



Review Article

Afghanistan's tick-borne crimean-congo hemorrhagic fever epidemiology

Hedayatullah Ehsan^{1,2*}, Abubakr Yosufi², Sharifullah Niazi³, Ali Sina Karimi¹,
Abdul Wakil Ramakee¹

¹Medical Sciences Research Centre, Ghalib University, Kabul, Afghanistan

²Infectious Diseases, Kabul University of Medical Sciences, Kabul, Afghanistan

³Dept. of Social Behavioral Change, UNICEF, Afghanistan



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ABSTRACT

Over the past decades, Afghanistan has encountered several serious healthcare difficulties. One of these occurrences, a lethal endemic of Crimean Congo Hemorrhagic Fever (CCHF), hit Afghanistan in 1998. A broad assessment of the literature reveals a number of characteristics that put the people of Afghanistan at a very high risk of developing CCHF. First off, the nation's poor healthcare system is now ill-equipped to handle difficulties of this kind. Medical institutions and healthcare personnel lack the necessary tools to correctly diagnose, treat, and prevent CCHF. Second, a significant percentage of people is ignorant about the vector's propagation and methods of control. Afghanistan has a major agricultural industry, and as a result, many individuals are active in caring for animals and handling cattle, which can result in the spread of the CCHF virus. Finally, during the past 20 years of the republican government of Afghanistan after the initial tenure of the Taliban's government as a result of the Afghan war, a sizable number of Afghan refugees returned to Afghanistan from Pakistan, a nation where CCHF is endemic. This increased Afghanistan's vulnerability. This literature review identifies probable causes of high-risk CCHF and offers suggestions that Afghan policy-makers may desire to take into account in order to ameliorate the existing situation.

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1. Introduction

Crimean-Congo hemorrhagic fever (CCHF) is a serious viral hemorrhagic fever that is transmitted by vectors. The genus Nairovirus of the Bunyaviridae family contains the causal agent. Hyalomma ticks can carry the infection to humans, as can direct contact with the blood or tissues of sick people or animals that are viremic.¹

Ticks are tiny, spider-like animals that feed on human blood as well as the blood of other mammals and birds. They range in size from 1mm to 1cm, on average. They typically have 6 or 8 legs.² Ticks with hard bodies that are common throughout Asia, Europe, and North Africa belong

to the genus Hyalomma.³ Small mammals and livestock, such as cattle, are the CCHF virus' natural hosts. From these hosts, the virus may infect humans and spread either by the Hyalomma species tick vector or through contact with the bodily fluids of infected animals.⁴ In particular, the virus can be transmitted nosocomial from hospitalized patients to healthcare staff. The majority of human illnesses are contracted by contact with raw meat, blood from cattle, or tick bites that function as vectors.⁴ During CCHF epidemics, healthcare professionals are regarded as a high-risk category for morbidity and mortality. Men and women who engage in agricultural, animal husbandry, slaughterhouse work, veterinary medicine, as well as those who work in health care settings, are thought to be high-risk categories for CCHF.⁵

* Corresponding author.

E-mail address: hedayatullahehsan@gmail.com (H. Ehsan).

A large portion of Southern Europe, Africa, the Middle East, and Asia are among the regions where CCHF is endemic. One of the areas where the virus is prevalent is Afghanistan.^{6–8} Afghanistan had its first CCHF instances in March 1998 (19 cases, 12 fatalities, CFR = 63.2%), followed by another 25 cases, 15 deaths, and a CFR of 60% in the Gulran area of Herat province in 2000. No other cases were noted until 2007 though.⁹ An epidemic with 60 probable cases occurred in Herat City, western Afghanistan, in the fall of 2008. Six samples from the Central Public Health Laboratory in Kabul tested positive for CCHF, which was later validated at the US Naval Medical Research Unit No. 3 (NAMRU-3)'s facilities in Cairo, Egypt. Since the beginning of active monitoring for CCHF in Afghanistan in 2007, 1,284 laboratory-confirmed and clinically diagnosed cases—ranging from 4 instances in 2007 to 483 cases in 2018—have been documented, showing a considerable rise in Afghanistan (MoPH, 2018), mostly in Herat Province.¹⁰ Recent studies show that the frequency of CCHF has risen in Afghanistan, but the ability of the labs to analyse samples and the general public health infrastructure to handle CCHF are still insufficient.¹¹ Crimean Congo Haemorrhagic Fever (CCHF) is prevalent in Afghanistan; from 2017 and 2022, there were 1,971 suspected cases and 207 recorded deaths, with females accounting for 25.9% (510) and those over five years of age accounting for 97.5% (1,922) of the total. The occupational categories that deal with animals (butchers, farmers, shepherds, and animal traders) were the most commonly recorded, accounting for 37.7% (743), followed by housewives (23.2%, 457). According to the most current WHO statistics, 32 provinces have reported a total of 806 cases of CCHF since the year 2023's beginning (86 fatalities, CFR=10.67%). The 16 provinces in which the CCHF-related deaths were recorded were Kabul (19), Balkh (6), Takhar (5), Parwan (3), Jawzjan (2), Kandahar (2), and one each of Badakhshan, Baghlan, Faryab, Ghazni, Kapisa, Khost, Kunduz, Paktya, Sar-e-pul, and Wardak. In Figure 2 805 (99.9%) of the overall patients were older than five years old, and 245 (30.4%) of the cases included females. In the last two months, the majority of cases have come from the South (Kandahar and Helmand), the North (Balkh), and the Central (Kabul) areas. Since the start of 2023, 771 samples of suspected CCHF cases have been analysed; 259 of those samples were positive (33.6% positivity).¹²

Human CCHF has a wide range of severity, from a moderate, nonspecific febrile illness to shock and death, and is marked by a sudden onset of fever, headache, disorientation, nausea, weakness, and severe limb and loin pain.⁷ But in Afghanistan, myalgia (75%), headache (80%), and fever ($T > 38, 5$) are the most prevalent symptoms.⁷ Epistaxis is the most common hemorrhagic symptom, and thrombocytopenia is confirmed to be the most common hematologic finding in CCHF in the

nation by a low plasma platelet count. Patients exhibit clear anorexia.⁸ It occasionally happens to have diarrhea, stomach discomfort, and vomiting. Conjunctival injection, face and chest flushing, and other early illness symptoms have been documented. Enanthem of the soft palate, uvula, and throat are among the hemorrhagic signs, along with a small petechial rash that spreads to the chest, belly, and rest of the body; occasionally, huge purpuric regions are noted. Gum, nose, uterine, lung, and intestinal bleeding have been documented in severe and fatal instances; these signs are frequently linked to substantial liver injury.⁵

Afghanistan's productive age group, which ranges in age from 27 to 35 on average, was afflicted with CCHF.¹³ The total case fatality rate (CFR) is around 30%.¹³ But there have been reports of ranging from 2% to 70%.¹³ Since there is currently no licensed vaccination against the CCHF virus, supportive therapy is the mainstay of care. Avoiding tick bites, humanely killing animals, and taking universal precautions in the provision of health care are the only effective methods of preventing CCHF virus infection.¹³ Studies on CCHF and the use of ribavirin were found to be highly confounded, and the one study that was completed had insufficient power, according to a systematic review and meta-analysis.¹⁴ However, it has been suggested that ribavirin given intravenously and convalescent plasma with a high neutralizing antibody titer are effective treatments.¹⁴ Additionally, successful use of oral ribavirin treatment has been documented.¹⁴ There are >30 countries in the globe where the illness is prevalent. The frequency of CCHF has significantly grown in recent years in the nations of the WHO Eastern Mediterranean Region (WHO EMR), with isolated human cases and outbreaks of CCHF being recorded from a number of those nations. An average of 5 to 50 human cases of the illness are documented in Afghanistan each year, which is part of the Hyalomma tick's endemic area.

Throughout reaction to the sickness throughout the nation, several actions have already been taken. The national strategy for Afghanistan's (2017–2021) prevention and control of zoonotic diseases has been designed, and implementation has begun. Additionally, the national taskforce committee for zoonoses is being established, which will oversee the implementation of the national strategy for the prevention and control of zoonoses. This strategy will include collaboration in the development of common response strategies as well as joint outbreak investigation and response to zoonotic disease outbreaks. The Ministry of Public Health (MoPH), the World Health Organization (WHO), the Ministry of Agriculture, Irrigation and Livestock (MAIL), municipalities, and other relevant stakeholders have signed Memoranda of Understanding (MoUs) to strengthen their joint collaboration with related sectors for prompt outbreak detection, investigation, and response.¹²

The National Zoonosis Committee meeting was held in 2023 in response to the CCHF outbreak and was presided over by the CDC-MoPH. Participants included relevant departments from the Ministry of Agriculture, Kabul Municipality, Ministry of Information and Technology, as well as national and international partners. The meeting focused on coordinating the preparedness and response to zoonotic diseases outbreaks, including the CCHF¹² and the following actions have taken:

1. In 34 provinces, surveillance support teams (SSTs) are actively involved in epidemic investigation and response operations.¹²
2. Since the start of 2023, 13 CCHF PCR kits have been provided to the RRLs in IDH, Nangarhar, Herat, Balkh, and Kandahar.¹²
3. The personnel of Nangarhar, Herat, and Balkh RRLs has received on-the-job training, and the ability to use PCR and ELISA technologies for laboratory confirmation of CCHF has been created.¹²
4. Six Regional NDSR lab focal points received six days of PCR and ELISA lab training at CPHL.¹²
5. A one-day workshop was also convened with participation from representatives from specialist hospitals and the guideline protocol section of the MoPH to present and finish the guideline, which has been updated and is being evaluated by the MoPH for their support.¹²
6. Since 2023's commencement, 177 healthcare professionals (HCWs) from all regions have received training in the CCHF case management protocol.¹²
7. The WHO sent Balkh province a total of 1,600 double bags to aid in CCHF case management.¹²
8. The North area has received 200 pieces of personal protective equipment and a total of 15 courses of the antiviral drug ribavirin, each course including 84 pills.¹²

Well-designed studies are required to provide an overview of CCHF characteristics and to aid in the early detection of suspected cases and the timely adoption of prevention and control strategies to stop the spread of infection because there is currently no approved vaccine and no specific treatment for CCHF.¹³

2. Vaccines

There is presently no effective vaccination for CCHF, despite the fact that an inactivated, mouse brain-derived vaccine against it has been created and utilized on a modest basis in eastern Europe. Furthermore, numerous hundred human volunteers received an experimental vaccination in the former Soviet Union's Rostov area and in Bulgaria, and strong antibody levels were found (reviewed in Whitehouse, 2007). There have been no effectiveness studies conducted.

The medicine has almost always been administered orally throughout therapy. Ribavirin, an antiviral medication, has been successfully used to treat CCHF infection. Formulations administered orally and intravenously both appear to work.

3. Therapy

The current strategy for treating CCHF relies on broad supportive measures, close observation of the patient's hematologic and coagulation state, replacement of cells and components when required, and ribavirin administration. The basic strategy for treating symptoms of CCHF in patients is general supportive care.

In the absence of a vaccine, the only way to reduce infection in people is by raising awareness of the risk factors and educating people about the measures they can take to reduce exposure to the virus.

Public health advice should focus on several aspects.

3.1. Reducing the chance of transmission from ticks to humans

1. Dress protectively (long sleeves, long pants;
2. Wear light-coloured clothing to make it easier to spot ticks on your clothing;
3. Apply acaricides (chemicals used to kill ticks on garments that have been authorized;
4. Apply a clothing- and skin-safe repellent;
5. Routinely check your skin and clothing for ticks; if any are detected, remove them carefully;
6. Look for ways to get rid of or manage tick infestations on animals or in stables and barns; and
7. Avoid regions with a lot of ticks and times of year when they are most active.

3.2. Reducing the chance of transfer from animals to humans:

1. When handling animals or their tissues in endemic regions, such as when slaughtering, butchering, and culling livestock at slaughterhouses or at home, wear gloves and other protective clothes;
2. Place animals in quarantine before they enter slaughterhouses or regularly pesticide-treat them two weeks before killing.

Reducing the possibility of community-wide human-to-human transmission:

1. Avoiding having direct physical contact with anyone who have the CCHF;
2. To put on safety gear and gloves when caring for sick persons;
3. Frequently wash your hands after attending to or visiting sick persons.

In order to strengthen CCHF monitoring, diagnostic capability, and epidemic response operations in Afghanistan, WHO is collaborating with partners.¹⁵

WHO also provides documentation to help disease investigation and control, and has created an aide-memoire on standard precautions in health care, which is intended to reduce the risk of transmission of bloodborne and other pathogens.^{15,16}

4. Future Research

The fact that Afghanistan is now reporting several hundred cases of CCHF annually suggests that investigations of the pathophysiology, quick diagnosis, and treatment that adhere to global norms of clinical research ethics may be carried out. Indicators other than death should be utilized to assess treatment efficacy because a lower-case fatality rate is seen in these instances than has been reported in series from other nations.

5. Recommendations

1. Enhancing regional and national surveillance efforts to give a more accurate picture of the CCHF situation in terms of its geographic spread.
2. Strengthening the professional and laboratory infrastructure in at-risk areas to guarantee early detection of CCHF, which is crucial for the control and therapeutic treatment of the illness.
3. Ensuring that Ribavirin is accessible in the CCHF-risk provinces.
4. Health care professionals should get specialized training so they can identify the early signs of CCHF and include the condition in their first differential diagnosis, ensuring the disease is caught early.
5. Specialized education for those in the professions most at risk for the illness, such as farm and slaughterhouse workers, veterinary professionals, and healthcare professionals (in the event of nosocomial infections).
6. Raising CCHF awareness in the community through public awareness programs.
7. Collaboration and coordination between the public health sector and all other pertinent sectors should be improved.
8. Using new scientific knowledge to create innovative surveillance and control methods

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7. Competing Interests

We have read and understood the journal policy on declaration of interests and declare that we have no

competing interests.

8. Authors' Contribution

(1) Hedayatullah Ehsan made significant contributions to conceptualization and design. (2) Hedayatullah Ehsan and Ali Sina Karimi are in charge of data collection, analysis, and interpretation. (3) All authors contributed to the creation of the article or critically revised it for significant intellectual content, and (4) Hedayatullah Ehsan gave the version his seal of approval before it was published.

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10. Conflict of Interest

None.

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Abubakr Yosufi, DMD-Doctor

Sharifullah Niazi, MD-Doctor

Ali Sina Karimi, MD-Doctor

Abdul Wakil Ramakee, MD-Doctor

Author biography

Hedayatullah Ehsan, DMD-Doctor  <https://orcid.org/0000-0001-5970-713X>

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