

## Factors For Acquisition of Crimean-congo Hemorrhagic Fever in Children in the South east of Iran

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**Background:** Crimean-Congo hemorrhagic fever (CCHF) is a tick-borne disease caused by arbovirus which can be transmitted to human by several routes. Tick bite and living in a rural area have been the most common factors for inception of CCHF in adults and children in studies reported from Iran.

**Objectives:** This study was conducted to detect the disease acquisition routes among children with confirmed CCHF in southeastern Iran.

**Patients and Methods:** We evaluated all the files of patients with confirmed CCHF who were younger than 19 years old and were admitted to university hospitals (Zahedan, Southeastern Iran) during January 2000-January 2014.

**Results:** Among 41 children and adolescents with CCHF (35 males and six females with age range of 5-19 years), animal contacts (23%) and living in endemic area (19%) were the most common factors for acquisition of the disease.

**Conclusions:** Children and adolescents can acquire CCHF through the same routes that adults can be infected; but, in children tick bite is an uncommon way.

**Keywords:** Crimean-Congo; Hemorrhagic Fever, Children; Risk Factor

### 1. Background

Crimean-Congo hemorrhagic fever (CCHF) is one of the severe forms of hemorrhagic fever in the world and is endemic in many countries in Africa, Asia, the Middle East, and Eastern Europe (1, 2). CCHF is also an important public health threat and has a wide distribution, which correlates with the global distribution of Hyalomma tick, the vector responsible for viral transmission (1, 3-5). This disease is usually asymptomatic in infected animals, but can be fatal in humans. Although tick is a major vector in transmission of the disease, animal holders, farmers, butchers and livestock workers are at risk for inception of CCHF as well (1-7). Health care personnel are also at risk through unprotected contact with infectious blood, tissue, and other infected body fluids. Secondary cases are seen due to human to human transmission by percutaneous or mucosal exposure to blood and other fluids containing the virus (8). To prevent further spread in the community, community-based control measures like the use of pesticides to control the tick population are necessary (1-7). To now, tick bite, living in an endemic area and working in slaughterhouses have been reported as the most common causes for inception of CCHF in adults and children in all the studies reported from Iran as well as from some other countries (1-6, 8-15).

### 2. Objectives

Here, we aimed to evaluate the disease acquisition routes among children and adolescents with confirmed CCHF in the southeast of Iran.

### 3. Patients and Methods

We evaluated all the files of patients with confirmed CCHF who were younger than 19 years old and admitted to university hospitals (in Sistan and Balouchestan province, southeast of Iran) during January 2000-January 2014.

### 4. Results

Among 41 children and adolescents with CCHF (35 males and six females with age range of 5-19 years), animal contacts was the most common route for inception of the disease (23%). Living in a rural area (19%), tick existence in the living area (14%), contact with freshly slaughtered meat (12%), and tick bite (3%) were other risk factors.

### 5. Discussion

The first evidence of CCHF goes back to the 12th century when an outbreak of CCHF happened in Tajikistan. In

the recent century, CCHF was described for the first time among Soviet Union military personnel in Crimea during the Second World War and was named Crimea hemorrhagic fever. Subsequently, the virus responsible for Crimea hemorrhagic fever was reported from Congo, which caused a febrile illness similar to Crimean hemorrhagic fever. Hence, linking these two names led to a new nomination; CCHF (1, 3, 8, 9). Humans get the infection through being bitten or crushed by an infected tick on bare skin. The infection can also be acquired through percutaneous and permucosal routes via contact with the infected animal blood or tissues or and drinking unpasteurized milk (1, 8, 9, 16). Human-to-human transmission is a rare but important route,, happening when skin or mucosal membranes are exposed to blood or body fluids of patients with hemorrhagic diathesis (1, 8, 9, 16). The possibility of aerosol transmission has also been reported in few cases in Russia (9). In addition, possible horizontal transmission from a mother to her child has been reported. Studies in Iran show that in addition to tick bite and living in endemic areas, existence of the tick in the living area, animal holders, slaughter houses, livestock workers and farmers are at risk for inception of CCHF. Alavi-Naini et al. in 2006 reported that tick bite was the most common cause of involvement (4). Studies by Sharifi-Mood et al. showed that tick bite and the presence of tick in the living area were the most common ways for acquisition of CCHF (5, 6, 16). The same results were also reported by Mardani et al., Metanat et al., and Keshtkar Jahromi et al. (3, 8-10, 17). Similar results were also reported by Izadi et al. in 2004 (11). Our results showed that animal contact was the most common route for inception of the disease and living in an endemic area and presence of tick in the living area were the most common causes for acquisition of infection. This study also showed that tick bite (3%) was less common compared to other studies reported in recent years. Therefore, the main step for prevention and control of CCHF should target both the community level and the nosocomial set ups. In the community level, all the attention should be focused on prevent the human contact with live tick. Measures to avoid tick bites include tick repellents, environmental modification (brush removal, insecticides), and regular examination of clothing and skin for ticks. Universal precautions are also necessary when taking care of patients. These recommendations include isolation use of gloves, gowns, face-shields, and goggles. Using liquid bleach solution as a disinfectant is an important factor when body is exposed to blood and other infected secretions. Laboratory workers must follow stringent biosafety precautions. Viral isolation techniques should be carried out only in those laboratories where biosafety level 4 is available (1, 8, 9, 16, 18, 19). Children and adolescents can acquire CCHF by the same routes through which adults can get infected. However, in children tick bite is less common than in adults. Animal contacts are one the most common route for disease inception, as in adults. Therefore, high level of

attention should be paid to prevent the human contact with livestock and tick.

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