Awareness and Practices Regarding Crimean-Congo Haemorrhagic Fever among Animal Handlers in Peri-urban Karachi and Rural Areas of Sindh

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Abstract

Objective: To assess the awareness and practices among animal handlers regarding Crimean-Congo haemorrhagic fever and compare the awareness and practices among different groups of animal handlers in Sindh, Pakistan.

Methods: Cross-sectional study conducted among 150 animal handlers with the response rate of 93%, including sellers, butchers, transporters, caretakers and veterinary doctors in peri-urban Karachi and rural areas of Sindh. Quota sampling technique was adopted to select the study population. The duration of the study was three months from August 2016 to October 2016; this period includes selling of animals of sacrifice for Eid-ul-Azha in temporary established markets. Data was entered into Epidata 3.1 and analysed using SPSS version 23.

Results: A total of 150 participants enrolled in the study. The mean age of the study participants was 35 ± 7.5 years. Among the subjects, 48% were uneducated. Overall, 52% of the participants were aware about the Crimean-Congo fever. The hygiene practice among animal handlers was found to be washing; 40.7%, bathing; 27.3% and tick removal; 11.3%. The awareness of Crimean-Congo fever among animal caretakers was 50%, animal sellers; 43.3%, transporters; 36.7% and butchers; 30% ($p<0.001$).

Conclusion: The awareness among animal handlers was on the lower side among animal sellers, transporters, butchers and animal care taker and there is a need to improve the awareness level among these groups regarding practices, hygiene of the animal as well as handling procedures.

Keywords: Crimean haemorrhagic fever, awareness, hygiene, animals, disease vector.

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Introduction

Crimean-Congo haemorrhagic fever (CCHF) is considered a highly infectious and fatal disease, with a case fatality rate ranging from 10% to 50%[1]. CCHF is a vector-borne disease spread over a wide geographical area around the globe; the virus has the widest geographic range of all tick-borne viruses and is endemic in more than 30 countries in Europe, Mediterranean region and Africa[1,2]. Asia, Pakistan, Iran and Afghanistan are considered as endemic regions[1].

Crimean-Congo haemorrhagic fever is transmitted via vector Hyalomma ticks or through contact with an infected animal's blood or tissue[3]. The disease occurs most frequently among occupational groups including people involved in the livestock industry, such as agricultural workers, slaughterhouse workers et cetera[3,4]. Health care workers, medical personnel and veterinarians are also a vulnerable

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group to the infection through contact with the body fluids of infected patients[4]. Nomads travelling place to place along with their herds of animals are said to be responsible for spread of disease, both to animals and animal handlers[1].

World Health Organization (WHO) is working with the different stakeholders regarding prevention and control of CCHF by supporting the establishment of a surveillance system, improving diagnostic capacity and activities during outbreak in Europe, Middle East, Asia and Africa[3].

Many countries have reported, since last decade, an outbreak situation of CCHF in Iran, Turkey, India and Pakistan[2,5-7]. In 2011, CCHF was reported in Gujarat, India with 4 deaths[2]. In Iran, 71 cases were reported in 2012 with 8 fatalities[7].

Pakistan is considered as an endemic country for Crimean Congo haemorrhagic fever with sporadic cases especially reported during the last few years[8]. Since the last five years, in Pakistan, Baluchistan province has reported a higher number of cases of CCHF. Since January 2016, 84 cases were reported in Quetta, out of which 10 died. Similarly in 2016, five deaths were reported in Karachi while two died in Bahawalpur[9]. Due to poor diagnosis, reporting mechanism and treatment facilities, the case fatalities reach up to more than 10% in Pakistan[9].

Globally, there are many studies conducted to assess the awareness regarding CCHF among livestock handlers, veterinarians and health care workers[6,8,10,11]. Moreover, in Pakistan, very few studies have been conducted so far to assess the awareness, attitude and practices among healthcare workers, medical students and general public[12-14]. However, among high-risk groups, a study was conducted to assess the CCHF awareness and practices among butchers in Rawalpindi city[15]. Another descriptive study with limitations was conducted in Larkana among animal handlers[16].

However, comprehensive assessment among other high-risk groups, involved in the animal handling have not been approached and assessed regarding the awareness and practices of CCHF control and prevention. Therefore, the aim of this study was to assess the awareness and practices among animal handlers regarding Crimean-Congo Fever and compare the awareness and practices among different groups of animal handlers in Sindh, Pakistan.

Subjects and Methods

The study period includes the time when temporary markets are set up to sell animals for Eid ul Azha sacrifices.This was a cross-sectional survey, conducted for three months, between August to October 2016, among animal handlers in peri-urban Karachi and rural areas of Sindh province. Quota sampling technique was adopted to select the study population. We included five groups of animal handlers, 30 each among animal seller, animal transporter, butcher, animal caretaker and veterinary doctors who were exposed to handling the animals for at least one year. We excluded those people who kept and handled cats, dogs and other animals. Seasonal butchers were also excluded. We also excluded those who did not provide informed consent.

The sample size was calculated using WHO sample size calculator at 95% confidence level, 5% precision with an anticipated proportion of 10%. We calculated proportions for awareness of Congo fever 9%, awareness about mode of transmission 2.6% and awareness of disease caused by animals 7% among animal handlers. Initially we calculated the sample of 139 and after inflation of 10%, the final sample size was found to be 150.

A pre-tested semi-structured questionnaire was used and interviews were carried out by a team of medical students who had been briefed about the details, aims and objectives of the study. We approached them in veterinary clinics, livestock market, barns and butcher shops. Our study variables included independent variables; participant age, education and characteristics of animal handlers; seller, transporter, butcher, caretaker and vet. The dependent variables included awareness of disease caused by animal, awareness of CCHF, mode of transmission of CCHF, awareness of symptoms. Variables also included the practices for prevention of CCHF and different sources of getting information about CCHF. Animal handlers were approached and explained about the research. They were also as-

sured that their identities will be kept strictly confidential.

Data was entered into Epi data 3.1 and analysed using SPSS version 23. Descriptive statistics were used to describe age groups, education and other general details of the subjects. Chi-Square test and Fischer exact test were performed to compare the awareness levels and practices among different groups of animal handlers. A p-value of <0.05 was considered as significant. The ethical approval was taken from the Ethical Review and Research Committee of Jinnah Medical and Dental College, Karachi. Verbal and written informed consent was taken from all participants.

Results

The mean age of the study participants was 35 ± 7.5 years. Among all, 72 (48%) of the study participants were uneducated while education level characterised 34 (23%) with primary education, 11 (7%) matriculated and graduated each, and 22 (15%) were post-graduates (Fig. 1).

Overall, 56% of the participants were aware about the disease caused by animals. Moreover, 52% of the participants were aware about the Crimean-Congo fever. Awareness about the mode of transmission of CCHF was 39.9%. The source of information was found to be from television (52%), radio (12%) and newspaper (4.7%), while others (31.3%) knew about CCHF through other media of information (Table 1).

Among different groups of animal handlers and veterinary doctors, the awareness of CCHF was found to be 43.3% among sellers, 36.7% in transporter, 30% in butcher, 50% in caretakers and 100% in veterinary doctors (p<0.001). The awareness of symptoms of CCHF and the mode of transmission among animal handlers and veterinary doctors was also found significant (p<0.001). Among animal handler's groups, animal sellers consulted more with the veterinary doctors (73.3%), followed by animal caretakers (56.7%), butchers (53.3%) and transporters (50%) (Table 2).

The hygiene practice among animal handlers was found to be significant among different groups including washing (40.7%), bathing (27.3%) and tick removal (11.3%) (p<0.001) (Table 3).

The association of different sources of getting awareness about CCHF among animal handlers was found to be more from television i.e. animal sellers 50%, transporter; 43.3%, butcher; 66.7%, caretaker; 50% and veterinary doctors; 50% (p<0.02) (Table 4).

Discussion

Karachi is the largest city of Pakistan where the population estimated according to unofficial figures is about 23.5 million[17]. The diversity in the population of Karachi includes different ethnic groups living together[18]. Sindh is the second largest province of Pakistan according to the density of population. It is estimated that population of Sindh increased up to 55.24 million since the census conducted in 1998[19]. The province of Sindh has 6.92 million cattle, 7.34 million buffaloes, 3.96 million sheep, 1.26 million goats and 278,000 camels, while the accumulated live stock holdings of the province stands at 21% of the entire country. Similarly, in Karachi the market is escalating with the daily requirement of milk now is 8 million litres and meat about 620 metric tons. The amount of high numbers of requirement poses the significant possibilities for livestock development in terms of production capability, large amount of food resources, and huge value of liquid asset[20].

Hence, this community-based study targeted the high-risk occupational group of animal handlers regarding the awareness and practices of Crimean-Congo fever conducted in Pakistan. This study showed the level of awareness and hygiene practices among different groups of animal handlers in Sindh, Pakistan. Furthermore, this study also revealed that most of the people received awareness about Crimean-Congo haemorrhagic fever through television and radio as a source of medium. This study has also indicated that, only minority of population found it important to visit the veterinary doctors for their animals, while others did not visit, as they may assume, it was not even relevant to make a visit to the vet for the sake of their animal's health. During our research one major incident took place when we heard about two of our interviewee, one care taker and one veterinary doctor, died due to CCHF.

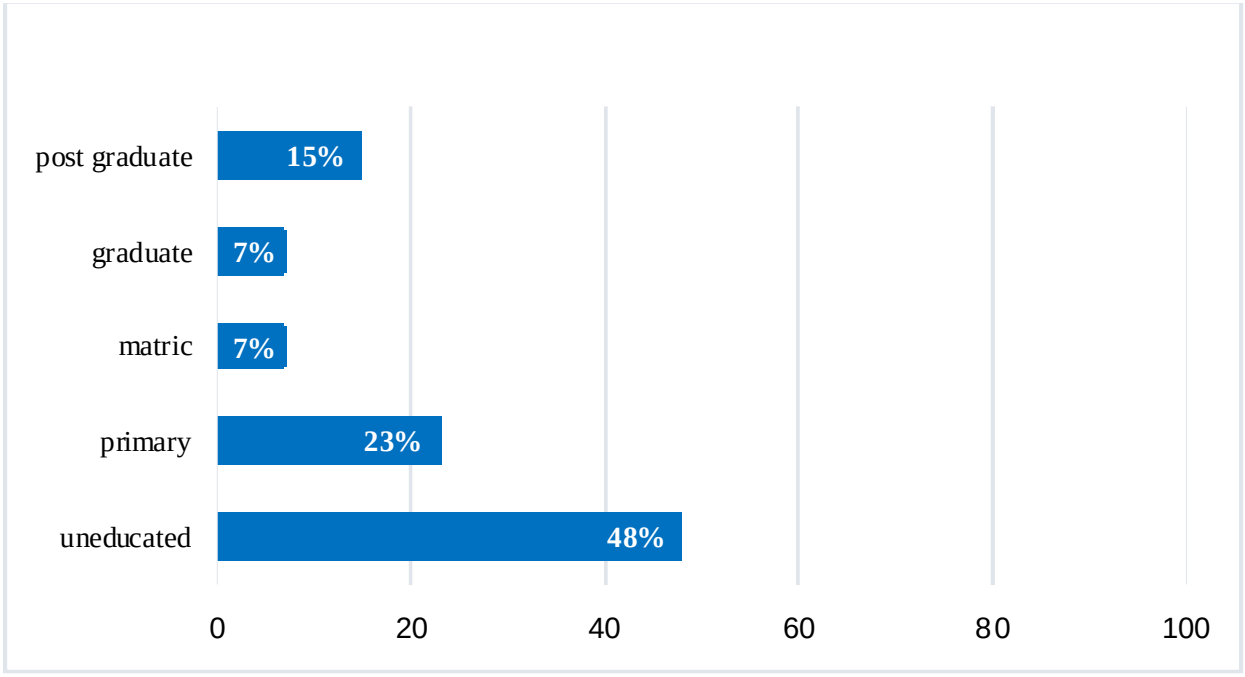

Fig 1. Level of education among animal handlers in Karachi, Pakistan. (n= 150)

The findings of our study indicated that the need to increase CCHF awareness level among animal handlers is very important in order to prevent further spread. Even educated individuals in our populations tend to ignore the use of precautions while handling animals. In order to accomplish this, an education campaign consisting of different means of information (television,radio, social media, newspaper etcetera) being utilised the most, should be used for disseminating information. Furthermore, we found only veterinary doctors were aware about the different sign and symptoms of CCHF, because of their education level.

Our study findings were similar with the findings of other studies conducted locally and internationally. A study conducted in Rawalpindi, among butchers (n = 150) showed no awareness about the sign and symptoms of CCHF among butchers[15]. They did not practice any precautionary measures as well. However, regarding the preventive measures against CCHF, 18% reported in affirmation among which 25.9% had primary education while 62.9% had secondary education[15].

Another descriptive study conducted in urban area of Larkana, Sindh, showed that among animal

Table 1. Descriptive information of awareness level among animal handlers in Karachi (n= 150)

Characteristics	Frequency n (%)
Awareness of disease caused by animal	
Yes	85 (56.6)
No	65 (43.3)
Awareness of CCHF	
Yes	78 (52)
No	72 (48)
Mode of transmission of CCHF	
Yes	59 (39.3)
No	91 (60.7)
Awareness about symptoms of CCHF	
Yes	53 (35.3)
No	97 (64.7)
Source of awareness about CCHF	
TV	78 (52)
Radio	18 (12)
Newspaper	7 (4.7)
Others	47 (31.3)
Practice of animal handlers	
washing	61 (40.7)
bathing	41 (27.3)
tick removal	17 (11.3)
others	31 (20.7)

Table 2. Level of CCHF awareness among different types of people involved in animal handling in Karachi (n = 150)

Level of awareness amonggroups	Yes n (%)	No n (%)	p-value
Awareness of disease caused by animal			
Seller	12 (40)	18 (60)	<0.001
Transporter	14 (46.6)	16 (53.3)	
Butcher	12 (40)	18 (60)	
Caretaker	17 (56.6)	13 (43.3)	
Vet	30 (100)	0 (0)	
Awareness of CCHF			
Seller	13 (43.3)	17 (56.7)	<0.001
Transporter	11 (36.7)	19 (63)	
Butcher	9 (30)	21 (70)	
Caretaker	15 (50)	15 (50)	
Vet	30 (100)	0 (0)	
Mode of transmission of CCHF			
Seller	6 (20)	24 (80)	<0.001
Transporter	6 (20)	24 (80)	
Butcher	8 (26.7)	22 (73.3)	
Caretaker	9 (30)	21 (70)	
Vet	30 (100)	0 (0)	
Awareness of symptoms of CCHF			
Seller	3 (10)	27 (90)	<0.001
Transporter	8 (26.7)	22 (73.3)	
Butcher	6 (20)	24 (80)	
Caretaker	6 (20)	24 (80)	
Vet	30 (100)	0 (0)	
Consulted a vet doctor			
Seller	22 (73.3)	8 (26.7)	0.263
Transporter	15 (50)	15 (50)	
Butcher	16 (53.3)	14 (46.7)	
Caretaker	17 (56.7)	13 (43.3)	

Table 3. Comparison of practices among animal handlers for the prevention of CCHF in Karachi (n = 150)

Characteristics	Washing	Bathing	Tick removal	Others	p-value
Seller	16 (53.3)	12 (40)	2 (6.7)	0 (0)	<0.001
Transporter	18 (60)	4 (13.3)	8 (26.7)	0 (0)	
Butcher	15 (50)	10 (33.3)	4 (13.3)	1 (3.3)	
Caretaker	12 (40)	15 (50)	3 (10)	0 (0)	
Vet	1 (3.3)	1 (3.3)	1 (3.3)	27 (90)	

Table 4. Comparison of different sources of getting awareness about CCHF among animal handlers in Karachi (n = 150)

Characteristics	TV	Newspaper	Radio	Others	p-value
Seller	15 (50)	4 (13.3)	1 (3.3)	10 (33.3)	<0.02
Transporter	13 (43.3)	3 (10)	1 (3.3)	13 (43.3)	
Butcher	20 (66.7)	6 (20)	0 (0.0)	4 (13.3)	
Caretaker	15 (50)	5 (16.7)	5 (16.7)	5 (16.7)	
Vet	15 (50)	1 (3.3)	1 (3.3)	13 (43.3)	

handlers (n = 200) including milkmen, butchers, veterinarians, livestock farmers and skin processors, reported knowledge of CCHF collectively was 71%[16]. This study did not use validated questions to enquire about the knowledge, signs and symptoms, mode of transmission, hygiene practices and source of information regarding CCHF.

Another community-based study conducted among the general population of Karachi (n=150) reported 23% awareness regarding CCHF[14]. Most of the studies conducted in Pakistan among medical personnel are focused to assess the awareness level of CCHF. A study conducted among health care workers in Pakistan (n = 235), reported 66% awareness level about CCHF. Among them 80% were medical doctors. The results also showed that only few of the doctors were aware about the signs and symptoms of CCHF and less than 50% of the doctors were aware about the preventive measures taken while handling infected animals and patients with Congo virus. On the other hand, we only focused veterinary doctors in our study and no other doctors or nurses were included. All categories of the respondents had a poor knowledge regarding the burial procedure of dead patients[12].

Another study conducted in Turkey among health care workers (n = 109) reported 64.8% of doctors, 23.1% of nurses and 21.2% of paramedics knew the prevention of CCHF by using bleaching powder in Congo contaminated areas. Approximately 40.7% doctors, 56.4% nurses and 69.7% paramedics did not know that Congo fever can be asymptomatic. Moreover, 17 participants did not know that the avoidance of antiseptic was required at the site of tick bite. This study further explored that 45.9% (95% CI: 36-55) of the sample knew about the mode of transmission, which was similar to our findings.

In our study, television and radio were found to be the source of information from most of the strata. This finding is similar to the result of another community-based survey (n = 1034) conducted in Turkey[21]. Television and radio were considered as the most important and useful sources of information on the disease[21]. Another local study (n = 150) conducted among the residents of Karachi also reported more than 50% of the information regarding CCHF was acquired from the television and internet[14].

This study had some limitations which included a non-probability quota sampling technique, which restrained generalize ability of our findings. The data was only collected during Eid-ul-Azha, which has a short time span and restrained our data collection. We were unable to inquire about the attitude toward CCHF among animal handlers. Although the overall sample size was calculated, but for each stratum it was not powered.

However, the strength of this study included high-risk group of animal handlers with different types of job descriptions. We targeted both rural and peri-urban areas of Sindh which has not been done before. The estimates are comparable with other study findings. There is a need for the spread of further utilisation of hygiene practices in animal handlers which we found to be low in almost every group of animal handlers. Furthermore, multidisciplinary collaboration between the hospital's infection-control team, epidemiologists and health department is required to proactively participate in an outbreak situation to limit the vulnerability to infection.

The reason of increase in incidence over the decade remains unclear, however, the level of information among animal handlers is one of the tool to prevent and control of this problem. There is a need to design awareness campaign or interventions to target all the groups of animal handlers to improve the level of knowledge and practices, regarding their practices, hygiene of the animal as well as handling procedures. Furthermore enabling environment should also be provided to the provider levels, to improve the quality of health among this occupational group.

Conclusion

CCHF is a disease of public health importance with a high fatality rate that has resulted in an increase in the incidence and displayed geographical spread over the past decade. The awareness among animal handlers was on the lower side, especially among animal sellers, transporters, butchers and animal care taker..

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Conflict of Interest

Authors have no conflict of interests and no grant/funding from any organisation for this study.

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