

# A Mini Review on the Outbreaks of Crimean-Congo Hemorrhagic Fever in Balochistan, Pakistan.

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## ABSTRACT

Crimean-Congo Hemorrhagic Fever (CCHF) is a deadly viral disease which is spread by ticks especially by Hyalomma species. It has spread worldwide but in developed countries its spreading has been controlled but in underdeveloped countries especially Asian countries are at risk. Recently in Balochistan province of Pakistan has an outbreak emerge which cause high morbidity as well as mortality.

### Introduction:

CCHF is indeed a zoonotic viral disease that poses a significant threat to both human and animal populations pandemically all over the globe as well as endemic in Balochistan (Pakistan). Ticks and the diseases they transmit have posed a longstanding threat to both human and animal populations over an extended period [1]. Ticks serve as significant vectors in the transmission of various diseases [2]. Tick-borne viruses are classified within the orders Bunyavirales and Mononegavirales, both of which encompass nine families responsible for inducing tick-borne diseases [3].

### Epidemiology:

Southeast Asian nations exhibit heightened vulnerability due to escalating population figures and the ongoing development of healthcare infrastructure and communities. CCHF, a life-threatening zoonotic disease, poses a significant risk across a wide geographic area, particularly within the Balochistan province of Pakistan [4].

### Etiology:

CCHF is attributed to a virus classified within the Nairovirus genus, with its familial affiliation being Nairoviridae. This pathogen is characterized as a negative-sense RNA virus featuring a segmented genome, consisting of small (S), medium (M), and large (L) segments, as depicted in Figure 1. Notably, the small segment plays a pivotal role in fostering diversity among viral isolates originating from distinct geographical regions [5].

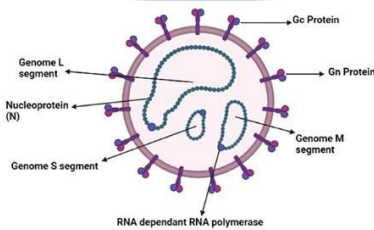


Figure 1: Representation of (Crimean Congo hemorrhagic fever virus)

### Transmission:

The transmission of Crimean-Congo Hemorrhagic Fever (CCHF) facilitated by the Hyalomma tick involves salivary pathways, leading to its dissemination among both animals and humans. The virus, characterized by high virulence, poses a potential bioterrorism threat. Human mortality rates range from 3 to 30%, with outbreaks becoming particularly catastrophic when surpassing endemic levels. Transmission sources encompass tick bites, animals in the viremic phase, and contact with the blood of an infected patient during the acute phase of infection [6].

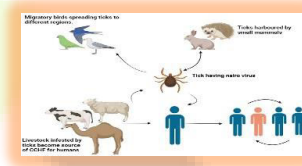


Figure 2: Transmission of (Crimean Congo hemorrhagic fever virus) involving ticks

### Sign and Symptoms:

From a clinical perspective, the disease manifests with fever, widespread hemorrhaging, and myalgia. Observable indicators, including hepatomegaly and splenomegaly, exhibit regional variations in prevalence, with distinct patterns contingent upon geographical locations and the specific vector types involved [7].

### Pathophysiology: [8]

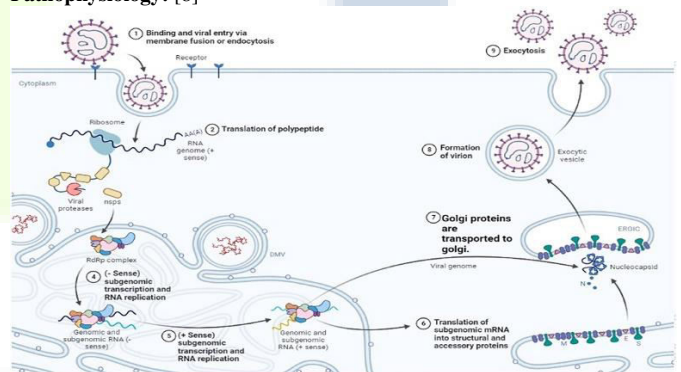


Figure 3: Pathophysiology of (Crimean Congo hemorrhagic fever virus)

### Blood Chemistry:

CCHF has developed in four phases and in this way changes the blood chemistry of the patient. In the Prehemorrhagic phase there is a slight decline while in Hemorrhagic phase there is a major decline in Platelets and Leucocytes while loss of Protein increases from Prehemorrhagic phase to Hemorrhagic phase. While in convalescent phase there is a slow recovery of the patient as illustrated in Fig 4 [9].

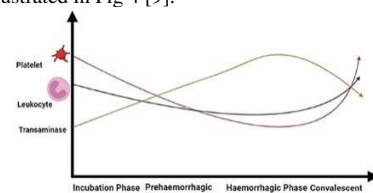


Figure 4: Blood parameters and different phases of (Crimean Congo hemorrhagic fever virus)

### Treatment:

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The efficacy of ribavirin in the treatment of Crimean-Congo Hemorrhagic Fever (CCHF) relies solely on observational studies, indicating a provisional basis for its therapeutic use [10]. Provide supportive care by managing fluid equilibrium, correcting electrolyte imbalances, optimizing oxygenation, and addressing hemodynamic stability [11]. A vaccine derived from inactivated mouse brain, employed in Eastern Europe for Crimean-Congo Hemorrhagic Fever (CCHF), is characterized by its high cost and minimal adverse reactions [12].

**Precautions:**

The adoption of preventive measures against CCHF virus is justified by its fatality rate. In regions endemic to the disease, characterized by a high prevalence of tick vectors, the utilization of protective clothing is recommended during periods of tick biological activity ref. The application of repellents such as DEET (N, N-diethyl-meta-toluamide) and the thorough inspection of skin and clothing for tick removal can mitigate the incidence of tick bites ref. Individuals residing in urban environments face an elevated susceptibility to potential exposure to viremic animals. Consequently, it is recommended that they utilize gloves when manipulating animal tissue or blood to mitigate the risk of infection [13].

**CCHF reports from Balochistan (Pakistan)**

Recently an outbreak occurred in Balochistan (Pakistan) which cause high mortality and morbidity in Jan 2023. The graphical representation given by Khalid Dashti Statistician [14], which shows confirmed cases from 2011-2023. Also shows that mostly young age people are affected which are basically Doctors and other staff and gender wise shows that males are more prone to this as compared to females.

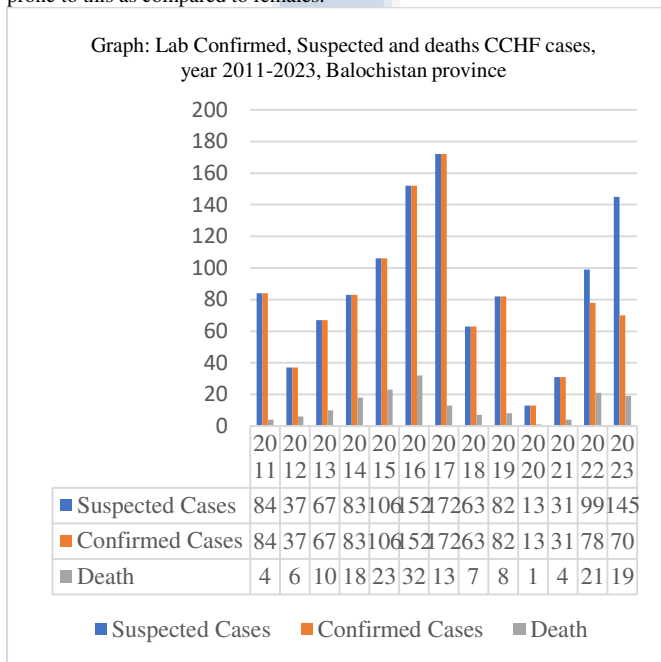
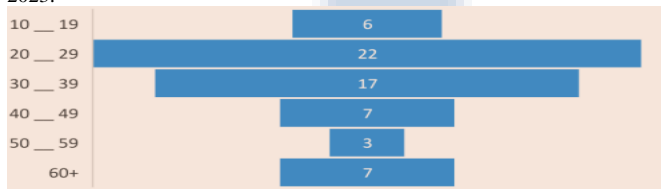


Figure 5: Confirmed CCHF cases age wise representation from Jan – 5<sup>th</sup> Nov 2023.



**Conclusion:**

Collaborative efforts among epidemiologists, microbiologists, entomologists, and veterinarians within the framework of One Health are imperative for devising comprehensive strategies to mitigate the incidence of CCHF. Facilitating swift risk communication between these interdisciplinary fields and incorporating insights from ecologists is crucial for preemptive measures against the disease within specific geographic regions. The imperative necessitates the initiation of targeted drug trials to ascertain a therapeutic agent for CCHF; for instance, the exploration of heparin and other anti-coagulants in clinical trials to assess their efficacy in managing disseminated intravascular coagulation. Emphasis should be placed on investigating the prevalence of the CCHF virus in Asian and Middle Eastern countries, elucidating its interface with human populations, and formulating treatment strategies in alignment with the principles of One Health.

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