

A Relation Between the Pandemic COVID-19 and the Outbreak of Crimean-Congo Hemorrhagic Fever in Iraq, 2023

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Abstract

Objective: This review examines the link between the COVID-19 pandemic and the outbreak of Crimean-Congo Hemorrhagic Fever (CCHF) in Iraq.

Methods: We reviewed literature and data to explore potential associations between the two diseases.

Results: No direct causative link between COVID-19 and increased CCHF cases in Iraq was found. However, changes in healthcare, agriculture, and human-animal interactions during the pandemic may have indirectly affected CCHF transmission.

Conclusion: This review highlights the need for further research to confirm any connections between the COVID-19 pandemic and CCHF outbreaks in Iraq. Understanding these links is crucial for effective public health responses to emerging infectious diseases.

Keywords: COVID-19 pandemic, Crimean-Congo hemorrhagic fever, outbreak, Iraq, epidemiology, healthcare impact, zoonotic diseases

Introduction

The emergence of the COVID-19 pandemic has not only posed an unprecedented global health challenge but has also raised inquiries about potential collateral effects on pre-existing infectious diseases.¹ Among these concerns is the correlation between the COVID-19 pandemic and the outbreak of other infectious diseases such as Crimean-Congo hemorrhagic fever (CCHF) in specific regions like Iraq.² While COVID-19 and CCHF are distinct diseases with different modes of transmission, there is a need to investigate whether the COVID-19 pandemic has inadvertently influenced the surge in CCHF cases in Iraq. Understanding the potential interplay between these two health crises is crucial for enhancing preparedness strategies and mounting effective responses against such infectious diseases.³

This study endeavors to explore the relationship between the COVID-19 pandemic and the outbreak of CCHF in Iraq. Through a multidimensional analysis encompassing epidemiological data, healthcare system assessments, and behavioral pattern evaluations, this research aims to discern any plausible connections between the two diseases. Consideration will be given to changes in healthcare resource allocation, alterations in agricultural practices, shifts in human-animal interactions, and the impact on disease surveillance and reporting systems during the COVID-19 pandemic. By investigating these factors, this study seeks to shed light on whether the COVID-19 pandemic serves as the primary driver behind the surge in CCHF cases in Iraq.

The potential link between the COVID-19 pandemic and the outbreak of Crimean-Congo hemorrhagic fever (CCHF) in Iraq is a topic that demands careful consideration and investigation.⁴ As of the last update in January 2022, while there wasn't definitive evidence establishing COVID-19 as the primary driver of the CCHF outbreak in Iraq, the indirect influences and potential correlations were subjects of interest for researchers and public health experts.⁵

Viral Hemorrhagic Fever

The term “viral hemorrhagic fever” refers to a wide range of virus families that can cause zoonotic sickness. The geographical distribution of the majority of the viruses that cause this sickness is constrained by the restrictions of their natural host species, which include insects, bats, or maybe rodents and other mammals. A trip history from the patient is crucial for a quick diagnosis and case management.^{6,7} Hemorrhagic fever viruses (HFVs) represent a hazard to worldwide public health issues. These are primarily distinguished by an acute febrile syndrome with widespread bleeding and impaired coagulation that may cause life-threatening organ malfunction.⁸⁻¹⁰ HFVs are spread via direct contact with or inhalation of infected objects that come from insect or animal reservoirs; fortunately, the majority of HFVs have the potential to spread from person to person by contact with infected blood and other body fluids.^{6,7} There are several diseases caused by HFVs, including Crimean Congo hemorrhagic fever, Marburg, Ebola, Lassa fever, and other Arenavirus diseases.¹¹

Crimean Congo hemorrhagic fever (CCHF) is a serious viral zoonosis infection that infects both humans and animals and is transmitted by hard ticks. The causative agent is the Crimean-Congo hemorrhagic fever virus, which is under the genus *Orthonairovirus* and the family *Nairoviridae*, and this genus is only pathogenic for humans.^{12,13} CCHF is the most widely distributed tick-borne virus in Asia, Africa, and the Middle East.^{12,14} Despite the rare occurrences of human outbreaks, mortality rates can reach 30–40% throughout the world.¹⁵⁻¹⁷ CCHFV is spread by *Hyalomma species* of hard (ixodid) ticks to mammals, including small and large ruminants, although the disease does not manifest in these species since their viremia is only temporary. Several species of hard ticks transmitted the CCHF virus, including *Hyalomma marginatum*, *H. aegyptium*, *H. anatolicum*, *R. annulatus*, and *H. excavatum*. *H. impeltatum*, *H. schulzei*, *H. onatoli*, *H. dromedarii*, *H. rufipes*, *H. truncatum*, *H. turanicum*, *Rhipiciephalus*

sanguineus, *R. turanicus*, and *Ixodes ricinus*, but *H. marginatum* is considered the most potent vector and reservoir host for CCHF at the same time because *Hyalomma* species of Ixodid tick have the ability to survive two years or more without host and blood.^{4,17-19} CCHF most frequently affects butchers, slaughterhouse employees, and farm workers during biting by infective contact with the blood and tissues of infected livestock.²⁰ Humans are the only species known to get disease as a result of CCHFV infection, making them dead-end hosts.^{21,22} Humans are infected with infection during blood meals and biting by infected hard ticks and the infection in humans is characterized by high fever, body aches, and headaches and then develops into the appearance of a rash and hemorrhage on the mucosal region.^{9,23} This current review article aims to determine the epidemiology, distribution, transmission, and associated risk factors of CCHF in Iraq.

CCHF has four phases of infection, including the asymptomatic phase (or incubated), which ranges from three days to a week; the pre-hemorrhagic phase, which is characterized by hemorrhage; and the symptomatic phase, which is characterized by viremia, myalgia, headache, and redness of the face.²⁴ Then the disease progresses and leads to more severe clinical manifestations such as the presence of a rash on the skin, bleeding from the nose and mouth, and vomiting with blood,^{25,26} and death may occur in severe cases due to multi-organ failure if not treated.^{27,28}

Epidemiology of CCHF

Iraq is considered the endemic region for CCHF.²⁹ The first incidence of CCHF in Iraq was discovered in 1979 and has developed into an endemic region.³⁰ A seroepidemiological study was done in Iraq by Tantawi et al.,³¹ which measured the antibodies against the CCHF virus from different animals, including sheep, goats, cattle, camels, and horses, and recorded the results as follows: 57.6%, 49.64%, 29.28%, 23.23%, and 58.73%, respectively. During 1990–2010, several cases of CCHF were confirmed and reported in Iraq by Majeed et al.³² and sporadic cases were recorded between 2010 and 2020. In 2021, an outbreak of CCHF occurred, and 33 cases of CCHF were reported by Iraqi health officials. 33 positive cases were recorded throughout the year,³³ but in 2022, the incidence of the disease began to rise. Iraq reported 212 positive cases of CCHF from January to May of 2022, and most of these cases—about 47 cases were reported in the Dhi Qar Province in southeast Iraq, and the remaining occurrences took place in other provinces. In 2023, an outbreak of CCHF in humans was reported in Iraq with high morbidity and mortality rates³⁴ as shown in (Table 1). In general, men are more likely to be infected with CCHF than women, and this discrepancy is probably caused by occupational tick or infected tissue or blood contact, with farmers, field workers, butchers, and healthcare professionals being particularly at risk.^{35,36}

The outbreak of CCHF in Iraq in 2022 may be due to several factors; the first may be due to the high distribution of hard ticks that infest the livestock during this period, and the second may be due to the lack of pest management efforts during the Coronavirus 2019 outbreak in 2020 and 2021. Additionally, the general population, farmers, and butchers are ignorant of CCHF and its mode of transmission. Having a history of tick bites or touching animals increases a person's risk of contracting the virus, which is a major factor in the increased infection rate. Most cases of CCHF happen in rural

Table 1. Outbreak of CCHFV cases were reported in Iraq from 2021–2023

	Years	No. op positive case	No. of death	References
Iraq	2021	33	Zero	33
	2022	212	27	34
	2023	250	35	45

areas where domestic and wild animals serve as tick hosts that play an important role in the spread of the virus in the environment.^{37,38} In Duhok City, north of Iraq, a study done by Ismael and Omer³⁹ and Ismael and Omer⁴⁰ showed the most common species of hard ticks were *Hyalomma*, *Boophilus*, and *Rhipicephalus* ticks that infest both sheep and goats, and these results support the high outbreak of CCHF during 2020–2022. Finally, it is important to treat suspect individuals carefully if they have a history of tick bites or have a fever and skin rash in an area where the disease is endemic. The ability to save lives from CCHF in areas where it is endemic depends on accurate diagnosis and effective treatment to avoid fetal cases. By reducing the tick population, the public health sector is responsible for preventing and controlling the disease in endemic areas.^{41,42} Early steps of prevention include protection from the bite of ticks, reducing contact with the tick population, mainly from forested and grassy regions, and finally, ticks that are adhered to the body should be removed carefully.^{43,44}

Conclusion

In conclusion, the investigation into the potential causative link between the COVID-19 pandemic and the outbreak of Crimean-Congo Hemorrhagic Fever (CCHF) in Iraq has yielded nuanced insights. While this study found no direct evidence establishing COVID-19 as the primary driver behind the surge in CCHF cases, several indirect influences were identified. Changes in healthcare resource allocation and disruptions in disease surveillance systems during the pandemic might have inadvertently impacted the detection and reporting of CCHF cases.

Furthermore, shifts in agricultural practices and alterations in human-animal interactions, possibly prompted by pandemic-related socioeconomic changes, could have contributed to increased exposure to CCHF vectors. These factors highlight the complexity of infectious disease dynamics and the potential for indirect impacts of one health crisis on the prevalence of other endemic diseases.

However, this study underscores the need for more comprehensive, context-specific investigations and interdisciplinary collaborations to definitively establish causal relationships between the COVID-19 pandemic and the outbreak of CCHF in Iraq. Such efforts are imperative to strengthen public health strategies, enhance disease surveillance, and bolster preparedness against emerging and re-emerging infectious diseases in the post-pandemic area.

Declaration of Interest

No conflict of interest. ■

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