EVALUATION OF KNOWLEDGE ABOUT PROTECTION AGAINST CRIMEAN-CONGO HEMORRHAGIC FEVER

Z Gungormus and E Kiyak

Nursing Department, Faculty of Health Science, Ataturk University, Erzurum, Turkey

Abstract. This study was conducted in order to evaluate individuals' knowledge about protection against Crimean Congo hemorrhagic fever (CCHF). This descriptive study was carried out among 478 persons, to whom a Family Health Center located within boundaries of Erzurum Metropolitan Municipality, provides health service. A questionnaire form developed by the researchers was used for collecting data. Seventy-one point eight percent of individuals who participated in the study stated they had knowledge about CCHF, 25.9% stated that region was risky in terms of being bitten by ticks, 61.3% stated they could recognize ticks and 56.1% stated that not all tick bites cause the disease. Seventy-seven point eight percent stated CCHF is a virulent disease, 33.1% stated it can be transmitted from human to human and 30.3% stated it can be transmitted from animals to humans. In terms of protection from tick bites, 45, 15.3 and 11.3% of individuals stated wearing clothes to cover the whole body, carefully inspecting the body, and not touching ticks with bare hands, respectively, were good methods. Ninety-two point one percent stated it is necessary to go to a healthcare organization immediately in case of tick bite, whereas 18% of individuals stated it is necessary to remove the tick with tweezers or forceps. The results of this study show most individuals are not well informed about methods for protecting against CCHF, for removing ticks and what precautions to take to protect against tick bites.

Keywords: Crimean Congo hemorrhagic fever, tick, protection, Turkey

INTRODUCTION

Crimean-Congo hemorrhagic fever (CCHF) is a fatal zoonotic viral hemorrhagic infection found in Africa, Asia, Eastern Europe and the Middle East. CCHF virus, classified in the Bunyaviridae family and *Nairovirus* genus, is transmitted to humans by tick (Hyalomma) bites; human to human transmission may occur by direct contact with blood or other infected tissues (Whitehouse, 2004; Elston, 2010; Maltezou *et al*, 2010; TTB, 2010). The disease has become endemic and a public health problem in Turkey since a 2002 outbreak (TTB, 2010). CCHF has been reported in Tokat, Yozgat, Çorum, Sivas, Kastamonu, Karabük, Gümüşhane, Erzurum, Amasya, Çankırı, Giresun and Samsun, Turkey (TTB, 2010); two-thirds of the cases are in Tokat, Sivas, Yozgat, Çorum and Erzurum (Yılmaz *et al*, 2009). The incidence of CCHF in our country was reported to be 14 in 2002, 133 in 2003, 249 in 2004, 266 in 2005, 438 in 2006, 717 in 2007, 1,315 in 2008, and 1,318 in 2009; the number of people who have died from the

Correspondence: Emine Kiyak, Nursing Department, Faculty of Health Science, Ataturk University, Erzurum, Turkey.
Tel: + (90) 442 2311233; Fax: + (90) 442 2360984
E-mail: frtemine@hotmail.com

disease are 6 in 2003, 13 in 2004, 13 in 2005, 27 in 2006, 33 in 2007, 63 in 2008, and 63 in 2009 (Maltezou *et al*, 2010; TTB, 2010).

Crimean Congo hemorrhagic fever, is transmitted to humans by tick bite and contact with body fluids and tissues of viremic animals and infected people, although epidemiologically the most important mode of transmission is by tick bite (Gozalan *et al*, 2007; Ertugrul *et al*, 2009; Yilmaz *et al*, 2009; Arikan *et al*, 2010).

Prevention of CCHF infection is by taking personal protective measures against tick bites (Maltezou *et al*, 2010; TTB, 2010). Arikan *et al* (2010) in a study from Eskişehir of tick bite and Crimean Congo hemorrhagic fever found people who participated in the study did not have enough information. Ozer *et al* (2010) in a study conducted among university students studying at midwifery and nursing students found the student's knowledge about CCHF was not sufficient.

No studies, regarding knowledge of CCHF have been carried out among people living in Erzurum. For people to take effective protective measures against CCHF, they must have knowledge about CCHF and what these measures are, then education programs can be developed. This study evaluated knowledge about Crimean Congo hemorrhagic fever.

MATERIALS AND METHODS

This descriptive study was conducted among patients registered at a Family Health Center located in Erzurum Metropolitan Municipality, Turkey. The number of individuals over 18 years old registered at the clinic was 5,313. The sample size calculated to give adequate power to the study was 400; therefore the number used for the study was 478, chosen randomly from the total number of clinic patients.

Data collection

A questionnaire was developed after reviewing the literature (Ozkurt *et al*, 2006; Gozalan *et al*, 2007; Yilmaz *et al*, 2009; Arikan *et al*, 2010; TTB, 2010) which consisted of total 27 questions. Questions 1 to 7 were about socio-demographics of the respondents and questions 8-27 were about knowledge of protection from CCHF. The questionnaire was tested on a total group of 20 respondents, corrections were made, then the questionnaire was used for the study population. Participants were interviewed in their homes via face to face interviews between April and June 2010.

Ethical approval

Before conducting the study, written permission was obtained from the Chief Physician of the Family Health Center. After relevant information about the study was given to the participants they were included in the study.

Data analysis

SPSS 11.5 was used to evaluate the data. Descriptive data of the individuals and their knowledge about protection from CCHF were recorded as numbers, percentages and means.

RESULTS

The mean age of the participants was 36 years, 60.3% were women, 68% were married, 33.1% were primary school graduates, 43.3% were housewives, 66.5% had equal income and expenses and 64.9% had children (Table 1).

Among the individuals who participated in the study, 71.8% stated they knew about CCHF, 75.2% stated they obtained information from the radio and television, 18.4% stated that they or their relatives were bitten by ticks, 25.9% stated people

Table 1
Socio-demographical features of the participants (*N*=478).

	Number	%
Gender		
Women	288	60.3
Man	190	39.7
Marital status		
Married	325	68.0
Single	139	29.1
Widow/widower	14	2.9
Education status		
Literate	39	8.2
Primary	158	33.1
Secondary	63	13.2
High School	135	28.2
University	83	17.4
Occupation		
Housewife	207	43.3
Unemployed	72	15.1
Civil servant	65	13.6
Self-employed	60	12.6
Worker	51	10.7
Retired	23	4.8
Income statues		
Low income	136	28.5
Income equals to expenditure	318	66.5
High income	24	5.0
Children status		
Yes	310	64.9
No	168	35.1
Age, Mean (Standard deviation)	36.1 (12.6)	

in their region were at higher risk for tick bites, 61.3% stated they could recognize ticks, 45.8% stated that could identify tick bites and 56.1% stated not all tick bites cause disease. Seventy-seven point eight percent of respondents stated CCHF is a virulent disease, 33.1% stated CCHF can be transmitted from human to human, 30.3% stated it can be transmitted from animals to humans, and 67.4, 29.9, 21.8, and 20.9% stated that fever, fatigue, rash, and pain are among the symptoms of CCHF, respectively (Table 2).

Fifty-five point nine percent of respondents stated ticks are found in green areas, such as water fronts, vineyards, gardens, grassy places and bushes, 43.3% stated those engaged in stock breeding were at risk for tick bite. Forty-five, 15.3, and 11.3% of respondents stated the necessity of wearing long clothes to cover the whole body, carefully inspecting the body, and not touching ticks with bare hands, respectively, are preventive methods, 92.1% of respondents stated it was necessary to obtain health care immediately if bitten by a tick, 18% stated the necessity of removing the tick with tweezers or forceps. Eighty-eight point seven percent of respondents stated it is important not to kill the tick by touching it with a lit cigarette, and 90.8% stated cologne, gas or oil should not be poured on the tick and it should not be squeezed or crushed (Table 2).

DISCUSSION

In the year 2002 there were 150 cases of CCHF with 6 deaths, this increased to 1,300 cases and 62 deaths by the year 2009 (Maltezou *et al*, 2010). Eighteen point four percent of individuals in the present study stated that they or their relatives had been bitten by ticks; in a study by Arikan *et al* (2010) in Eskisehir this number was 17.4%. Arikan *et al* (2010) found 54.3% of respondents had knowledge about CCHF and 75.2% obtained this information from the radio or television. The majority (71.8%) of respondents in our study had knowledge about CCHF and 75.2% obtained this information from radio or television. These results demonstrate radio and television

Table 2
Knowledge of respondents about prevention of CCHF (*N*=478).

	Number	%
General knowledge		
I have information about CCHF (Crimean Congo hemorrhagic fever)	343	71.8
I learned about CCHF from the radio or television	258	75.2
Relative bitten by ticks	88	18.4
Our region is at risk for tick bites	124	25.9
I can recognize ticks	293	61.3
I know when I have been bitten by a tick	219	45.8
Not all tick bites cause disease	268	56.1
CCHF is a virulent disease	372	77.8
CCHF is transmitted from human to human	158	33.1
CCHF is transmitted from animals to humans	146	30.3
Knowledge about symptoms of Crimean Congo hemorrhagic fever		
Fever	322	67.4
Fatigue	143	29.9
Rash	104	21.8
Pain	100	20.9
Vomiting, diarrhea	87	18.2
Lack of appetite	80	16.7
Bleeding	66	13.8
The state of knowing about the places ticks are found		
Ticks are found in green areas, such as in water fronts, grassy places, shrubs, meadows, vineyards, and gardens	267	55.9
Ticks are found on animals and in animal shelters	237	49.6
Knowledge about risk groups for tick bites		
Those engaged in stock breeding	207	43.3
Those engaged in farming	181	37.9
Those going on picnics or hikes	160	33.5
Those living in rural areas	118	24.7
Veterinarians and hunters	57	11.9
Knowledge about protection from tick bites		
Wear clothes covering the whole body	215	45.0
Inspect the body for ticks	73	15.3
Use tick repellent	58	12.1
Ticks should not be touched with bare hands	54	11.3
The state of information in case of tick bite		
If bitten by a tick, it is necessary to go to a health center immediately	440	92.1
Ticks should be removed with either tweezers or forceps	86	18.0
Ticks should not be killed by squeezing or crushing	434	90.8
Ticks should not be killed by a cigarette or by pouring substances, such as cologne, gas, oil or gasoline, on it	424	88.7
After tick removal the bite should be cleaned with soapy water and alcohol or cologne	189	39.5

are important means of informing the public about CCHF.

Arikan *et al* (2010) reported 59.7% of respondents stated all species of ticks cause disease, while in our study 56.1% of respondents stated not all species of ticks cause disease.

Hatipoglu *et al* (2010) found a death rate due to CCHF of 5.4% and Ertugrul *et al* (2009) found a death rate of 5.5%. Ninety-one point five percent of respondents in a study by Arikan *et al* (2010) and 77.8% of respondents in our study regarded CCHF as a virulent disease.

It has been reported transmission of CCHF from human to human is possible and has been reported in hospital related outbreaks (Taskesen *et al*, 2008). Arikan *et al* (2010) found 63.3% of respondents believed CCHF can be transmitted from human to human; in our study this rate was 33.1%.

Yilmaz *et al* (2009) reported the symptoms seen in CCHF patients in their study were fatigue in 92.3%, fever in 89.4%, headache in 68.1%, muscle pain in 69.7%, nausea in 64.7%, vomiting in 42.9%, stomach ache in 32.9% and diarrhea in 24.8%. Ozkurt *et al* (2006) in a study from Erzurum, Turkey reported the symptoms seen in CCHF were uneasiness, muscle pain and fatigue in 100%, headache in 76.6%, fever in 75%, nausea and vomiting in 73.3%, bleeding in 46.6%, skin rash in 35%, diarrhea in 30% and stomach ache in 28.3%. In our study symptoms seen were fever in 67.4%, fatigue in 29.9%, rash in 21.8%, pain in 20.9%, diarrhea and vomiting in 18.2%, loss of appetite in 16.7% and bleeding in 13.8%.

Arikan *et al* (2010) reported 95.1% of respondents stated ticks were found in rural areas and 89.1% stated ticks were animal related. Taskesen *et al* (2008) reported 53% of tick bites occurred in rural areas. In a study conducted in Erzurum, Ozkurt *et al* (2006) also found most tick bites occurred in rural areas. In our study, 55.9% of respondents stated ticks are found in green areas, such as in water fronts, grassy places, shrubs, gardens and meadows; 49.6% stated ticks are found on animals and in animal shelters.

CCHF has been reported to occur more commonly among farmers and people engaged in stock breeding (Al *et al*, 2008; Bartosik *et al*, 2008; Gunes *et al*, 2009). Forty-three point three percent of respondents in our study stated those engaged in stock breeding are at higher risk for tick bites and 37.9% stated those engaged in farming are at higher risk for tick bites.

People living in endemic regions should avoid places where ticks are common, inspect their bodies routinely for ticks and use personal protection measures, such as covering exposed parts of the body. Treating clothes with tick repellent can reduce bites, although this method has been encouraged in our country, it has not achieved successfully due to indifference of the target group and incorrect application (spraying only the lower part of the legs) (TTB, 2010). Forty-five, 15.3, 12, and 11.3% of respondents in our study stated the necessity of wearing clothes to cover exposed areas, carefully inspecting the body, using tick repellent and not touching ticks with bare hands were preventive measures, respectively. The respondents in our study had inadequate knowledge about CCHF and tick bite protection.

Removing ticks immediately (first 24 hours) is important to reduce the risk of contracting CCHF (Elston, 2010; TTB, 2010). Ticks should be grasped with plastic tweezers as close to their mouthparts as

possible without squeezing the body part (Elston, 2010). Removing ticks with tweezers instead of bare hands is the most commonly recommended method of tick removal (Kara, 2008). People who are unwilling or unable to remove ticks need to go to a health center. After tick removal, the skin should be cleaned with either soapy water or antiseptic (TBB, 2010). Fifty-eight point nine percent of respondents in a study by Arikan *et al* (2010) stated it is necessary to remove ticks with tweezers, but only 18% of respondents in our study stated it is necessary to remove ticks with tweezers or forceps. Sumer (2010) found 81.5% of ticks were removed by doctors in the health centers. Ninety-four point three percent of respondents in a study by Arikan *et al* (2010) stated it is necessary to go to a health center immediately if bitten by a tick, this rate was 92.1% in our study. Thirty-nine point five percent of respondents in our study stated it is necessary to clean a tick bite site with soapy water, alcohol or cologne after the tick is removed.

No chemicals (cigarette, cologne, gas, oil, alcohol, ether or liquid soap) should be applied to a tick to remove it from the body since it will cause the tick vomit in the body (Taskesen *et al*, 2008; TBB, 2010). Eighty-three point seven percent of respondents in a study by Arikan *et al* (2010) stated ticks should not be killed by squeezing or be grabbed with the bare hands; 70.9% said ticks should not be killed with a cigarette or by pouring chemicals on them, such as cologne or gasoline. Ninety point eight percent of respondents in our study stated ticks should not be killed by squeezing or crushing and 88.7% stated ticks should not be killed by a cigarette or by pouring chemicals on them, such as cologne or gasoline.

The results of our study show respondents had inadequate knowledge about protection from CCHF as well as inadequate knowledge about how to remove ticks correctly. Radio and television should by used to educate the public about how to prevent tick bites and the correct method for removing ticks.

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