eJBio

Electronic Journal of Biology, 2016, Vol.12(4): 456-463

Evaluation of Knowledge, Attitude and Perception towards Crimean Congo Hemorrhagic Fever among Students: A Cross Sectional Study

Maria Ayub*, Syeda Rida Hasnain, Fakhra Parveen, Urooj Khan, Iqra Alvi, Arooba Nasir, Hafsa Zahid, Nida Zaeem, Hafiza Iqra Batool, Hina Liaquat

Jinnah University for Women, Pakistan.

*Corresponding author. Tel: 92331-3119160; E-mail: maria.ayub2000@gmail.com

Citation: Ayub M, Hasnain SR, Parveen F, et al. Evaluation of Knowledge, Attitude and Perception towards Crimean Congo Hemorrhagic Fever among Students: A Cross Sectional Study. Electronic J Biol, 12:4

Received: August 09, 2016; **Accepted:** September 30, 2016; **Published:** October 07, 2016

Research Article

Abstract

Pakistan is considered as an endemic country for Crimean Congo Hemorrhagic Fever with sporadic cases reported during the last few years especially. The disease is transmitted mainly through infected animals directly or via infested ticks. Among all medically arboviruses and originated from segmented negative stranded RNA virus belonging to the Bunyaviridae, genus Nair virus and is characterized by acute hemorrhagic fever. The objective of the study is to evaluate the basic knowledge of CCHF, attitude towards CCHF and opinion regarding transmission of CCHF in students of different professionals. The design of the study was the cross sectional. To participate in the survey we offered the students from different departments. To participate in the survey total 100 students agreed and filled the questionnaire. A self-administered questionnaire was developed. Data was analyzed carefully by SPSS version 21. In professional education higher participation from the students of pharmacy department that constitute up to 47% while the least percentage obtained from the students of BBA that is 3%. The p-value of the entire knowledge and Attitude questions is found to be highly significant statistically. It has been concluded that inadequate knowledge has been found in our students that they even did not aware from CCHF that creates an alarming and emerging issue. Further studies regarding the knowledge, attitude and perception of CCHF should be recommended in the literature especially in students.

Keywords: Cinnamon-Congo hemorrhagic fever; Pharmacy; Cross sectional; Alarming; Literature.

1. Introduction

After dengue virus, the second most widely spread is Cinnamon-Congo hemorrhagic fever. Among all medically arboviruses and originated from segmented negative stranded RNA virus belonging to the Bunyaviridae, genus Nair virus and is characterized by acute hemorrhagic fever. This disease is basically spread by bite of an infected tick or via aerosol generated from infected animal excreta and by domestic animals to the human contact with an infected person's blood, tissue or fluid discharge is responsible for the transmission in human to the human. Some species of Rhipicephalus, Boophilus, Dermacentor and Hyalomma (in particular *Hyalomma marginatum*) involved in this disease. Additionally the vector of this disease called arthropods borne belonging to hard ticks of Ixodide family. Spreading infection of this type Argas and Ornithodoros in Argasidae family have been reported [1-5]. When ticks are more active and questing hosts for blood feeding, outbreak of this disease occur particularly in warm seasons. Between April and September most cases were reported. Increased significantly the incidence of the CCHF in the CCHF infected areas by increasing mean temperature, normalized different vegetation index, savannah-type land coverage or habitat fragmentation [6]. The spread should be further studied that may influence epidemiology that includes human behavior, climate and environmental factors. It should be considered in the potential changing epidemiology of CCHF, facilitated tick production and global warming which are mainly attributed to climate change [7]. Among the emerging disease for which control and preventive measures should be reviewed and intensified, CCHF has also listed by world health organization. Pakistan, Tajikistan, Afghanistan, Iran and Turkey are the five countries having the presence of CCHF suggested by strong evidence according to our consistence measure [8,9]. When virus antibodies were identified in the sera of 45 sheeps sent from Tehran to Moscow, CCHF was 1st reported in Iran in 1970 [10]. Antibodies of virus detected who were living in Caspian Sea littoral from

East Azerbaijan Province in 13% of people [11]. Approaching mortality rates markedly dropped 6% in 2007 from 20% in 2000. However, CCHF in the country is an emerging disease. According to the epidemiological evidences and confirmed cases, the disease was existing in almost all parts of the Iran [12]. In provinces of Sistan-va-Baluchestan, Khuzestan, Chaharmahal-va-Bakhtiari, Azerbaijan-e-Gharbi, Bushehr, Yazd, Kerman, Tehran, Esfahan, Golestan, Fars, Qom and Khorasan in Iran, in recent decades confirmed cases were reported of human that resulted in death [12-14]. By blood of infected animal or human, CCHF virus is transmitted to human [15]. Increased animal and human migration, travel, the risk of bioterrorism and ecological deterioration, accounting for spread of viral infections to new places and their incidence in endemic regions the above mentioned are the contributing factors [16]. People predispose for this viral infection includes farmers, shepherds and vertinearans demonstrated as high risk group in endemic regions who are in occupational contact with livestock and wild animals [17]. In endemic areas risk factors for tick bite are the recreational activities represented by picnic, etc. The second major group at risk for infections is health care workers caring with CCHF patients [18]. Percutaneous exposure is the highest risk of transmission [19]. In 1944 CCHF was 1st described [20,21]. Removal time of the tick from the body is of great importance has been stated in the literature. The tick need to be removed in the shortest time is possible without crushing it, removing its mouth or spreading any chemical substance on to it has been emphasized. The most advisedly method today is removing the tick mechanically. In order to remove tick, bare hand is restricted [22-24]. Avoidance of the areas where ticks are abundant is the most effective preventive measure. To protect body from the ticks when they want to go in rural areas, repellents and weared trousers are trucked in boots or socks and a long sleeved shirt trucked in at the waist [25]. Being one of the most dangerous and deadly virus, CCHF results in high fever, back pain joint, headache, vomiting and stomach pain which may progress to severe nosebleeds, bruising and continuous bleeding in humans [26]. The incubation time for the disease is 2-9 days which is directly proportional to vital in columns and the routes of exposure [27].

The objective of the study is to evaluate the basic knowledge of CCHF, attitude towards CCHF and opinion regarding transmission of CCHF in students of different professionals.

2. Methodology

The design of the study was the cross sectional was conducted from March to April in Jinnah University for women Karachi Pakistan. In this study students were offered to participate in the survey from different departments. Informed consent was taken from whole sample of students. To participate in the survey total 100 students agreed and filled the questionnaire. A self-administered questionnaire was developed which constituted about 15 questions. To access the demographic data 1st four questions were constituted while others constituted for knowledge, attitude and opinion towards CCHF. Researchers helped to understand and take part in the questionnaire as when respondent needed instruction. This study was approved by dean of department of pharmacy of Jinnah University. Data were recorded anonymously and we respected the confidentiality of respondents. Data was analyzed carefully by SPSS version 20 and categorical variables in terms of frequency and percentage while chi- square test was applied for the determination of relation between two categorical variables.

3. Results

Table 1 represented the socio-demographic characteristics in which female was participated only that is 100%. In professional education higher participation from the students of pharmacy department that constitute up to 47% followed by B.S students up to 18%, intermediate students 16%, students from the department of mass communication and English with equal participation that is 8% while the least percentage obtained from the students of BBA that is 3%. In age group, mostly participated students were the age group of 18-22 years that is 34% while the least participation was obtained from the age group of 27-30 years students that is 14%.

A significant number of students from all discipline know about Crimean Congo hemorrhage fever, i.e.,

Table 1: Sociodemographic data of the students.

S. No.	Characteristics	Percentage
1	**Gender**	
	Male	0%
	Female	100%
2	**Professional Education**	
	Pharmacy	47%
	Intermediate	16%
	B.S	18%
	Mass communication	8%
	English	8%
	BBA	3%
3	**Age Group**	
	18-22	34%
	23-26	52%
	27-30	14%

46.6% while 29.5% student does not know about this disease. Majority of the students agreed that Congo virus is caused by tick, i.e., 52.4% while 6.5% students do not agree and 42.6% do not know about it respectively. Majority of students do not know about the availability of vaccine in Pakistan, i.e., 55.7% while 16.3% knows about the vaccine and 18% do not agree with the statement, respectively.

Student's attitude towards CCHF was carefully evaluated in terms of basic attitude's statement from which those students who were strongly agreed by the statements includes the highest percentage obtained from the statement "Congo virus severely infects humans or animals" that is 70% followed by the statement "Congo virus is a serious problem" that is 65%, "Congo virus spared in a particular area" that is 64%, "Environment plays imp role for causing this disease" that is 62%, "Can you eat your livestock's meat if a ticks bites it" that is 57% and lower percentage found to be from the statement "Signs of the virus are appeared in 2 to 4 days" that is 11% students who were strongly disagreed by the statement includes the highest percentage found to be from the statement "Signs of the virus are appeared in 2 to 4 days" that is 45% followed by the statement "Can you eat your livestock's meat if a ticks bites it" that is 23%, "Congo virus is a serious problem" that is 13%, "Congo virus spared in a particular area" that is 10%, "Environment plays imp role for causing this disease" that is 9% and lower percentage found to be from the statement "Congo virus severely infects humans or animals" that is 6% .

Student's knowledge about CCHF was carefully evaluated in terms of basic knowledge statement from which those students who said Yes and highest percentage obtained from the statement "The mortality rate of this disease 50-60 in Pakistan?" that is 59% followed by the statement "In Pakistan Is the vaccine is available for this virus?" that is 54%, "This disease damages vascular system?" that is 40%, "Crimean Congo virus is mainly caused by tick bite?" that is 24% and lower percentage found to be from the statement "Do you know about Crimean Congo Hemorrhage fever?" that is 20% while those students who said No and the highest percentage obtained from the statement "In Pakistan Is the vaccine is available for this virus?" that is 27%, followed by the "Do you know about Crimean Congo Hemorrhage fever?" that is 21%, with equal percentage obtained from the statement "Crimean Congo virus is mainly caused by tick bite?" and "This disease damages vascular system?" that is 10% and lower percentage found to be from the statement "The mortality rate of this disease 50-60 in Pakistan?" that is 8%. Those students who said do not know from which highest percentage obtained by the statement "Crimean Congo virus is mainly caused by tick bite?" that is 66% while the least percentage obtained by the statement of "In Pakistan Is the vaccine is available for this virus?" that is 19% as clearly illustrated in Figure 1.

Student's opinion about CCHF transmission was carefully evaluated which those students who responded to Yes by different opinions from which highest percentage obtained from Lack of knowledge that is 40% and lowest percentage obtained from poverty that is 8% while those students who responded to No by different opinions from which

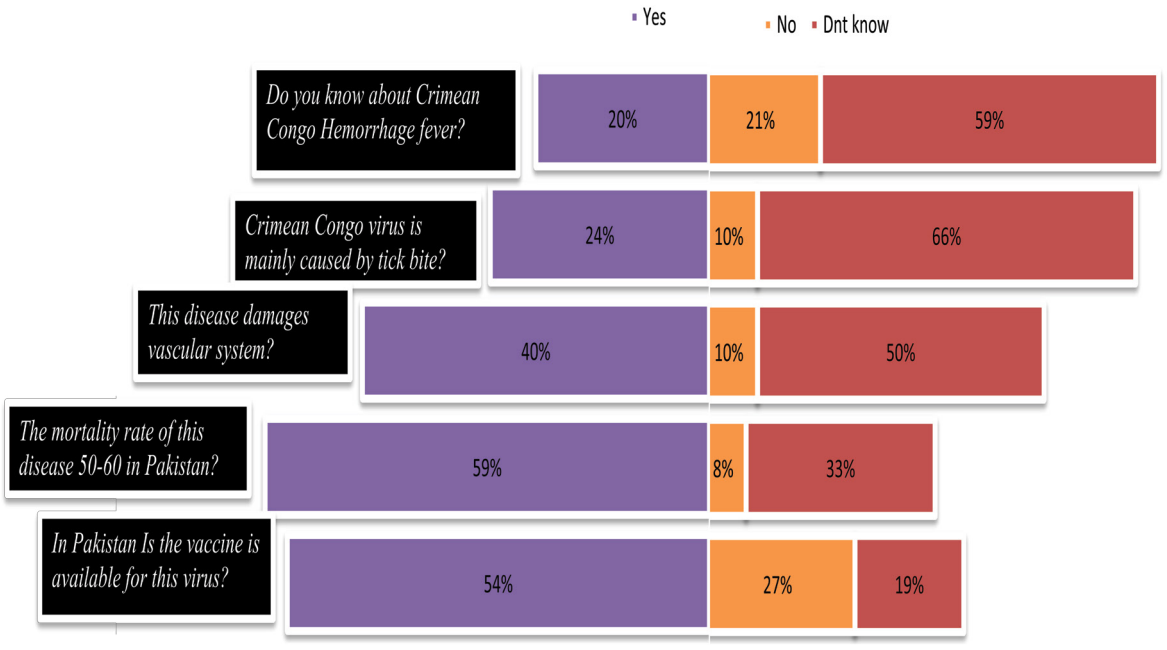

Figure 1: Showing percentages of the student's knowledge about CCHF.

highest percentage obtained from expensive test that is 94% and lowest percentage is obtained from lack of knowledge that is 60% as clearly represented in Figure 2.

This table clearly illustrated the relation between knowledge of the students by education. To analyze this relation Pearson chi-square test was applied in each question. As noted in Table 2 knowledge of CCHF, significant differences was observed between different professional departments The p-value of the entire knowledge questions is found to be 0.000* that is highly significant excepted from the question "In Pakistan Is the vaccine is available for this virus?" the p-value of this question was found to be 0.551 that is insignificant (Table 2).

This table clearly illustrated the relation between knowledge of the students by education. To analyze this relation Pearson chi-square test was applied in each question. As noted in Table 3 attitude towards CCHF, significant differences was observed between different

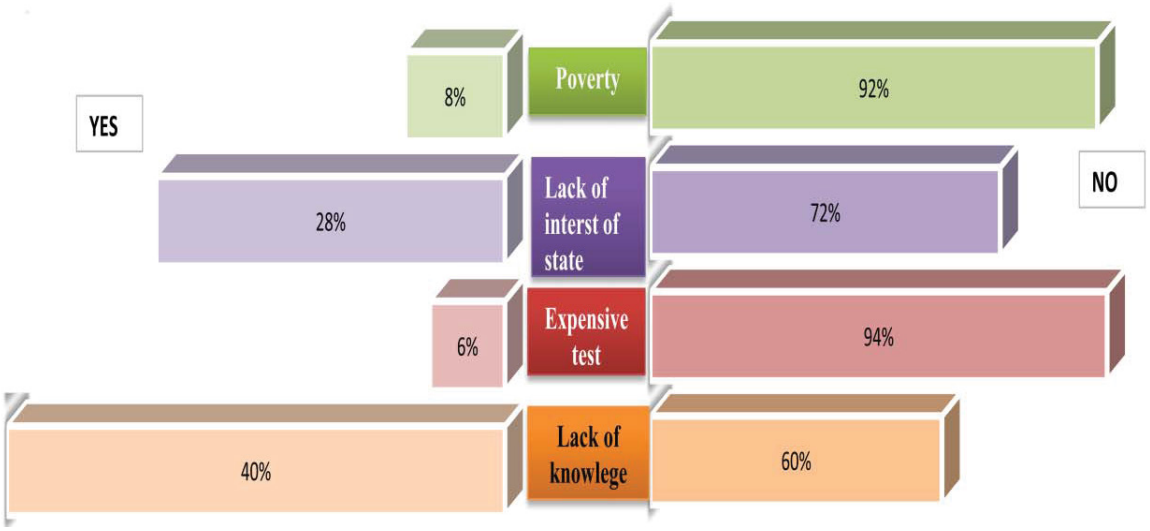

Figure 2: Showing percentages of the student's opinion about CCHF transmission.

Table 2: Showing knowledge of students about CCHF by education.

Education	Pharmacy	Intermediate	B.S	Mass communication	English	BBA	p-value
Q. No. 1: Do you know about Crimean Congo Hemorrhage fever?							
Yes	13	16	6	8	8	3	0.000*
No	15	0	12	0	0	0	
Do not know	19	0	0	0	0	0	
Q. No. 2: Crimean Congo virus is mainly caused by tick bite?							
Yes	34	4	13	3	4	1	0.000*
No	8	0	0	0	0	0	
Do not know	5	12	5	5	4	2	
Q. No. 3: This disease damages vascular system?							
Yes	34	0	6	0	0	0	0.000*
No	10	0	0	0	0		
Do not know	3	16	12	8	8	3	
Q. No. 4: The mortality rate of this disease 50-60 in Pakistan?							
Yes	24	0	0	0	0	0	0.000*
No	10	0	0	0	0	0	
Do not know	13	16	18	8	8	3	
Q. No. 5: In Pakistan Is the vaccine is available for this virus?							
Yes	13	3	0	0	4	0	0.551
No	0	9	5	5	0	2	
Do not know	34	4	13	3	4	1	

P-value calculated through chi-squared test, significance p<0.005. *significant

Table 3: Showing attitude of students towards CCHF by education.

	Pharmacy	Intermediate	B.S	Mass communication	English	BBA	p-value
Q. No. 1: Congo virus is a serious problem							
Strongly agree	21	3	0	0	2	0	0.000*
Agree	16	13	18	8	6	3	
Strongly disagree	10	0	0	0	0	0	
disagree	0	0	0	0	0	0	
Q. No. 2: Environment plays imp role for causing this disease							
Agree	15	0	0	0	0	0	0.000*
Strongly agree	19	14	18	8	8	3	
Disagree	4	2	0	0	0	0	
Strongly disagree	9	0	0	0	0	0	
Q. No. 3: Can you eat your livestock's meat if a ticks bites it							
Agree	9	4	0	0	0	0	0.000*
Strongly agree	4	3	0	0	4	0	
Disagree	34	0	11	0	0	0	
Strongly disagree	0	13	7	8	4	3	
Q. No. 4: Signs of the virus are appeared in 2 to 4 days							
Agree	9	0	0	0	0	0	0.000*
Strongly agree	34	4	13	2	4	0	
Disagree	4	5	5	5	4	0	
Strongly disagree	0	7	0	1	0	3	
Q. No. 5: Congo virus severely infects humans or animals							
Agree	0	9	5	4	0	3	0.000*
Strongly agree	37	4	13	4	4	0	
Disagree	2	3	0	0	4	0	
Strongly disagree	8	0	0	0	0	0	
Q. No. 6: Congo virus spared in a particular area							
Agree	0	8	0	3	0	3	0.000*
Strongly agree	34	5	18	4	4	0	
Disagree	5	3	0	1	4	0	
Strongly disagree	8	0	0	0	0	0	

P-value calculated through chi-squared test, significance p<0.005. *significant

professional departments The p-value of the entire Attitude questions is found to be 0.000* that is highly significant. In opinion of student CCHF is caused by both DNA and RNA 52.4%. According to students mostly CCHF occur in summer season (72.1%) (Table 4).

A significant number of student enrolled in our survey were of perception that major reason of CCHF virus in Pakistan is lack of knowledge 65.5%, expensive test 9.8%, poverty 45.9%, lack of interest of the state 13.1% respectively. Above chart shows the opinion of people, those who believe that this disease is occurring and spreading due to Lack of knowledge 65.5%, Expensive test 9.8%, Poverty 45.9%, Lack of interest of the state 13.1%, respectively.

4. Discussion

This study was basically conducted in order to rule out the knowledge and attitudes especially in students because there is very minor literature from Pakistan that evaluated the knowledge and attitude with perception about CCHF. This article is based on a disease known as Crimean-Congo hemorrhagic fever .Crimean–Congo hemorrhagic fever (CCHF) is a widespread tick-borne viral disease that is endemic in Africa, the Balkans, the Middle East and Asia. The virus is a member of the Bunyaviridae family of RNA viruses. It is a zoonotic disease carried by several domestic and wild animals. While clinical disease is rare in infected animals, it is severe in infected humans, with a mortality rate of 10-40%. Outbreaks of illness are usually attributable to Hyalomma tick bites or contact with infected animals or people. The rate of accurate knowledge about this disease in participants is very low according to our results it is 29% from this we observed that people are less aware of this disease. About 33% of participants know that this disease is

Table 4: Students perceptions about crimean-congo hemorrhagic fever (CCHF).

Barriers of participants about CCHF	A (%)	B (%)	C (%)	D (%)
This disease is caused by RNA virus or DNA virus?	12 (19.6)	11 (18.0)	32 (52.4)	6 (9.8)
What are the symptoms of CCHF?	18 (29.5)	2 (3.27)	---- (0)	41 (67.2)
Which season is CCHF common?	6 (9.8)	44 (72.1)	4 (6.5)	7 (11.4)
How do you remove the tick when it embeds your livestock or pet?	14 (22.9)	1 (1.6)	17 (27.8)	29 (47.5)
The disease is transmitted by?	5 (8.1)	16 (26.2)	40 (66.6)	6 (9.1%)

caused by a tick bite which is known as Hyalomma. during survey we have observed that some people have misconception relating to this disease that may be it is transmitted through mosquitos. However, mosquito bite cannot transmit this disease because virus is unable to survive and replicate within the mosquito gut. Differences in the results obtained and then it is concluded that this disease is caused by tick bite not by mosquito or other insect .A significant number of participants does not know that this disease may cause damage to vascular system the reason behind this damage is that A common pathogenic feature of hemorrhagic fever viruses is their ability to disable the host immune response by attacking and manipulating the cells that initiate the antiviral response. In order to find their weaknesses, assess the knowledge, attitude and practice of related staff as one of the high risk groups is the first priority and necessity, to overcome the disease by designing a proper educational plan at different educational and executive levels with assistance from related, so that essential steps can be taken. If we see the previous literature that described CCHF is the nosocomial infection [28-33]. So most of the participants are from the pharmacy department that is 47%.As in infection prevention and control programs in health system, pharmacist have responsibility [34]. According to the students we identified in this study that most of the student's event do not know about the CCHF because only 20% of the students know about CCHF and the ratio of those which did not know about CCHF are the 59% that creates an alarming issue. Addition to this another important point which has evaluated by this study that only 24% of the students consider that CCHF is transmitted through the tick bites and 66% of the students did not consider it means that they have no idea about the main organism behind this pathogen this is due to the insignificance study of CCHF in the literature. In past studies important drivers of CCHF infection have been considered the Temperature, precipitation and moisture indices [35-40]. This study also evaluated the knowledge of this basic factor with regards to the attitude among students and got good result that can consider the positive sign of this study which have ratio about 66%. In animals, there is no evidence of apparent clinical presentation but in disease transmission cycle, acting as reservoirs for continued tick re-infection by both wild and domesticated animals [41,42].

Although, whole study proves that most respondents demonstrated average knowledge about transmission and manifestation of Congo virus and majority of participants 37% according to our results does not know the mortality rate (death rate) of this disease which is about 10-40%. Study participants knew about the unavailability of medications that can cure Congo virus .currently the medications available for treating this disease. Ribavirin is the drug of choice as an antiviral agent for infected patients. However, use of ribavirin remains uncommon for several reasons. First, ribavirin use has not been tested in randomized clinical trials, since ethical constraints do not allow such a study design, although its effectiveness has been described in observational studies. Second, a decision concerning which CCHFV-infected patients should be given ribavirin may be difficult. Since severe cases need to be treated, categorization of the patients according to the severity of the infection is an essential first step in deciding whether to initiate antiviral therapy. attitudes of health care students providing care to conga virus were poor .despite the students know that Congo virus is a serious disease but on the other side they do not know that environment does not play role in the transmission of this disease Typically, after a 1–3 day incubation period following a tick bite (5–6 days after exposure to infected blood or tissues), flu-like symptoms appear, which may resolve after one week. In up to 75% of cases, however, signs of hemorrhage appear within 3–5 days of the onset of illness in case of bad containment of the first symptoms: first mood instability, agitation, mental confusion and throat petechial, then soon nosebleeds, and vomiting, and black stools. The liver becomes swollen and painful. Disseminated intravascular coagulation may occur as well as acute kidney failure and shock, and sometimes acute respiratory distress syndrome. Patients usually begin to show signs of recovery after 9–10 days from when the symptoms appear, however 30% of the cases result in death on the second week of the illness. Protective clothing and gloves should be used whenever there is chance of contact with skin or mucous membranes of viremia animals, particularly when blood and tissues are handled. Consumption of unpasteurized milk and uncooked meat should be avoided. Human-to-human transmission of CCHF virus is seen when direct contact with blood and body fluids occurs, especially in a healthcare setup

when appropriate infection control measures are not taken. Strict universal precautions are necessary when caring for patients and this can be achieved by barrier nursing, isolation, and use of protective gears such as gloves, gowns, face-shields, and goggles with side shields. Safe burial practices, including the use of liquid bleach solution as a disinfectant, and covering the body in polythene bags have been published. Laboratory workers must follow stringent biosafety precautions and viral isolation techniques should be carried out in laboratories where biosafety level 4 is available. CCHFV can be inactivated by disinfectants including 1% hypochlorite and 2% glutaraldehyde; these can be destroyed by heating at 56°C (133°F) for 30 min. Prophylactic treatment with ribavirin has occasionally been used after high-risk exposures but its role is controversial.

students opinions that what are the major reasons of Crimean Congo virus in Pakistan is lack of knowledge this is the major reason because people are less aware of this disease thy even do not know the signs and symptoms related to this disease .this article helps people to get knowledge and awareness about this disease. This finding is the further affirmation to the previous finding which states that study participants.

5. Conclusion

The research and studies regarding Crimean–Congo Hemorrhagic Fever (CCHF) shows that it is a serious health issue. As the survey states that only 50% of the population are aware of CCHF. Itis widespread tick-borne viral disease which is familiar in eastern countries. CCHF leads to overall damage in the vascular system. It is mainly treated by anti-viral drugs such as Ribavirin. The mortality rate of CCHF is quite high in Pakistan. On the other hand Environment plays a vital role in giving rise to CCHF which affects livestock and people living in a particular area. People should wear gloves and cover themselves properly when their livestock or pets are infected with CCHF. Awareness campaigns should be held so that more and more people become aware of such fatal viral infections.

References

[1] Duh A, Saksida M, Petrovec S, et al. (2007). Viral load as predictor of Crimean-Congo hemorrhagic fever outcome *Emerg Infect Dis.* **13:** 1769–1772.

[2] Messina JP, Pigott DM, Golding N, et al. (2015). The global distribution of Crimean-Congo hemorrhagic fever. *Trans R Soc Trop Med Hyg.* **109:** 503–513.

[3] Tahmasebi F, Ghiasi SM, Mostafavi E, et al. (2010). Molecular epidemiology of Crimean-Congo hemorrhagic fever virus genome isolated from ticks of Hamadan Province of Iran. *J Vector Borne Dis.* **47:** 211–216.

[4] Telmadarraiy Z, Ghiasi SM, Moradi M, *et al.* (2010). A survey of Crimean-Congo haemorrhagic fever in livestock and ticks in Ardabil Province, Iran during 2004–2005 Scand. *J Infect Dis.* **42:** 137–141.

[5] Wölfel R, Paweska JT, Petersen, et al. (2007). Virus detection and monitoring of viral load in Crimean-Congo hemorrhagic fever virus patients. *Emerg Infect Dis*. **13:** 1097–1100.

[6] Vescio FM, Busani L, Mughini-Gras L, et al. (2012). Environmental correlates of Crimean-Congo haemorrhagic fever incidence in Bulgaria. *BMC Public Health.* **12:** 1116.

[7] Maltezou HC, Andonova L, Andraghetti R, et al. (2010). Crimean-Congo hemorrhagic fever in Europe: Current situation calls for preparedness. *Euro Surveill.* **15:** 19504.

[8] Yolcu S, Kader C, Kayipmaz AE, et al. (2014). Knowledge levels regarding Crimean-Congo hemorrhagic fever among emergency healthcare workers in an endemic region. *J Clin Med Res.* **6:** 197–204.

[9] Ali Z, Kumar R, Ahmed J, et al. (2013). Mureed knowledge, attitude and practice of Crimean-Congo hemorrhagic fever among rural population of Baluchistan, Pakistan. A public health nutritional assessment of elderly in Islamabad: A mixed method study. *J Publ Health.* **3:** 11–13.

[10] Izadi S, Salehi M, Holakouie-Naieni K, et al. (2008). The risk of transmission of Crimean-Congo hemorrhagic fever virus from human cases to first-degree relatives. *Jpn J Infect Dis.* **61:** 494–496.

[11] Jabbari A, Tabasi S, Abbasi A, et al. (2012). Alijanpour Crimean-Congo hemorrhagic fever: Treatment and control strategy in admitted patients. *Casp J Intern Med.* **3:** 443–444.

[12] Chinikar S, Ghiasi SM, Moradi M, et al. (2010). Geographical distribution and surveillance of Crimean-Congo hemorrhagic fever in Iran. *Vector Borne Zoonotic Dis.* **10:** 705–706.

[13] Chinikar S. (2009). An overview of Crimean-Congo hemorrhagic fever in Iran Iran. *J Microbiol.* **1:** 7–12.

[14] Williams RJ, Al-Busaidy S, Mehta FR, et al. (2000). Crimean-Congo haemorrhagic fever: A seroepidemiological and tick survey in the Sultanate of Oman. Trop Med Int Health. **5:** 99–106.

[15] Ansari H, Shahbaz B, Izadi S, et al. (2014). Crimean-Congo hemorrhagic fever and its relationship with climate factors in southeast Iran: A 13 year experience. *J Infec Dev Ctries.* **8:** 749–757.

[16] Bakir M, Ugurlu M, Dokuzoguz B, et al. (2005). Turkish CCHF Study Group Crimean-Congo haemorrhagic fever outbreak in Middle Anatolia: A multicentre study of clinical features and outcome measures. *J Med Microbiol.* **54:** 385–389.

[17] Flick R, Whitehouse CA. (2005). Crimean-Congo hemorrhagic fever virus. *Curr Mol Med.* **5:** 753–760.

[18] Ergonul O, Zeller H, Celikbas A, et al. (2007). The lack of Crimean-Congo hemorrhagic fever virus antibodies in healthcare workers in an endemic region. *Int J Infect Dis.* **11:** 48–51.

[19] Simpson DI. (1978). Viral haemorrhagic fevers of man. *Bull World Health Organ.* **56:** 819–832.

[20] Mardani M. (2001). Nosocomial CrimeaneCongo

haemorrhagic fever in Iran (1999-2000) 11th European congress of clinical microbiology and infectious disease, Istanbul, Turkey. P1044.

[21] Altaf A, Luby S, Ahmed AJ, et al. (1998) Outbreak of Crimean-Congo haemorrhagic fever in Quetta, Pakistan: Contact tracing and risk assessment. *Trop Med Int Health.* **3:** 878–882.

[22] Bulut C, Yetkin MA, Hatipoğlu AC, et al. (2009). Evaluation of knowledge of the healthcare workers regarding Crimean-Congo haemorrhagic fever. *Klimik Dergisi.* **22:** 14-17.

[23] Harxhi A, Pilaca A, Delia Z, et al. (2005) Crimean-Congo hemorrhagic fever: A case of nosocomial transmission. *Infection.* **33:** 295-296.

[24] (1998). Crimean-Congo hemorrhagic fever, fact sheet no. 208.

[25] Kara A. (2006). Crimean-Congo hemorrhagic fever. *Çocuk Sağlığı ve Hastalıkları Dergisi.* **49:** 175-184.

[26] Ergonul o. (2016). Crimean-Congo hemorrhagic fever, *Journal Eid*. **19:** 200-215.

[27] Hewson R, Chamberlain J, Mioulet V, et al. (2016). Crimean-Congo hemorrhagic fever virus in livestock ticks and animal handler seroprevalence at an abattoir in Ghana. *BMC Infect Dis.* **16:** 324.

[28] Ali Z, Kumar R, Ahmed J, et al. (2013). Mureed knowledge, attitude and practice of Crimean-Congo hemorrhagic fever among rural population of Baluchistan, Pakistan. A public health nutritional assessment of elderly in Islamabad: a mixed method study. *J Publ Health.* **3:** 11–13

[29] Izadi S, Salehi M, Holakouie-Naieni K, et al. (2008). The risk of transmission of Crimean-Congo hemorrhagic fever virus from human cases to first-degree relatives. *Jpn J Infect Dis.* **61:** 494–496.

[30] Ozer A, Miraloglu M, Ekerbicer HC, et al. (2010). Aloglu knowledge levels about Crimean-Congo hemorrhagic fever among midwifery and nursing students in Kahramanmaras, Turkey Southeast. *Asian J Trop Med Public Health.* **41:** 77–78.

[31] Sharifi-Mood B, Mardani M, Keshtkar-Jahromi M, et al. (2008). Metanat Clinical and epidemiologic features of Crimean-Congo hemorrhagic fever among children and adolescents from southeastern. *Iran Pediatr Infect Dis J.* **27:** 561–563.

[32] Sheikh AS, Sheikh AA. (2004). Sheikh knowledge, attitude and practices regarding Crimean-Congo haemorrhagic fever among healthcare workers in Balochistan. *J Ayub Med Coll Abbottabad.* **16:** 39–42.

[33] Sharifinia N, Rafinejad J, Hanafi-Bojd AA, et al. (2013). Knowledge and attitudes of the rural population and veterinary and health personnel concerning Crimean-Congo hemorrhagic fever in Western Iran in 2012. *Fla Entomol*. **96:** 922–928.

[34] ASHP statement on the pharmacist's role in antimicrobial stewardship and infection prevention and control: medication therapy and patient care: Specific practice areas–statements. 291-293.

[35] Vescio FM, Busani L, Mughini-Gras L, et al. (2012). Environmental correlates of Crimean-Congo haemorrhagic fever incidence in Bulgaria. *BMC Public Health.* **12:** 1116.

[36] Sargianou M, Panos G, Tsatsaris A, et al. (2013). Crimean-Congo hemorrhagic fever: seroprevalence and risk factors among humans in Achaia, western Greece. *Int J Infect Dis.* **17:** 1160-1165.

[37] Mostafavi E, Haghdoost A, Khakifirouz S, et al. (2013). Spatial analysis of Crimean Congo hemorrhagic fever in Iran. *Am J Trop Med Hyg.* **89:** 1135-1141.

[38] Gonzalez JP, LeGuenno B, Guillaud M, et al. (1990). A fatal case of Crimean-Congo haemorrhagic fever in Mauritania: Virological and serological evidence suggesting epidemic transmission. *Trans R Soc Trop Med Hyg.* **84:** 573-576.

[39] Ansari H, Shahbaz B, Izadi S, et al. (2014). Crimean-Congo hemorrhagic fever and its relationship with climate factors in southeast Iran: A 13 year experience. *J Infect Dev Ctries.* **8:** 749-757.

[40] Wilson ML, LeGuenno B, Guillaud M, et al. (1990). Distribution of Crimean-Congo hemorrhagic fever viral antibody in Senegal: Environmental and vectorial correlates. *Am J Trop Med Hyg*. **43:** 557-566.

[41] Appannanavar SB, Mishra B. (2011). An update on Crimean Congo hemorrhagic fever. *J Glob Infect Dis*. **3:** 285–292.

[42] Jane P, Messina, David M, et al. (2015). The global distribution of Crimean-Congo hemorrhagic fever. *Transactions of the Royal Society and of Tropical Medicine and Hygiene***. 109:** 503–513.