Original Article

Knowledge, Attitudes, and Practices Related to Crimean–Congo Hemorrhagic Fever Among Butchery and Livestock Workers: A Cross-Sectional Study in Babil Governorate, Iraq

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Abstract

Background: As morbidity and mortality rates from Crimean–Congo hemorrhagic fever (CCHF) continue to increase, they pose a major burden on Iraq's already fragile healthcare system. **Objectives:** The purpose of the current study was to evaluate the knowledge, attitudes, and butchers and livestock workers regarding CCHF. **Materials and Methods:** This was a cross-sectional study. A convenient purposive sample of 146 participants was interviewed in Babil Governorate, Iraq, after obtaining their verbal consent using a pre-prepared questionnaire that included demographic characteristics and some questions related to the awareness of prevention and control of this deadly viral endemicdisease, as well as the practice of random slaughter and the reasons for doing so. **Results:** It is alarming that one-third of an at high-risk group of CCHF did not know (32.8%) the real cause of this endemic disease in our country, and appropriate preventive measures were implemented to protect themselves when dealing with infected livestock, and that 74.7% of the participants did not know the appropriate method for disinfecting meat contaminated with the hemorrhagic fever virus. Analysis revealed that the level of education and low monthly income have significant impacts on knowledge and attitudes ($P < 0.05$). Likewise, mean attitude scores differed significantly by age, education, and income status ($P < 0.05$). **Conclusion:** The results indicated that butchers and livestock workers in Iraq lack adequate understanding, attitudes, and practices concerning CCHF, which can be considered lower than expected. Given the high infection rate of CCHF, it is necessary to take comprehensive measures to contain the disease before it spreads further throughout Iraq.

Keywords: Attitudes, Babil, butchers, CCHF, knowledge, live stocks, practice

Introduction

The Crimean–Congo Hemorrhagic Fever Virus (CCHFV) is the causative agent of the zoonotic viral disease known as Crimean–Congo hemorrhagic fever (CCHF).[1] The CCHFV virus is a member of the Bunyaviridae family, specifically the genus Orthonairovirus. Humans are mostly infected by the virus through tick bites or contact with animal secretions and bodily fluids.[2] Hard ticks in the Ioxididae family, particularly those belonging to the species *Hyalomma marginatum*, are the most frequent carriers of this arthropod-borne illness. Contact with the tissues and bodily fluids of infected individuals can potentially result in human-to-human transmission, particularly in medical environments. The illness is transmitted by a variety of domestic and wild animals, such as sheep, goats, cattle, and hares.[3]

It has also been observed that humans contract CCHFV from eating undercooked meat obtained from infected animals.[4] The virus transmission route is one of the many variables that affect the incubation period.[5] The time between contact and symptom onset is significantly shorter in nosocomial infections.[6] Nonspecific fever symptoms after the incubation phase are similar to those

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of other viral hemorrhagic diseases. This virus commonly causes rapid fever, headaches, exhaustion, myalgia, petechial hemorrhages, ecchymosis, and stomach pain. Some patients present with significant bleeding, hepatic dysfunction, and other gastrointestinal symptoms.[7,8] A clear diagnosis can only be established based on particular investigations. Reverse transcription-polymerase chain reaction can be used to detect viral nucleic acids in the early stages of a viral disease, and antibodies to the specific antigen can be used to confirm the diagnosis in the later stages.[9,10]

The virus that causes CCHF was initially detected in the Democratic Republic of the Congo in 1969 and identified in the Crimean region of the former Soviet Union in 1944, thus the name.[11] Over 5000 cases and over 140 outbreaks involving the virus have been recorded globally since its discovery. Fifty-two nations in all have been classified as endemic.[12] Many regions of the Middle East, Europe, Asia, and Africa have seen epidemics caused by CCHFV.[13] The five nearby nations that currently offer the most compelling evidence of CCHF existence are Pakistan, Afghanistan, Tajikistan, Iran, and Turkey.[14] Some workers like butchers, animal breeders, are at high risk of this disease due to increased exposure.[15] The incidence of this zoonotic virus was increasing in Iraq over the last 3 years, causing a significant epidemic scenario in the year 2023.[16-20]

The rate of new infections increases during Eid-ul-Adha, the biggest Muslim religious celebration, when huge number of animals are killed.[21] With a steady increase in cases over the previous 10 years, CCHF continues to represent a major threat to the already precarious healthcare system. Studies on knowledge, attitudes, and practices (KAPs) are particularly important in the field of public healthcare because they aid in the evaluation of data on ongoing initiatives, the development of behavioral plans, and the implementation of new initiatives.[22] Studies involving different endemic regions have been carried out to demonstrate KAP of the population at risk for CCHF, such as butchers and medical professionals.[23-25]

Materials and Methods

Study design and setting

Convenience purposive sampling techniques were used to conduct a cross-sectional survey among butchers and participants working toward livestock care in Babylon Governorate, Iraq. We adopted convenience sampling because it is very quick, easy, readily available, and cost-effective. Data were collected over 3 months in late 2023.

Questionnaire development

The questionnaire was validated through an extensive literature review[2,3,26] and reviewed by a research committee with relevant research experience. After discussion and review, the authors finalized the questionnaire. The questionnaire consisted of an introductory paragraph explaining the aim and objectives of the study, followed by mandatory informed verbal consent for all participants; the questionnaire includes information about demographic data age, sex, educational levels, marital status, monthly income, and the specific occupations of volunteered participants. The selected subjects are mainly vulnerable to capture CCCHF disease butchery, livestock breeders, and two veterinary workers who accepted to participate in this study, and then three sections assess knowledge, attitudes, and practices according to their subjective responses.The knowledge, attitudes, and practices are assessed according to Jamil *et al*.[26] Data were collected through face-to-face interviews by trained interviewers.

Data collection and sampling

All individuals, between the ages of 17 and 63 years, of both sexes (male or female), living in Babylon, were eligible to participate in the survey. Those participants who refused to provide informed consent were excluded from the study. Data were collected through face-to-face interviews using the validated questionnaire for occupational risk participants including butchers, livestock herders, and veterinarians.

Statistical analysis

Statistical analysis was carried out using the Statistical Package for the Social Sciences (SPSS) version 23.0 (SPSS, IBM Company, Chicago, IL 60606, USA). Inferential statistics were used depending on the nature of the data and variables.

Ethics approval

The study ensured that each participant's privacy was appropriately protected. The study did not include any names or email addresses so that the participant could not be traced. Participants were allowed to withhold the completed form at any time before submitting it. The study protocol was approved by the Ethical Review Committee of Hillah University, Babylon, Iraq. Verbal consent was obtained from the participant after being informed of the purpose of the study and research objectives at the beginning of the study.

Results

One hundred and forty-six participants were included in this study, and their mean age and standard deviation are 30.5 ± 8.7 (ranging from 17 to 63) years, respectively. Males are found to outnumber females significantly (97.3%), most of them are from urban areas (87.7%), and the majority fall between the ages of 21 and 30.

The highest proportion of them were illiterate or had primary educational levels, which constituted (27.4%)

and (23.3%), respectively. The occupations of those who participated in this study were butchers, livestock herders, and veterinarians, at a proportions of (67.1%), (31.5%), and (1.4%), respectively [Table 1].

Figure 1 shows the frequency distribution of participants according to their level of education, where most of them were illiterate or had primary education, respectively at (27.4%) and (23.3%).

Table 1: Distribution of the study samples by demographic characteristics

Characteristics		*N* (%)
Gender		
Male		142 (97.3)
Female		4 (2.7)
Total		146 (100)
Age (years)	mean ± SD	30.5 (8.7)
Age		
20≥		11 (7.5)
21–30		74 (50.7)
31–40		45 (30.8)
41–60		16 (11)
Residence		
Rural		18 (12.3)
Urban		128 (87.7)
Educational		
Cannot read and write		27 (20.5)
Illiterate		40 (27.4)
Primary education		34 (23.3)
Intermediate school		29 (19.9)
Secondary school		6 (4.1)
College and above		10 (6.8)
Occupation		
Butcher		98 (67.1)
Livestock herder		46 (31.5)
Veterinarian		2 (1.4)

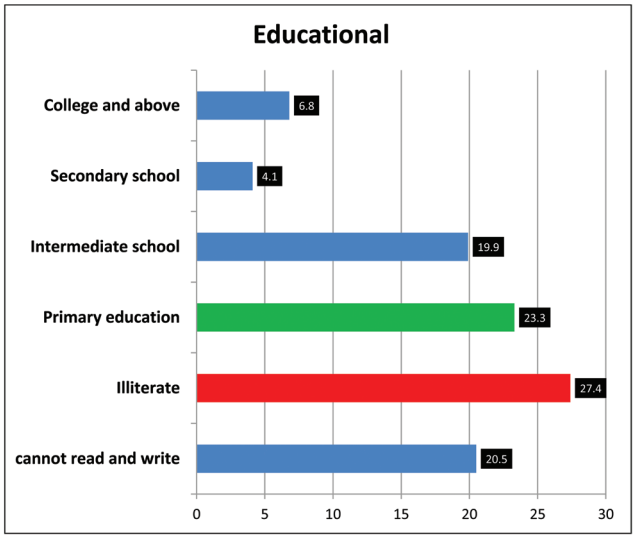

Figure 1: Frequency distribution of participants by education level

Figure 2 shows the frequency distribution according to occupations. Butchers, livestock herders, and veterinarians participated in this study with percentages of (67.1%), (31.5%), and (1.4%), respectively.

Table 2 shows that over half of the participants had sufficient monthly income (62.3%), more than three-quarters were married, and the majority were smokers (76%).

Table 3 shows that about one-fifth (17.1%) engaged in random slaughter on occasion, mainly due to the lack of inspection by the concerned authorities (64%) and the ease of work (36%). About one-third (28.7%) of

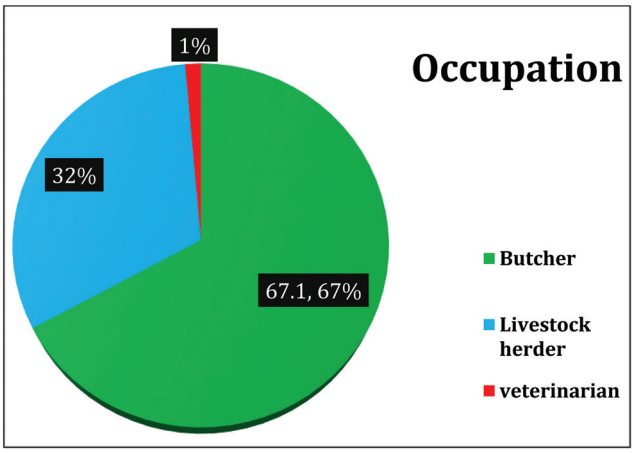

Figure 2: Frequency distribution of the study group by profession

Table 2: Frequency distribution of participants in terms of monthly income, marital status, and smoking habits

Income	
Enough	91(62.3)
Not enough	50(34.2)
Enough and more	5(3.4)
Marital status	
Single	35(24)
Married	109(74.7)
Divorced	2(1.4)
Smoking	
Yes	111(76.0)
No	35(24.0)

Table 3: Distribution of participants in terms of their random slaughter and the reasons for performing the random slaughtering and positive attitudes

Do you practice random slaughter?	No	121 (82.9%)
	Yes	25 (17.1%)
The reason for the practice of indiscriminate slaughter	Easy of work	9 (36%)
	Lack of oversight from the concerned party	16 (64%)
	Total	25 (100)
Do you advise your colleagues to prevent hemorrhagic fever?	Yes	104 (71.2)
	No	42 (28.7)

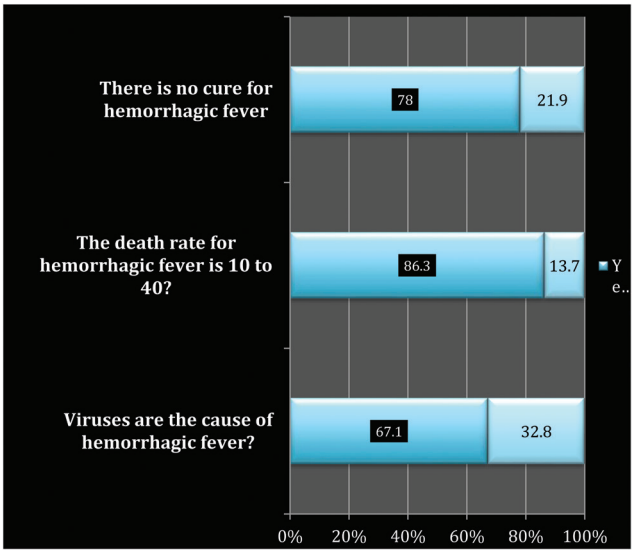

Figure 3: Frequency distribution of participants according to their knowledge regarding Crimean–Congo hemorrhagic fever

Table 4: Frequency distribution of participants according to their knowledge of preventive methods

Preventive measures include wearing gloves and protective equipment when caring for infected livestock regularly washing hands, and ensuring the health of the slaughtered animal?	Yes	57 (39)
	No	89 (61)
The virus dies if contaminated meat with the virus is cooked well or frozen?	**Yes**	37 (25.3)
	No	109 (74.7)

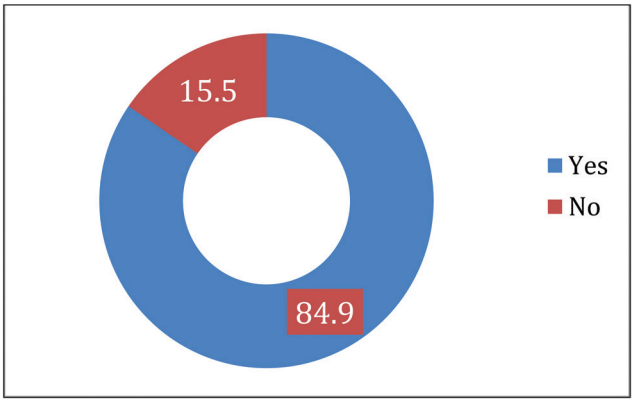

Figure 4: Distribution of the study sample according to the awareness of the symptoms of hemorrhagic fever. It shows that 84.9% of the participants knew the correct symptoms of the disease, while (15.1%) of the participants did not know these symptoms

the participants do not like to advise their colleagues to prevent CCCHF hemorrhagic fever.

Figure 3 shows that 78% of them knew that there was no cure for the disease. The majority of participants knew the severity of the disease (86.3%) of the participants knew that the case fatality rate for hemorrhagic fever is 10% to

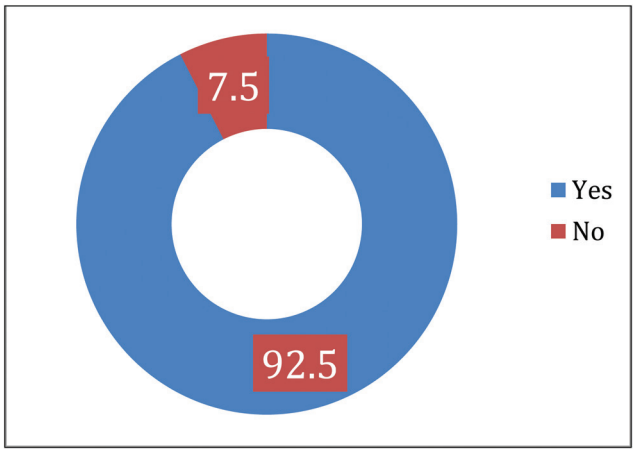

Figure 5: Distribution of the study sample according to the awareness of the methods of transmission of hemorrhagic fever. It appears that 7.5% of the participants did not know that contact with an infected animal or the bite of a tick carrying the disease transmits the disease to them.

40%, while only two-thirds (67.1%) knew that viruses were the cause of the disease.

Table 4 shows that only 39 (26.7%) of the participants knew the correct preventive measures when dealing with livestock, and 25.3 (17%) agree that the best way to get rid of the virus from infected meat is to cook it well or freeze it [Figures 4 and 5].

Discussion

To the best of our knowledge, this was the first nationwide study to investigate the knowledge, attitudes, and practices among CCHF-vulnerable groups of workers (mainly butchers and livestock Iraqi workers).

Due to the high fatality rate of CCHF, it has been classified as a high-priority, deadly occupational disease by the World Health Organization.[27] This study was conducted in a country with the most CCHF cases and the largest high-risk areas for occurrence. Iraq maintains the highest incidence of CCHF globally.[15,19]

This study revealed that about two-thirds of participants are butchers and one-third of the study sample comprise husbandry workers. These two groups are more affected by occupational exposure to CCHFV. This finding is in line with the findings reported by Sisman in Samssun province, Turkey, who identified the risk factors of CCHF and concluded that CCHF can be improved by periodic education of people at high risk, that is, men and women working in agriculture and animal husbandry, especially in rural areas.[28] A study conducted in Iran explored that this viral zoonotic occupational disease affected butchers and slaughterhouse workers and was considered to be high risk for occupational groups for the disease in Iran and found that high seroprevalence of CCHF among butchers and slaughterhouse workers and among those with minimal use of personal

protective equipment's during daily work, indicating the need for training courses, for these groups to increase their knowledge, attitude, and practice with respect to zoonosis.[29]

Although butchers and shepherd workers have the highest risk of contacting animals and their tissues, many of them in the study did not use any personal protective devices. This finding was consistent with the findings of another study.[30]

The findings of the current study reveal that the workers enrolled in this study have inadequate knowledge, attitudes, and practices regarding occupational safety and health protection against CCHFV infection. These findings are better than those reported by similar studies conducted in Kagadi District, Uganda, and in Multan District, Pakistan.[31,32] In contrast, a study done explored that butchers generally had better knowledge, attitudes, and practices than the findings of the current study.[33,34]

Conclusion

Results indicated unsatisfied levels of knowledge, attitudes, and practices regarding CCHF among butchers and livestock herders in Babylon. CCHF is a highly contagious disease and requires a comprehensive approach to deal with the situation before it spreads further in Iraq. Preventive interventions are uncommon due to a lack of education, slaughtering at home due to unavailability or restricted standard safe slaughterhouses, and livestock-related facilities. The findings of this study may offer valuable insights for policymakers and healthcare administrators, aiding in formulating preventive strategies for CCHF, particularly within this vulnerable population. It is time for Iraq's health, agriculture, and media sectors to cooperate with international organizations to create and implement a strategic framework for awareness and prevention of this occupational zoonotic endemic disease.

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Nil.

Conflicts of interest

There are no conflicts of interest.

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