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Predictable yet neglected: a review of Crimean-Congo hemorrhagic fever outbreaks and response delays in Iraq

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Abstract

Crimean-Congo Hemorrhagic Fever (CCHF) poses a significant and growing public health challenge in Iraq, with outbreaks occurring predictably each year during warmer months and primarily affecting rural, livestock-rearing regions. Despite the known seasonal and geographical patterns, public health responses remain largely reactive and delayed, contributing to higher incidence and case fatalities most notably in the large outbreaks of 2022 and 2023. Factors such as disrupted veterinary services during the COVID-19 pandemic, uncontrolled animal movements, and limited healthcare infrastructure have exacerbated the spread and severity of CCHF. This review highlights the persistent gaps in proactive surveillance, intersectoral collaboration, and preventive measures in Iraq, contrasting them with more effective strategies implemented in neighboring countries. To mitigate future outbreaks, a strengthened One Health approach is urgently needed, incorporating continuous tick and animal surveillance, targeted acaricide treatment, regulation of animal slaughter, and enhanced public education. Improved national coordination and resource allocation are critical to transitioning from a reactionary stance to a sustainable, preventative framework against CCHF in Iraq.

Keywords: Crimean-Congo Hemorrhagic Fever (CCHF), Predictable, Outbreak, COVID-19 impact, Iraq

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Background

Crimean-Congo Hemorrhagic Fever (CCHF) is a serious viral disease with deleterious consequences that can be transmitted by ticks and contact with infected blood and tissues [1]. The main symptoms of the infection are high fever, severe headache and hemorrhage, and a case fatality rate of 10–40 [2]. Since 1979, there have been reports of CCHF in Iraq, but the number of cases has been rising sharply in recent years, making it a major public health issue in the country. The situation was further complicated by the freely roaming animals and disrupted public health services caused by COVID-19 [3]. There was a huge outbreak across the country, with over 300 confirmed cases by the end of 2022 and 587 by the end of 2023 [4,5]. Although previous research indicate that CCHF outbreaks in Iraq may be predicted by time and place, public health response is generally reactive and only starts when human cases are identified [5]. This study investigates the time and place patterns of CCHF in Iraq, the current outbreaks and epidemiological trends, and the issues of public health response.

Seasonal patterns of CCHF in Iraq

In Iraq, CCHF outbreaks have occurred in the warmer months in the past, which is when ticks are most active, in the spring and early summer. For example, the first verified human case during the 2022 outbreak was identified in March, and the incidence kept rising until peaking in mid-June [6]. Besides, there has also been a modest second wave of illnesses in late summer to early fall, which may be linked to a second generation of ticks [6,7]. These seasonal peaks are important because they are predictable. For example, public health specialists expected a second wave of CCHF cases from August to October 2022 after the first wave in the spring of 2022 [4-7]. This consistent timing each year gives us the opportunity to implement preventive measures to control the number of cases from rising.

Geographical distribution of CCHF in Iraq

CCHF is common in Iraq's ecology; however, outbreaks have mostly happened in certain areas. The disease mostly spread in rural areas where people raise animals, as ticks thrive on them. Historically, the southern and southeastern governorates, especially those that border Iran, have been high-risk zones [5]. In the early 2022 epidemic, about half of all verified CCHF cases

came from the Dhi Qar (Thi Qar) governorate in southern Iraq [8]. Besides, many cases were reported from the nearby southern governorates of Maysan (Missan) and Al-Muthanna. The endemic nature of these provinces is likely due to the large number of livestock. One possible reason for the spread of CCHF in these areas is the unlawful trade of animals across the Iran–Iraq border. This is because infected animals or ticks might be brought in through uncontrolled movements. Sero-epidemiological investigations show that up to 60% of these animals in some places have antibodies against CCHF [9,10].

Recent outbreaks and epidemiological trends

Over the past years, the number of CCHF cases in Iraq has risen at an alarming rate, reaching levels never seen before. In previous outbreaks, only few cases were diagnosed. However, an increase in the number of diagnosed cases was noted starting about 2018 [6,7]. In 2022, Iraq had around 300 lab-confirmed cases with a case fatality rate of 13%, the highest of many years. More than half of the confirmed cases were young adult men (15–44 years), which is the age group that does the most animal farming and slaughtering [6,7]. Besides, Dhi Qar province alone made up over 48% of confirmed cases in 2022 [8]. In 2022, other impacted governorates included Maysan, Muthanna, Wasit, and Basrah in the south, as well as a few cases in central and northern locations including Baghdad, Kirkuk, and Nineveh [8]. The rise in cases and case fatality rate in 2022 was partly due to failures in prevention efforts during the COVID-19 epidemic. Routine tick control programs and veterinary health services were scaled down in 2020 and 2021, which contributed to a high burden of tick infestations on farms and in cattle. The pandemic's economic burden and transportation limitations also led to greater unauthorized killing of animals outside of official abattoirs with less hygienic procedures and more people contact with infected blood and ticks. All these factors came together to make the biggest CCHF outbreak Iraq has ever seen up to that date [11]. But instead of being a one-time increase, the 2022 outbreak led to an even bigger wave of infections in 2023. By the end of 2023, there were 587 human CCHF cases across the country [5]. This by far is the largest outbreak in decades for the country with a slightly higher fatality rate of 14% [5,6,9]. In the meantime, CCHF cases became more widespread in terms of location. In the past, most instances were in established southern regions. By 2023, however, cases were reported in low-risk regions of Iraq. For instance, northern governorates like Kirkuk and Nineveh, which only had a few cases in 2022, experienced big clusters by 2023 [5,6,9]. Such a change in the location of the infection may be explained by climate change and the continuous uncontrolled movement of animals across the borders between with Syria and Turkey. By the beginning of 2025, the number of CCHF cases was rising again, though not as quickly as in 2023. At least 14 confirmed cases and 2 fatalities had been reported to the Ministry of Health as of April 2025 [11]. It's apparent from the last several years that CCHF in Iraq is now happening in yearly outbreaks, and each year the number of cases and the area where they spread seem to get bigger and wider. This pattern shows how predictable CCHF is (cases always rise in the same rural areas every spring) and how hard it is to deal with. It also shows how unprepared the government is, even if it knows where and when CCHF will hit. The country had been unable to contain the spread of infection in the region.

Public health response: gaps and delays

Iraq's health officials and partners have responded quickly to CCHF outbreaks once cases are reported, but these interventions have frequently been delayed and reactive rather than fast and proactive. In the same way, public education programs and risk communication, including giving out protective gloves and educating butchers and farmers of the risks, got more robust mostly because of the epidemic, not before it. Because of this reactionary pattern, interventions frequently arrive at a late time to stop the virus from spreading from animals to people in the first place [12]. One of the main problems is that there was no proactive monitoring and management in the animal industry before human incidents. CCHF is a zoonotic disease that is transmitted from animals to humans [13]. Ideally, authorities would check the levels of tick infestation and animal infection rates in high-risk areas every season and take steps to prevent the spread of the virus. Such interventions include dipping cattle, spraying acaricide, or controlling animal movement [13]. In reality, inadequate resources and capacity have made it hard to take such proactive steps [12]. Despite the huge governmental budget, veterinary and agricultural services in Iraq still don't have enough resources, and lack collaboration with each other's and other governmental departments [12]. Investigation after the 2022 pandemic showed that the lack of regular preventative veterinarian operations from 2020 to 2021 made the 2022 outbreak contributed to the surge of cases in 2022 outbreak [14]. Iraq's fragmented and delayed response system to the epidemic has also been a problem [11]. This means that provincial authorities have to deal with CCHF outbreaks on their own. Because of this, many infections had already occurred by the time help got there. The healthcare system that needs to handle CCHF has also been stretched, which makes it harder to respond quickly. Additionally, there are just a couple specialist labs in Iraq with facilities to test for CCHF. The resultant need for the samples to be sent from farthest areas to central labs slows down the diagnosis and contributes to the spread of the disease. Furthermore, it is difficult to safely manage CCHF patients when the hospitals lack sufficient isolation units and personal protective equipment, especially in rural areas. This led to the unfortunate deaths of healthcare personnel, including that of a young doctor in Kirkuk in 2023 by CCHF. On the other hand, neighboring countries have taken more proactive steps in places where CCHF is common. For example, Iran have sent more than 500 mobile veterinary teams to high-risk areas to keep investigate and control ticks [15]. Jordan has made a mandatory request for the cattle to have health certificates before they can be slaughtered [16]. These interventions are aimed to control the source of the infections. Because Iraq's CCHF outbreaks happen at around the same times and places every year, it is possible that comparable preventive measures be implemented to reduce the impact of the disease. However, Iraq has had trouble putting these kinds of plans into action because of a shortage of money and a lack of a unified national strategy.

Conclusion

The recent history of CCHF in Iraq shows a worrying paradox: outbreaks may be predicted in many ways, such as by season and geography, yet the public health response has mostly been slow and reactive. It was possible to see the rise in cases in 2022 and 2023, which included hundreds of infections and dozens of

deaths, but early measures were not enough. This reactionary stance has expensive effects, such as lives lost, hospitals being overloaded, and the infection spreading to other places. Iraq's health officials, together with agricultural and international partners, need to move toward a proactive, preventative approach to CCHF in the future. It is very important to strengthen the One Health strategy by combining surveillance of ticks and animal illnesses with surveillance of human diseases. Key steps should include keeping an eye on tick numbers in high-risk governorates all year long, treating animals with acaricide before the spring tick season, enforcing rules against unauthorized slaughterhouses, and running public information programs in rural areas that are at risk. Early warning methods, such as serosurveys in animals or climatic data-based forecasting models, might help us figure out where outbreaks are most likely to happen each year and start taking steps to stop them in time. At the national level, better coordination and financing are essential. A unified CCHF control program would make sure that all areas are equally prepared and resources can be quickly redirected out ahead of time.

Abbreviation

CCHF: Crimean-Congo Hemorrhagic Fever

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Availability of data and materials

Data will be available by emailing nawfal.hussein@yahoo.com

Authors' contributions

Nawfal R Hussein (NRH), the primary investigator, contributed to the conception, data collection, and interpretation. Aya R Hussein (ARH) wrote the first draft. Halder J Abozait (HJA) contributed to the critical review, editing, and rewriting of the manuscript. All authors have read and approved the final version of the manuscript for publication.

Ethics approval and consent to participate

We conducted the research following the declaration of Helsinki. However, the qualitative research and review articles need no ethical approval.

Consent for publication

Not applicable

Competing interest

The authors declare that they have no competing interests.

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