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Evaluation of public awareness and attitudes on Crimean-Congo hemorrhagic fever: a survey study in a rural area of western Anatolia of Turkiye

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ABSTRACT

Aims: Crimean-Congo hemorrhagic fever (CCHF) is a zoonotic viral disease caused by a virus belonging to the genus Nairovirus, with *Hyalomma* spp. being the primary vector. The purpose of this study is to examine the knowledge, attitudes, and behaviors of rural communities regarding CCHF, its symptoms, transmission modes, and related topics. Furthermore, this study aims to contribute to the development of public health education programs.

Methods: This cross-sectional survey was conducted through face-to-face interviews between June 25, 2024, and July 25, 2024, in the countryside of Balıkesir, Turkiye.

Results: A significant majority of participants (87.6%) were aware that CCHF is present in Turkiye, but only 47.6% were aware of its presence in their local region. This discrepancy suggests that while general awareness of CCHF is high, its perceived importance at a local level is lower.

Conclusion: The survey highlights both the strengths and weaknesses in public awareness and attitudes towards CCHF in a rural area of the Marmara Region. While there is general recognition of the seriousness of the disease, gaps in specific knowledge and preventive behaviors point to the need for targeted public health interventions. These gaps can be addressed through specialized education campaigns aimed at at-risk populations, improving societal attitudes and responses to tick bites, and ultimately benefiting the prevention, transmission, and diagnostic processes of CCHF in these vulnerable populations.

Keywords: Hemorrhagic fever, public awareness, virus, rural area

INTRODUCTION

Crimean-Congo hemorrhagic fever (CCHF) is a zoonotic viral disease caused by a virus belonging to the genus *Nairovirus*, with *Hyalomma* spp. being the primary vector. Clinical symptoms begin with fever, headache, myalgia, and fatigue, which can progress to bleeding, multi-organ failure, and death.[1] Thrombocytopenia is a common laboratory finding in CCHF infection.[2] Patients typically present with leukopenia and elevated levels of aspartate aminotransferase (AST), alanine aminotransferase (ALT), lactate dehydrogenase (LDH), and creatine phosphokinase (CPK).[3] Coagulation tests, including prothrombin time (PT) and activated partial thromboplastin time (aPTT), are often prolonged. Additionally, fibrinogen levels may decrease while fibrin degradation products are frequently elevated.[4]

The primary modes of transmission are through tick bites or contact with infected materials. Due to the wide geographic distribution of its vector, CCHF is one of the more common and potentially fatal tick-borne diseases.[2] It is prevalent in many regions worldwide.[3-6] The highest risk group comprises farmers living in outbreak areas, with most affected individuals engaged in agriculture and/or livestock farming.[5,6] A study conducted in Kosovo by Fajs et al.[7] demonstrated a seroprevalence rate of 4.0%.

Several factors may influence the transmission and mortality of the disease. Beyond viral virulence and treatment-related factors, aspects such as the method of tick removal and early diagnosis also impact the course of the disease. These factors are directly related to the knowledge, attitudes, and awareness of at-risk communities.[4-7] A high level of public knowledge can contribute to better recognition of the disease, and quicker access to treatment for CCHF.[6,8,9] Moreover, timely diagnosis plays a vital role in guiding therapy and minimizing the risk of nosocomial infections.[10]

Studies on knowledge, attitudes, and behaviors are particularly critical in public health for assessing existing knowledge, forming behavioral strategies, and subsequently developing new public health programs.[11,12]

The purpose of this study is to examine the knowledge, attitudes, and behaviors of rural communities regarding CCHF, its symptoms, transmission modes, and related topics. Furthermore, this study aims to contribute to the development of public health education programs.

METHODS

Ethics committee approval for this study was received from the Balıkesir University Health Sciences Ethical Review Board (Date: 11.06.2024, Decision No: 2024/89). Before the start of data collection, each participant in the study provided written informed consent, and only those who willingly participated were included. After obtaining their informed consent, the participants completed the questionnaires. All procedures were carried out in accordance with the ethical rules and the principles of the Declaration of Helsinki.

This cross-sectional survey was conducted through face-to-face interviews between June 25, 2024, and July 25, 2024, in the villages of Eğerci, located in the Savaştepe district, and Çamuca, in the Balya district of Balıkesir, Turkiye. These locations were selected due to the previous observation of CCHF cases. Random sampling was employed to select participants.

Statistical Analysis

Categorical data were presented as frequencies (n) and percentages (%), while continuous (measured) data were summarized using mean, standard deviation, and minimum-maximum values. The data were visualized using various formats, including pie charts.

All collected data were entered into the SPSS software package (IBM Corp. Released 2013. IBM SPSS Statistics for Windows, Version 22.0. Armonk, NY: IBM Corp.) and subsequently analyzed using the same program.

RESULTS

The survey included a total of 338 participants, with 61.3% (n=207) being male and 38.7% (n=131) female. The average age of the participants was 51.0 years, with a standard deviation of 15.9 years. Among the male participants, the mean age was 50.3 years (±15.4), while for the female participants, the mean age was 52.3 years (±16.4). The occupations represented among the participants were as follows: retirees (19.2%, n=65), housewives (18.6%, n=63), and individuals engaged in agriculture and animal husbandry (16.9%, n=57), workers (8.9%, n=30), tradesmen (6.9%, n=23), and students (4.8%, n=16). Individuals in other occupations accounted for the remaining 24.7% (n=84).

In terms of educational background, 30.8% (n=104) were primary school graduates, 9.2% (n=31) were secondary school graduates, 25.4% (n=86) had completed high school, 30.8% (n=104) were university graduates, and 3.8% (n=13) had never attended school.

Regarding exposure to CCHF, 9 of the participants reported a personal or family history of CCHF, while 327 had no such history. Additionally, 296 were aware that CCHF occurs in Turkiye, and 161 of the participants indicated that it is present in their local region. When asked about the availability of a vaccine for CCHF, 257 of the participants responded 'no,' while 78 of the participants answered 'yes.' In terms of causative agents, 162 of the participants correctly identified viruses as the cause of CCHF, whereas others incorrectly identified. Regarding transmission, 89.6% of the patients correctly stated that CCHF is transmitted by ticks, while 7.7% of the patients mentioned mosquitoes, and 2.7% of the patients incorrectly cited contaminated water.

When asked how they would respond to finding a tick on their body, 80.1 % (n=271) indicated they would go to a hospital for tick removal, while 10.7% (n=36) would remove it with tweezers, and 9.2% (n=31) would remove it by hand. In terms of protective behaviors, 77.8 % (n=263) agreed that using protective equipment, such as gloves and boots, during animal contact can help prevent CCHF transmission, while 12.13% (n=41) were undecided, and 8.9 % (n=30) disagreed. Four individuals did not respond to the question regarding the protective behaviors.

In addition, in one of the survey questions, participants were asked what the symptoms of CCHF disease would be. Tho choices were bleeding, high fever, muscle-joint pain, and fatigue. 47.3% (n=159) of the participants answered that bleeding, high fever, muscle-joint pain, and fatigue would be symptoms of CCHF. Another 19.0% (n=64) answered that high fever, muscle-joint pain, and fatigue would be the symptoms. High fever alone was answered as the sole symptom by 17.0% (n=57) of the participants. A combination of bleeding, high fever, and muscle-joint pain was answered by 4.2% (n=14), while 3.0% (n=10) of the participants answered combination of bleeding and high fever. Additionally, 2.7% (n=9) of the participants answered that combination of high fever and fatigue would be the sypmtoms, and another 2.7% (n=9) answered that bleeding would be the only symptom. High fever and muscle-joint pain sypmtom combination were answered by 0.9% (n=3), and 0.9% (n=3) answered bleeding, high fever, and fatigue sypmtom combination. However, 0.9% (n=3) answered that fatigue would be the only symptom, and another 0.9% (n=3) answered that muscle-joint pain would be the only symptom. On the other hand, 0.6% (n=2) answered that muscle-joint pain and fatigue symptoms would be together. Two individuals did not respond to the question regarding the symptoms of CCHF disease.

Out of the study group, 93.5% (n=315) of the responders stated that CCHF is a fatal disease, while 6.5% (n=22) believed that it is not. 1 people did not respond to this question (**Figure**).

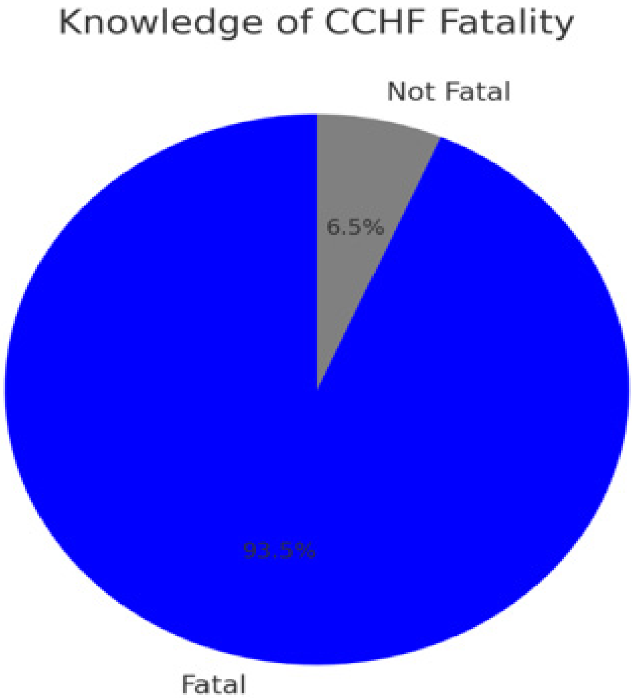

Figure. Knowledge of the fatality of Crimean-Congo hemorrhagic fever

DISCUSSION

The aim of this study was to evaluate the knowledge, attitudes, and behaviors of a rural community in Southern Marmara (Turkiye) regarding CCHF symptoms and modes of transmission. A significant majority of participants (88.9%) were aware that CCHF is present and as a fatal disease (80%), but only 47.9% were aware of its presence in their local region. This discrepancy suggests that while general awareness of CCHF is high, its perceived importance at a local level may be lower. As individuals who do not perceive CCHF as a local threat may be less inclined to adopt preventive measures, potentially increasing their risk of infection transmission. Nejati et al.[13] conducted a study in Iran, where participants displayed a good attitude toward CCHF prevention by recognizing the importance of using safety equipment both during animal slaughter and while handling livestock. Besides, Abazari et al.[14] suggested that the health belief model can predict preventive behaviors for CCHF. Furthermore, a study conducted in Pakistan examined the public's knowledge, attitudes, and practices concerning CCHF were not high, with approximately 70.3% of participants reporting that they took precautions against tick bites.[11] Similarly, 77.8% of participants in our study agreed to use protective equipment during animal slaughter or contact to prevent CCHF transmission. However, this highlights the need for further education, especially in rural areas where the risk of tick exposure is higher due to agriculture and livestock farming activities.

Public health campaigns should emphasize the importance of preventive behaviors, such as wearing protective clothing and checking for ticks after outdoor activities. Such campaigns could be implemented through community meetings, local health centers, and agricultural cooperatives to effectively reach at-risk populations. Educating these communities about risk factors and control measures could help reduce CCHF transmission and improve disease prevention.

People living in endemic areas should regularly inspect their clothing and skin for ticks during rural area wandering. Additionally, practical measures, such as wearing gloves or other protective clothing to prevent direct skin contact with infected tissue or blood, should be adopted.[10,15] Our study also found that the majority of participants expressed a strong willingness to attend informational meetings about CCHF. This reflects a societal desire and willingness to participate in educational initiatives to raise awareness and adopt preventive measures against this disease.

Public health campaigns should emphasize the critical importance of preventive behaviors, such as wearing protective clothing and checking the body for ticks after outdoor activities. These campaigns can be implemented through community meetings, local health centers, and agricultural cooperatives to effectively reach the most at-risk populations. Educating the risky population about risk factors and preventive methods could further help reduce the spread of this disease.[2,8,11-17] Almorish et al.[17] evaluated the knowledge and attitudes of slaughterhouse workers in Yemen towards CCHF and they reported that the majority of respondents had poor knowledge.

The findings of this study may help to assist the Ministry of Health and associations in developing strategies and interventions to raise public awareness and prevent future outbreaks.

Limitations

The limitations of our study include the relatively small sample size, which may not fully represent the broader population of the Marmara Region. Additionally, the cross-sectional nature of the survey provides only a snapshot of awareness and attitudes, without capturing changes over time.

CONCLUSION

The survey highlights both the strengths and weaknesses in public awareness and attitudes towards CCHF in a rural area of the Marmara Region. While there is general recognition of the seriousness of the disease, gaps in specific knowledge and preventive behaviors point to the need for targeted public health interventions. These gaps can be addressed through specialized education campaigns aimed at at-risk populations, improving societal attitudes and responses to tick bites, and ultimately benefiting the prevention, transmission, and diagnostic processes of CCHF in these vulnerable populations.

ETHICAL DECLARATIONS

Ethics Committee Approval

Ethics committee approval for this study was received from the Balıkesir University Health Sciences Ethical Review Board (Date: 11.06.2024, Decision No: 2024/89).

Informed Consent

All participants provided written informed consent.

Referee Evaluation Process

Externally peer-reviewed.

Conflict of Interest Statement

The authors have no conflicts of interest to declare.

Financial Disclosure

The authors declared that this study has received no financial support.

Author Contributions

All of the authors declare that they have all participated in the design, execution, and analysis of the paper, and that they have approved the final version.

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