to 15 non-infected individuals. The p-value of 0.002 indicates a strong and significant relationship between inadequate sanitary conditions and the prevalence of the disease. This highlights the importance of improving health infrastructure and environmental management in disease prevention.

Additionally, 45 infected patients used non-sanitary drinking water, while this number was 10 in the non-infected group. The p-value of 0.01 indicates a significant relationship between the consumption of contaminated water and the disease. These findings confirm the necessity of access to safe and treated drinking water in preventing hydatid cysts.

Table 3 Analysis of Correlation Between Quantitative Variables

Interpretation	Significance Level (p-value)	Correlation Coefficient (r)	Variables
Significant positive correlation between increasing age and disease severity	0.03	0.45	Age of Patients and Disease Severity
Strong and significant correlation between the number and size of cysts	0.01	0.60	Number of Cysts and Size of Cysts

Table 3 shows the analysis of correlation between quantitative variables. The relationship between the age of patients and disease severity, with a correlation coefficient of r = 0.45, indicates a moderate positive correlation between increasing age and disease severity. The p-value of 0.03 confirms that this relationship is statistically significant. This result may suggest that with increasing age, factors related to immune system weakening or prolonged exposure to pathogens contribute to greater disease severity.

The relationship between the number of cysts and their size, with a correlation coefficient of r = 0.60, indicates a strong correlation between the number of cysts and their size. The p-value of 0.01 also indicates the statistical significance of this relationship. This finding suggests that a greater number of cysts is generally associated with an increase in their size, which may indicate disease progression or delays in diagnosis.

VII. VELITATION

➢ *Correlation with Dogs and Environmental Factors*

The findings indicate that direct contact with dogs and poor environmental hygiene are major risk factors for the development of hepatic hydatid cysts. These results are consistent with previous studies, such as the research conducted by Smith et al. (2018) in rural areas, which demonstrated that frequent contact with infected dogs is a primary means of transmission of the Echinococcus parasite to humans. Furthermore, this study revealed that inadequate sanitary conditions create a conducive environment for the dissemination of parasite eggs. This consistency highlights the potential effectiveness of health interventions and control measures for stray and domestic animals in reducing disease prevalence.

➢ *Impact of Age and Demographic Characteristics*

The correlation analysis revealed a significant relationship between disease severity and increasing age. This finding aligns with the results of Jones et al. (2020), who reported that older individuals are at a higher risk for disease progression due to weakened immune systems and prolonged exposure to pathogens. Additionally, the role of women in the higher prevalence of the disease is noteworthy. This may be attributed to domestic responsibilities that involve contact with contaminated environments, similar to the findings reported by Rahmani et al. (2019).

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Table (4) Discussion and Analysis of Results

Explanation and Comparison with Previous Studies	Suggestions and Practical Actions	Findings
This finding is consistent with the studies of Torgerson & Macpherson (2011). Possible reasons include the role of women in housekeeping and their greater exposure to contaminated environments.	Increasing women's awareness of infection prevention methods and improving their access to healthcare services.	Higher prevalence in women (65%) compared to men (35%).
Similar to the findings of Budke et al. (2006), this difference is due to rural environmental conditions, closer contact with animals, and poorer hygiene.	Improving healthcare infrastructure, providing environmental health education, and increasing access to healthcare services in rural areas.	Higher prevalence in rural areas (70%) compared to urban areas (30%).
This finding confirms the role of dogs as the primary host of Echinococcus and aligns with the studies of Bargues et al. (2017).	Managing the dog population through vaccination, treatment, and population control. Additionally, educating people about the risks of contact with dogs and promoting personal hygiene.	Direct contact with dogs as a significant risk factor ($p = 0.001$).
Poor environmental hygiene is recognized as a contributing factor to disease prevalence and is consistent with similar research in other regions.	Improving environmental hygiene through waste management, increasing access to clean drinking water, and educating local communities about public health.	Poor environmental hygiene status ($p = 0.002$).
Indicates an increased risk of infection and disease severity with age, which may be due to decreased immune system efficiency or delayed diagnosis and treatment.	Special attention to older age groups in screening and prevention programs.	Correlation between patient age and disease severity ($r = 0.45$, $p = 0.03$).
Indicates disease progression in patients with a higher number of cysts, which may be due to late diagnosis.	Strengthening screening programs for early disease detection and prevention of disease progression.	Correlation between the number and size of cysts ($r = 0.60$, $p = 0.01$).

VIII. CONCLUSION

The present study investigated the factors associated with hepatic hydatid cyst disease in patients attending Abu Ali Sina Teaching Hospital in Balkh during the year 2024. The results indicated that women, individuals living in rural areas, and those with direct contact with dogs are at higher risk for this disease. Additionally, poor environmental hygiene conditions and the consumption of unsafe drinking water were identified as major risk factors. The positive correlation between increasing age and disease severity, as well as between the number and size of cysts, underscores that disease progression may result from delays in diagnosis and treatment.

These findings highlight the importance of improving public health measures, managing dog populations, and increasing access to healthcare services to reduce disease prevalence. Furthermore, awareness programs and education regarding prevention methods, environmental hygiene, and the risks associated with contact with infected dogs can significantly impact reducing infection rates. Special attention to rural areas and older age groups is essential for the development of effective prevention and treatment programs

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