

Public's Knowledge, Opinions and Behaviors about Crimean-Congo Hemorrhagic Fever: An Example from Turkey

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Summary

The aim of this study was to determine the knowledge, opinions and behaviors of the adults, regarding Crimean-Congo Hemorrhagic Fever (CCHF). This descriptive study data was collected from 405 adults who attended two health centers in Ankara city. The mean age of the adults was 38.2 ± 14.5 years, 73.8% were female, and 63.0% had an educational level of secondary school or below. Of them, 91.6% were not involved with activities, which might have created risk in terms of CCHF. When the name of the disease or the tick was mentioned, 86.7% declared that they heard CCHF. The males ($P < 0.001$), people with educational level of high school or more ($P < 0.001$) and those who are currently working ($P = 0.004$) heard CCHF more compared to others. Of the study population, 89.8% declared that disease was transmitted by ticks and caused fever (83.8%) and 65.0% knew there were ways of prevention from the disease. Mean knowledge score of CCHF was found to be 17.5 ± 8.3 (min-max=0-30, median=20). Being younger than 50 years of age ($P = 0.003$), being male ($P = 0.003$), having an educational level of high school or higher ($P < 0.001$), and working ($P < 0.001$) increased the CCHF knowledge score. The study population did not have enough knowledge regarding CCHF. In order to increase the knowledge level, there should be cooperation among health authorities, health workers, veterinary public health service providers, educators, local authorities and the media.

Keywords: *Crimean-Congo Hemorrhagic Fever, Prevention, Tick, Knowledge, Behavior, Opinion*

Kırım Kongo Kanamalı Ateşinde Halkın Bilgi, Görüş ve Davranışları: Türkiye'den Bir Örnek

Özet

Çalışmanın amacı erişkinlerin Kırım-Kongo Kanamalı Ateşi (KKKA) ile ilgili bilgi, görüş ve davranışlarının saptanmasıdır. Bu tanımlayıcı çalışmada, veriler Ankara'da iki Sağlık Ocağı'na başvuran 405 erişkinden toplanmıştır. Erişkinlerin yaş ortalaması 38.2 ± 14.5 yıl olup %73.8'i kadın ve %63'ü ortaokul ve altı eğitim düzeyine sahiptir. Yüzde 91.6'sı KKKA açısından risk taşıyabilecek işlerde çalışmamaktadır. Hastalığın adı belirtildiğinde veya kenelerin neden olduğu bir hastalık olarak hatırlatıldığında %86.7'si KKKA'ni duyduklarını söylemişlerdir. Erkek olmak ($P < 0.001$), yüksek okul ve üstü düzeyde eğitimi olmak ($P < 0.001$) ve halen bir işte çalışıyor olmak ($P = 0.004$) KKKA'ni duymuş olmayı artıran faktörlerdir. Çalışmaya katılanların %89.8'si hastalığın kenelerle bulaştığını, %83.8'i ateşe neden olduğunu ve %65'i hastalıktan korunma yolları olduğunu bilmektedir. KKKA bilgi puanı ortalama 17.5 ± 8.3 (En küçük-en büyük=0-30, ortanca=20) olarak bulunmuştur. Elli yaşından genç olmak ($P = 0.003$), erkek olmak ($P = 0.003$), yüksekokul ve üstü eğitim düzeyinde olmak ($P < 0.001$) ve çalışıyor olmak ($P < 0.001$) KKKA bilgi puanını artırmaktadır. Çalışmanın yapıldığı bireylerin KKKA hakkında yeterli bilgi düzeyine sahip olmadığı anlaşılmıştır. Toplumun bilgi düzeyinin artırılması için sağlık yöneticileri, sağlık çalışanları, toplum veterinerlik hizmetleri sunanlar, eğitimciler, yerel yönetimler ve medya arasında işbirliği yapılması gereklidir.


Anahtar sözcükler: *Kırım-Kongo Hemorajik Ateşi, Korunma, Kene, Bilgi, Davranış, Görüş*


INTRODUCTION

Crimean-Congo Hemorrhagic Fever (CCHF) is an acute illness affecting multiple organ systems and characterized by extensive ecchymosis, visceral bleeding,

and hepatic dysfunction; and it has a case-fatality of 8% to 80%. This fatal viral infection was described in parts of Africa, Asia, Eastern Europe and the Middle East ¹.

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The virus belongs to the genus *Nairovirus* in the Bunyaviridae family, and causes severe disease in humans ^{2,3}. The disease was first characterized in the Crimea in 1944 and named as Crimean hemorrhagic fever. It was then recognized later in 1969 as the cause of disease in Congo, thus resulting in the current name of the disease. The CCHF virus may infect a wide range of domestic and wild animals. Animals become infected with CCHF, when infected ticks bite. Humans become infected through the bites of ticks, by contact with a patient who is in the acute phase of CCHF, or by contact with blood or tissues from viraemic livestock ^{4,5}. Changing social, economic and climatic conditions such as increased travelling, bio-terrorism and ecological disruption may increase the possibility of the introduction of Viral Hemorrhagic Fever (VHF)-associated viruses into new areas or increase the incidence in endemic areas ⁶. Clinical features commonly show a dramatic progression characterized by haemorrhage, myalgia, and fever. Simple barrier precautions have been reported to be effective ⁷⁻¹⁷.

This infection is also an important public health issue in Turkey, because of its high case fatality rate ¹⁸. *Hyalomma marginatum* is the main vector which transmits the virus to humans in Turkey ¹⁹⁻²¹. The CCHF has not been officially reported in Turkey before 2002, although epidemics have been reported in neighboring countries before 2003 ^{22,23}. Cases infected with CCHF virus were first reported in Turkey in 2002 ²⁴⁻²⁶. Between 2002-2008, 3135 cases of CCHF have been reported, and 155 (4.9%) of these cases died ²⁷. Since there is no effective treatment for this disease, means of prevention, and mainly public education on it is crucial ³.

The main objective of this study was to determine the knowledge, opinions and behaviors of the adults who admitted to two health centers for any kind of health related issue in Ankara, regarding CCHF.

MATERIAL and METHODS

In this descriptive study, 405 adults who attended two health centers in Ankara city, responded to a 27-item questionnaire, between 31 July-9 August 2006 (8 workdays included) since the seasonal peak was seen during this period. Although Ankara was not an endemic region for CCHF, many admissions due to tick bite were recorded in the city during the peak season. The first set of questions was related with the socio-demographic characteristics of the respondents. The second set of questions comprised knowledge and opinions on CCHF. Some of these questions included more than one alternative that could have been answered. Source of

knowledge on CCHF, mode of transmission, acquisition from the animals, symptoms of the disease, knowledge on common preventive measures were asked. Behaviors of the participants were derived from both sets of questions. Data was collected by face to face interview technique. Each question about CCHF knowledge were scored as "1" (true) and "0" (false) and the knowledge level was evaluated according to the total score (Min=0, Max=30). In the further analysis, the cut-off point for the knowledge score was accepted as the median score for the study population. SPSS version 14 statistical software package (Chicago, IL) were used for data entry and chi-square test (χ^2) was used in statistical analysis for the study.

RESULTS

A total of 405 adults who accepted to participate in the study in Ankara city constituted the study group. Mean age of the adults was 38.2±14.5 years (min-max=18-80, median=36), 73.8% were female, 63.0% had a secondary school or lower level of education. Of the participants, 78.8% were not working and 85.7% were living in an apartment (*Table 1*).

Table 1. Some socio-demographic characteristics of participants
Tablo 1. Katılımcıların bazı sosyo-demografik özellikleri

Characteristics	n	%
Age		
29 and below	145	35.8
30-39	89	22.0
40-49	66	16.3
50 and above	105	25.9
Mean=38.2 years Min.=18 Max.=80 Sd=14.5		
Sex		
Male	106	26.2
Female	299	73.8
Education		
Illiterate	16	4.0
Secondary school or lower	239	59.0
High school or higher	150	37.0
Work Status		
Currently not working	319	78.8
Currently working	86	21.2
Health Insurance		
Insured	361	89.1
Not insured	44	10.9
House Type		
Apartment	347	85.7
Slum house	34	8.4
Detached house	24	5.9
Total	405	100.0

Of the adults, 8.4% were dealing with agriculture, livestock, and gardening activities, which had risk for CCHF (*Table 2*).

Table 2. Some job related risk characteristics of participants for CCHF

Tablo 2. KKKA açısından katılımcıların işleri ile ilgili bazı risk özellikleri

Risk Characteristics (n=405)	n	%
Involved in agriculture, livestock, and gardening		
Yes	34	8.4
No	371	91.6
Staying in rural areas during spring or summer		
Every year	91	22.5
Sometimes	100	24.7
Never	214	52.8

Of the participants, 86.7% declared that they heard this disease when the name of the disease or the tick was mentioned. There was statistically significant relationship between the sex of the adults and hearing the disease ($P < 0.001$). Males heard the disease more than females. Adults who had an education level of high school and above declared that they heard the disease more when compared to the adults who had a lower level of education ($P < 0.001$) (*Table 3*).

Most of the adults knew that the disease was transmitted by ticks (89.8%) and caused fever (83.8%) (*Table 4*), and more than half of them (65.0%) knew that there were precautionary measures against the disease.

Table 3. The associations between some socio-demographic characteristics of participants and hearing the CCHF (%)

Tablo 3. Katılımcıların bazı sosyo-demografik özellikleri ile KKKA'ni duymuş olmaları arasındaki ilişkiler (%)

Characteristics (n=405)	Ever Heard	Never Heard	Test Results
Sex			
Male	55.7	44.3	$\chi^2=17.265$ P<0.001
Female	32.8	67.2	
Age Group			
18-29	12.4	87.6	$\chi^2=0.962$ P=0.271
30-39	5.6	94.4	
40-49	7.6	92.4	
≥50	24.8	75.2	
Education			
Illiterate	18.8	81.2	$\chi^2=37.675$ P<0.001
Primary/Secondary school	28.0	72.0	
High school or more	58.0	42.0	
Work Status			
Currently working	52.3	47.7	$\chi^2=8.458$ P=0.004
Currently not working	35.1	64.9	
Total	38.8	61.2	

Regarding the information on vectors, majority of the responders mentioned tick (96.9%), dog (67.2%), livestock (69.2%), and false alternatives such as snake (25.1%). When knowledge on the symptoms of the disease was investigated, fever (83.8%) and lassitude (82.9%) were known as the most common symptoms, although false answers were also given such as hair loss (7.1%) (*Table 4*). Ninety four percent of the adults stated that they learned the disease via television broadcasts. Only 6.4% stated that they learned the disease via the health centers, 7.4%, via the health care workers, and 4.0% via the internet.

Mean knowledge score was found to be 17.5 ± 8.3 (min-max=0-30, median=20). The comparisons between the socio-demographic characteristics and knowledge score (≤ 19 and ≥ 20) were given in *Table 5*. It was found

Table 4. The knowledge of participants regarding some characteristics of CCHF (%)*

Tablo 4. Katılımcıların KKKA'nin bazı özellikleri hakkında bilgileri (%)*

Knowledge ** (n=405)	Yes	No	No Idea
Mode of Transmission			
<i>Tick bite</i>	89.8	2.8	7.4
<i>Direct contact with patient's blood</i>	60.4	17.1	22.5
<i>Dirty water</i>	30.8	41.6	27.6
<i>Direct contact with infected animal's blood</i>	72.1	9.4	18.5
<i>Unwashed vegetables/fruits</i>	37.6	46.4	16.0
Acquisition from the Animals			
<i>Livestock</i>	69.2	18.2	12.6
<i>Fish</i>	5.7	78.6	15.7
<i>Tick</i>	96.9	0.6	2.5
<i>Snake</i>	25.1	50.1	24.8
<i>Bird</i>	46.2	35.6	18.2
<i>Dog</i>	67.2	20.2	12.6
Symptoms of the Disease			
<i>Fever</i>	83.8	0.9	15.3
<i>Infertility</i>	3.7	45.3	51.0
<i>Hair loss</i>	7.1	45.0	47.9
<i>Bleeding</i>	43.0	24.5	32.5
<i>Lassitude</i>	82.9	2.3	14.8
<i>Putting on weight</i>	3.1	57.5	39.4
<i>Headache</i>	67.8	7.4	24.8
Precautions for the Disease			
<i>Anti-tick treatment of animals (livestock)</i>	52.8	2.5	44.7
<i>The ticks should be killed by hands when seen</i>	5.2	49.6	45.2
<i>Insecticide use in the animal shelter</i>	55.8	0.5	43.7
<i>Animal shelters should be plastered and distempered</i>	53.8	1.3	44.9
<i>The sick people should be cured at home</i>	4.7	51.1	44.2
<i>No one should touch the blood and body fluids of sick animals or people without gloves</i>	53.8	1.3	44.9

Correct answers are given in italics

* Row percentages, ** More than one correct answer

that the knowledge score was significantly related to the participants' age ($P=0.003$), sex ($P=0.003$), education ($P<0.001$) and work status ($P<0.001$). Being younger than 50 years of age, being male, having an educational level of high school or higher, and working increased the CCHF knowledge score (Table 5).

Table 5. The distribution of associations between some characteristics of participants and knowledge scores (%)

Tablo 5. Katılımcıların bazı özellikleri ve bilgi puanları arasındaki ilişkilerin dağılımı (%)

Characteristics (n=405)	Knowledge Score * (% **)		χ^2	P
	≤19	≥20		
Age Group				
≤ 29	44.1	55.9	13.723	0.003
30-39	47.2	52.8		
40-49	36.4	63.6		
≥50	62.9	37.1		
Sex				
Male	35.8	64.2	9.049	0.003
Female	52.8	47.2		
Educational Status				
Secondary school/lower	55.3	44.7	13.122	0.000
High school/higher	36.7	63.3		
Work Status				
Currently not working	53.9	46.1	18.352	0.000
Currently working	27.9	72.1		

* Scoring for knowledge: "1" (correct) and "0" (false),

** Row percentage

DISCUSSION

In Turkey and other countries where the epidemic is common, the majority of cases have occurred in those who are involved in agriculture and animal husbandry. Slaughterhouse workers and veterinarians are also considered ^{8-15,26} as risk groups. In this respect, majority of our study group was not at risk as far as CCHF was concerned.

In the study, nearly eighty percent of the participants were females as most of the people who visited the health center were mainly housewives. They mostly brought their children for vaccination. Men were probably at work and often did not visit the health center. So, this limitation should be kept in mind while evaluating the results of the study.

Sex, education and employment status were found to be associated with knowledge regarding CCHF. Since most of the participants were housewives this can be a confounding factor in the analysis.

Most of the adults knew the transmission route of CCHF. This result was important as people could have protected themselves against the disease by knowing the mode of transmission. Most of the adults knew that CCHF caused headache, fever and lassitude. This knowledge might have been valuable in early diagnosis and treatment of CCHF, especially during the seasonal peak of the disease. Majority of the responders declared that there was a need for more information about the disease and its measures related to the prevention and control. There seemed to be some variations in terms of knowledge score depending on the socio-demographic characteristics of the study group, ie. young group, males, more educated and working people had high score probably due to being more aware on recent cases on CCHF.

As indicated by the responders, television broadcasts were the main source of information regarding CCHF. This result showed that television might have been an important tool to inform public on CCHF. Number of people who were informed by Internet was not high in this study. This result probably might have been due to the socio-economic status of the participants. Although there were educational tools, pamphlets, brochures as well as information on the website of Directorate of Health, they might have been ineffective due to distribution problems, lack of sufficient amounts, poor accessibility, level of literacy, or lack of Internet access.

Since most of the research on CCHF was concentrated on clinical and laboratory aspects of the disease in Turkey and neighboring countries, it was not possible to compare the study results with similar surveys. Two studies one from Iran and one from Turkey were conducted among healthcare workers regarding knowledge and attitudes of these personnel on CCHF and ticks. However, these two studies did not provide a comparable data as their target groups and items investigated were different ^{25,27}.

Mean knowledge score was found to be 17.5 ± 8.3 (min-max=0-30, median=20). There were statistically significant relationships between the age, ($P=0.003$), sex ($P=0.003$), education ($P<0.001$), work status ($P<0.001$) and the knowledge score. Being younger than 50 years of age, being male, having an educational level of high school or higher, and working increased the CCHF knowledge score. This statistical difference in age might have been due to the education level of the participants or communication difficulties with older people. As females were in majority in the study group, sex was also found to be associated with the knowledge.

In Turkey, primary health care was provided to the

majority of the population in health centers which were widely distributed throughout the country and these services were provided by 14956 physicians, and 31541 nurses/midwives in health centers²⁸. These figures indicated that majority of the population had the possibility to access primary care. This level of health care might contribute a lot in the struggle against CCHF by educating and providing information to the public, besides prompt and appropriate tick removal and early diagnosis of the disease. This study was just a pioneering and not a representative one. It provided some valuable clues regarding the general approach of the lay people on CCHF. Therefore, it might provide important information for the health care planners for future interventions such as implementing education for CCHF prevention. The general preventive measures may decrease the burden of this fatal disease. As it is not possible to eradicate it and there is no known treatment, prevention and tick-control remain as a vital mode of intervention. The questionnaire and results can form a baseline for the future studies.

It is known that people living in endemic areas should use personal protective measures, which include the avoidance of areas where tick vectors are abundant, particularly when the ticks are active; regular examination of clothing and skin for ticks, and their removal; and the use of repellents^{8,29}. People who are exposed to potentially viraemic animal blood should take practical measures to protect themselves, including wearing gloves or other protective clothing to prevent skin contact with infected tissue or blood^{8,9,16}. Informing public on precautions and practices is essential for preventing this disease. According to Scientific Advisory Board of CCHF in Turkey, preventive measures related to tick-control have to be taken by provincial veterinary bodies as well as related organs of the municipalities. A specific emphasis should be given to the people living in the rural area and people who go to picnic very often, since they are more vulnerable to tick bites. This will increase the chance of prevention from the tick bites and early diagnosis and treatment of the disease by increasing the awareness.

It was found that the study population did not have enough knowledge on CCHF. In Turkey where the epidemic is common, public's education on CCHF generally targeted the rural population. Therefore this can be one of the factors that affected this finding.

However, in the cities and in their suburbs, health centers can be the primary source of information or intervention since they are accessible for the middle and low-income groups who are more likely to go to the

recreational places at weekends. To increase the knowledge there should be cooperation among health authorities, health workers, veterinary public health service providers, educators, local authorities and the media. Besides, most of the activities of the Provincial Directorate of Agriculture are planned and conducted in the rural areas. For the city centers, and the semi-urban areas the public information activities are insufficient³⁰. Therefore, public authorities should provide support for developing projects to fight against various aspects of this public health problem.

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