O R I G I N A L P A P E R

Nursing Students' Knowledge about the Crimean-Congo Haemorrhagic Fever in the Endemic Regions

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Abstract

Aim: This study was conducted to determine the knowledge levels of the nursing students working in an endemic region about Crimean-Congo hemorrhagic fever (CCHF).
Methods: This descriptive study involved 290 baccalaureate nursing students. Data were collected by means of a questionnaire.
Results: Half of the students indicated that following up a patient with CCHF makes nursing a highly risky profession. The participating students were found to be unwilling to deal with patients with CCHF because of the obscurities about the ways people contract the disease.
Conclusions: To improve nursing students unwilling to care for CCHF, particular emphasis should be placed on the training of nursing students as skilled nursing staff with humane attitudes towards CCHF.

Keywords: CCHF, infectious diseases, knowledge levels, nursing students

Introduction

Crimean-Congo Haemorrhagic Fever (CCHF) is a fatal tick-borne zoonotic disease and people contract CCHF virus as a result of bites of the Hyalomma ticks (Kalaycıoğlu et al., 2013). Having emerged first in Crimea in 1944, the CCHF is sporadic and endemic in Northern Europe, Asia, Middle East, and Africa. Observed as an epidemic in Turkey for the first time in 2002, CCHF becomes prevalent during the months between April and October (Kara, 2006; Çevik, et al. 2007; Yapıcı, et al., 2010; Sümer, 2010; Mardani & Pourkaveh, 2012). CCHF indicates such strong symptoms as mortality in humans while it has no symptoms for the animals. A total of 5317 CCHF cases have been reported in Turkey, with 267 of them (5%) resulting with death. Due to the increased number of deaths resulting from tick bites, some campaigns have been conducted in

Turkey to avoid CCHF and raise awareness about it. However, CCHF still remains a serious problem for Turkey (Karti et al., 2004; Elaldı, 2010; kader et al.,2011).

CCHF directly affects the health staff as it poses nosocomial infection risks to them. It is therefore necessary for the health staff to take related safety measures. It has been reported that a significant number of health staff get infected with viral hemorrhagic fevers in various parts of the world, particularly in Africa (Ergönül, 2006). Especially in cases in which there is blooding in the infected area as well as oral or vaginal blooding, the infection risk is remarkably high for the health staff directly involved in the patient's care. So far, it has been reported that five health staff members have caught CCHF in Turkey, two of whom lost their lives. The protective measures to be taken in hospitals regarding the CCHF infection is of great significance for preventing the disease from spreading in the society (D'Alessandro et al., 2014; Mertensa et al., 2013; Ergönül et al.,2006; Mardani et al., 2007).

Nursing students are exposed to many occupational potentially fatal infectious diseases during their students and occupational lives. There is no effective means of protection and no vaccinations for Crimean-Congo Haemorrhagic Fever (CCHF) are available. Additionally, the serious prognose of CCHF increase the importance of this subject (Unver et al., 2012). In general, nursing students, as a subgroup of healthcare providers exposed to an occupational risk of CCHF infection due to direct contact with blood and bodily fluids during clinical practice attitudes, have been reported to tend to have negative attitudes towards CCHF patients(D'Alessandro et al., 2014; Kiliç Akça , Başer & Gül Kuzucu, 2013; Özer et al.,2010; Mertensa et al., 2013; Ergönül et al.,2006; Mardani et al., 2007).

Yozgat is among the endemic regions for CCHF. In epidemic regions, nursing students doing clinical internships in emergency and infectious diseases services frequently encounter CCHF cases from April to October. It should be taken into account that there may be life-threatening infections when the health staff fail to obey the necessary protection rules. There is a wide range of research on CCHF in the relevant literature. However, studies dedicated to the health staff in the endemic regions is rather limited in number.

This is a descriptive study which attempts to assess the knowledge levels of the student nurses about CCHF. It is expected that the findings of this study will contribute to their educational curriculum and inform the student nurses to take the related protective measures in their nursing practices.

Methods

Study Design and Sample

The study was conducted on the nursing students at University in the city endemic region, which is situated in the middle and the mid-northern part of Turkey, where the CCHF is quite prevalent. The data was gathered in October and December during the 2012-2013 academic year. The sample of the study included 310 nursing students (first, second, third and fourth grade) who have submitted their written consent to 290 participate voluntarily in the study. Nursing students were present inclass on the day the questionnaire was administered.

Instrument

Data were gathered by means of a questionnaire which was developed according to the relevant literature (Mardani et al., 2007; Jagger, 2007; Rahnavardia et al., 2008; Bulut et al., 2009; Yılmaz et al., 2009; Özer et al., 2010; Kader et al., 2011; Kiliç Akça , Başer & Gül Kuzucu, 2013). Along with questions addressed to identify the demographic properties of the participants, the questionnaire included 50 items about the prevalence of CCHF in Turkey, its seasonal distribution, its incubation time, basic clinical and laboratory symptoms, tick removal, how to approach a patient with CCHF, disinfection of the contaminated area, and the basic properties of the virus. Filling in the questionnaire form required 25-30 minutes.

Statistical Analysis

The data received through the questionnaires were then transferred into Stata 11 (College Station, Texas, The USA) for analyses. Descriptive statistical analysis was used to calculate frequencies, mean values, and range. *P* values <0.05 were considered statistically significant.

Ethical Considerations

Necessary permissions to conduct the study were obtained from the Ethics Committee of The Faculty of Medicine and The Health School at University.

Results

Demographic characteristics and their knowledge levels about CCHF

The mean age of the participants in the study was 19.9±1.9, with 79.7% being female students, and 34.5% being second year students at the four-year Health School. 4.5% of the students reported that they did internship in services which had a patient with CCHF. 95.2% of the students noted that the CCHF disease occurs as a result of virus-carrying tick bites while 58.6% of them reported that people get infected as a result of getting into contact with the blood or liquid substances of the CCHF patient. The participating students indicated that they got informed about CCHF by means of the internet-mass-media (69.7%), during their education (20%), and through seminars and conferences (10.3%). However, only 34.8% of the students claimed sufficient knowledge about CCHF (Table 1).

General opinions of the nursing students about CCHF

The student nurses reported (a) that the CCHF was a disease resulting from the virüs infecting the human body (81.7%), (b) that this infection occurs via ticks (94.1%), (c) that it becomes prevalent during the summer months (92.4%), (d) that its incubation time is 1 to 10 days (75%), and (e) that people going to the countryside or the woods need to wear clothes covering their whole body, and to spray insecticides onto open parts of their body. 72.4% of the student nurses reported that not all the ticks infect the disease (72.4%), and that nothing should be spread onto the ticks before their removal from the body (78.6%) (Table 2). 76.9% of the student nurses have reported that CCHF is potentially contagious in terms of nosocomial infection, that the health staff who contacted infected blood or tissue need to be observed on a daily basis for temperature and symptoms for a period of 14 successive days after the first contact, and that an efficient and safe vaccination to protect from the disease is still not available (Table 2). Half of the students indicated that following up a patient with CCHF makes nursing a high risk profession. They also reported that they are afraid of catching the disease although they know everything about how humans contract it. In addition, 38.6% of the nursing students stated that they would rather not work with a patient with CCHF if they were given a chance not to do so.

Nursing student's opinions on individuals with suspected CCHF

As regards the opinions of the participating students about how to approach a patient with suspicion of CCHF, 88.3% of them indicated that the patient should be hospitalized, and 90.7% suggested that contact isolation measures be taken (Table 3). About one third of the students reported that the use of 1/10 liquid bleacher is sufficient for disinfecting the areas contaminated with the patient blood or body fluids (Table 3).

Knowledge of Nursing student's about clinical and laboratory findings CCHF

As for the symptoms of CCHF, the student nurses indicated the following clinical symptoms (in order of frequency): fever (96.7%), weakeness (90.0%), nausea and vomiting (82.8%), muscular pain and bleeding (54.1%) . Regarding the laboratory symptoms, they mentioned reproduction in the blood culture (54.1%), leukopenia (47.2%), thrombocytopenia (45.2%), and elevation in ALT/AST (43.1%) (Table 4).

Discussion

As part of their professional responsibilities, the health staff/nursing students always encounter infectious diseases as they come into direct contact with all kinds of patients in clinic and field. CCHF is a fatal viral infection which has been identified in Africa, Asia, Western Europe, and The Middle East. The lack of an efficient treatment (e.g. a vaccination) and the seriousness of its prognosis increases the significance of CCHF (Jagger, 2007; D'Alessandro et al., 2014). Within the current study 76.9% of the student nurses were found to report that CCHF is potentially contagious as a hospital-based infection, that the health staff who come into contact with the infected blood or tissue should be observed daily for temperature and symptoms for a period of 14 successive days after the first contact, and that an efficient and safe vaccination to protect from the disease is still lacking

The study revealed that the nursing students get informed about CCHF primarily through internet, and that only one third of them consider their knowledge as satisfactory. In a study conducted on nursing students by Özer and his colleagues, it was found that the students get informed about CCHF chiefly during their nursing education and practices (Sheikh et al., 2004). In a study conducted on the nurses in endemic regions, it was observed that over half of them (68.5%) have enough knowledge about CCHF, and that they get this knowledge mostly by means of in-service training, media, seminars and conferences, and books (Kiliç Akça , Başer & Gül Kuzucu, 2013).

Table 1. The demographic characteristics of the participants and their knowledge levels about CCHF (n=290)

Demographic Characteristics	**n (%)**
Age mean	19.9±1.9
Gender	
Female	231 (79.7)
Male	59 (20.3)
Collage Year	
First year	93 (32.1)
Second year	100 (34.5)
Third year	56(19.3)
Fourth year	41(14.1)
Do you have enough information about CCHF	
Yes	101 (34.8)
No	189 (65.2)
Nursing students main sources of CCHF information	
İnternet-mass media	202 (69.7)
Nurse training	58 (20.0)
Seminars/conferences	30 (10.3)
Working with an individual with CCHF	
Yes	13 (4.5)
No	277 (95.5)
Path of transmission *	
The bite of ticks infected with the virus	276 (95.2)
Contact with diseased individual's body fluids and blood	170 (58.6)
Contact with diseased animal's body fluids and blood	156 (53.8)
Tick bite eating the flesh of animals	82 (28.3)
Respiratory	29 (10.0)
People considered to be at highest risk *	
People living in rural areas	261 (90.0)
Campers / picnickers	249 (85.9)
Agricultural workers	248 (85.8)
Meat products workers	244 (84.1)
Forest workers	233 (80.3)
Veterinary	178 (61.4)
Slaughterhouse workers and butcher	100 (34.5)
Soldiers	92 (31.7)

Table 2. General opinions of the nursing students about CCHF(n=290)

Knowledge Status	True (n%)	False (n%)
The disease develops as a result of CCHF virus infecting the human body.	237(81.7)	53(18.3)
CCHF virus can infect the body through ticks.	273(94.1)	17(5.9)
All the ticks in nature can potentially carry and infect the CCHF virus.	80(27.6)	210(72.4)
CCHF disease becomes prevalent particularly during the summer months.	268(92.4)	22(7.6)
The incubation time fort he CCHF disease is 1-10 days that follow the tick bite.	220(75.9)	70(24.1)
The ticks stuck to the body should be removed by dropping a killing substance onto them.	62(21.4)	228(78.6)
The people going to the countryside should wear clothes to cover their bodies and should spray insecticides to the open parts if necessary.	280(96.6)	10(3.5)
CCHF is contagious as a hospital-acquired infection.	223(76.9)	67(23.1)
The health staff who come into contact with the infected blood or tissue should be observed daily in terms of temperature and symptoms for a period of 14 successive days after the first contact	245(84.5)	45(15.5)
There is not an efficient and safe vaccination for humans to protect from CCHF yet.	207(71.4)	83(28.6)
CCHF patient follow-up makes my job highly risky.	145(50.0)	145(50.0)
Although I know everthing about how CCHF infects, I am still afraid of catching the disease	176(60.7)	114(39.3)
If you have a choice, I prefer to work with patients CCHF.	112(38.6)	178(61.4)

Table 3. Nursing student's opinions on individuals with suspected CCHF(n=290)

Nursing student's opinions	True n(%)	False n(%)
Hospitalized	256(88.3)	34(11.7)
Contact isolation be used during contact with patients	263(90.7)	27(9.3)
Gloves be used during contact with patients	286(98.6)	4(1.4)
Mask be used during contact with patients	178(61.4)	112(38.6)
The environment contaminated with the blood or body fluids of a CCHF patient should be disinfected by means of 1/10 liquid bleach.	93(32.1)	197(67.9)

Table 4. Knowledge of Nursing student's about clinical and laboratory findings CCHF (n=290)

Clinical findings	True n(%)	False n(%)
Fever	281 (96.9)	9 (3.1)
Nausea and vomiting	240 (82.8)	50 (17.2)
Weakness	261 (90.0)	29 (10.0)
Widespread pain	222 (76.6)	68 (23.5)
Bleeding	157 (54.1)	133 (45.9)
Diarrhea	97 (33.5)	193 (66.6)
Dysuria	48 (16.6)	242 (83.5)
Constipation	33 (11.4)	257 (88.6)
Laboratory findings		
Blood culture	157 (54.1)	133 (45.9)
Thrombocytopenia	131 (45.2)	159 (54.8)
Leukopenia	137 (47.2)	153 (52.8)
Highest ALT/AST level	125 (43.1)	165 (56.9)
Highest lactic dehydrogenase level	88 (30.3)	202 (69.7)
Highest creatinine phosphokinase level	106 (36.6)	184 (63.5)
Anemia	122 (42.1)	168 (57.9)
Urine culture	93 (32.1)	197 (67.9)
Polycythemia	80 (27.6)	210 (72.4)
Vitamin B_{12} deficiency	79 (27.2)	211 (72.8)

In similar studies in the endemic regions in some other counties, the majority of the health staff indicated that they get their knowledge about CCHF through posters and broshures, internet, and their friends(Mardani et al., 2007; Rahnavardia et al., 2008; Sheikh et al., 2004; Özer et al.,2010).

Almost all of the nursing students reported that CCHF emerges as a result of virus-carrying tick bites. However, 41.4% of the students were found not to accurately indicate that CCHF occurs as a result of coming into contact with the blood or body fluids of a patient. Our findings demonstrate that the knowledge of the student nurses about the ways humans acquire CCHF infection is insufficient. In Özer et al's study, the students stated that CCHF infection takes place as a result of tick bite (93.7%) and coming into contact with the patient's blood or body fluids (75.8%). In another study, almost all of the nurses correctly indicated that the cause of the disease is the virus, and that infection may occur as a result of tick bite, contact with the blood or body fluids of the patient, contact with mucous membrane, and inhalation (Özer et al.,2010)..

It has been stated in the literature that the removal time of the tick from the body is of great significance. It has been emphasized that the tick need to be removed in the shortest time possible without crushing it, removing its mouth, or spreading any chemical substance onto it. Removing the tick mechanically is the most widely advised method today. The tick should never be removed with bare hand (Harxhi et al., 2005; Kara, 2006; Bulut et al., 2009). Three forth of the nursing students in this study stated that the tick should be removed within the shortest time without spreading any substance onto it. In some other similar studies, it has been found that more than half of the nurses or the students reported that the tick need to be removed as mentioned above and by means of a forceps from the nearest point to the skin (Kader et al., 2011; Rahnavardia et al., 2008; Sheikh et al., 2004; Yılmaz et al., 2009).

Over the recent years, it has been observed that the high mortality rates of and the obscurities about CCHF infection have also affected the attitudes and behaviours of the health staff toward patients with CCHF. Half of the students indicated that following up a patient with CCHF makes nursing a highly risky profession. They also reported that they are afraid of catching the disease although they know everything about how it infects, with 38.6% of them declaring that they would rather not work with a patient with CCHF if they were given a chance not to do so. In a related study, it was revealed that the majority of the nurses in emergency clinics were reluctant to work with patients with CCHF. In the same study, the nurses who had already dealt with CCHF patients were found to be unwilling to work with them any more (Kiliç Akça , Başer & Gül Kuzucu, 2013).

In the diseases holding nosocomial infection risks, it is of great importance to protect the health staff and others around the patient (D'Alessandro et al., 2014; Uğurlu, Uzun & Soydal 2004). The majority of the nursing students reported that patients with a suspicion of CCHF should be hospitalized. Moreover, nearly all of them indicated that isolation measures need to be taken and gloves need to be worn before contact.

Half of the students stated masks should be used. In some other studies as well, it was found that almost all the participating health staff indicated that they used gloves, with half of them stating that they additionally used masks (Özer et al.,2010; Kiliç Akça , Başer & Gül Kuzucu, 2013; Bulut et al., 2009). In another study which involved the health staff, nearly all of the nurses were found to wear both gloves and masks when dealing with a patient with a suspicion of CCHF. In a study conducted by Rahnavardi and his collegues in 2008, a vast majority of the nurses reported that universal protection methods are essential in order to avoid percutaneous infection (Gozel et al., 2013; Rahnavardia et al., 2008; Jagger, 2007; Ergönül et el., 2007). In the current study, it was observed that the knowledge of the nursing students about the isolation measures and the use of gloves were adequate, while their knowledge about the use of masks was not. Regarding the clinical symptoms of CCHF, the student nurses pecified fever, prostration, nausea and vomiting, muscular pain and bleeding. As for the laboratory symptoms of CCHF, they mentioned reproduction in the blood

culture, thrombocytopenia, leukopenia, and increase in ALT/AST. Similarly, in another relevant study, nursing students accurately specified the symptoms of CCHF (Özer et al., 2010; Duran et al., 2013; Çevik, et al. 2007; Bodur et al. 2011).

Conclusion

In this study, although the nursing students' knowledge about CCHF itself is sufficient, their knowledge about the ways of infection, the laboratory symptoms, and protection measures were found to be below the desired level.

The nursing students in the endemic regions are afraid that they can contract the disease during their encounters with potential or diagnosed CCHF cases in the hospital, the countryside, or the society. This situation adversely affects the quality of the care given to the patients with CCHF. In accordance with the findings of this study, it can be suggested that the nursing students should be trained sufficiently about CCHF disease, the risk groups, tick removal, treatment, infection, and protection methods.

Limitations

As the study was conducted on nursing students in only one city where CCHF is prevalent, the findings are representative of that city and cannot be generalized for other cities. A similar study can be conducted with a larger sample which includes other cities as well.

Conflict of interest: The authors have declared that no competing interest exists.

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