



## Research Paper

# Epidemiological Profile of Crimean-Congo Hemorrhagic Fever in Thi-Qar Province, Iraq: A Three-Year Retrospective Analysis

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## ABSTRACT

**Background:** Crimean-Congo hemorrhagic fever (CCHF) is a severe disease. It is most commonly spread by the bite of an infected tick of the Hyalomma genus, or by direct contact with blood and bodily fluids of an infected person or other animals. The current study aimed to determine the prevalence of hemorrhagic fever cases during 3 years in Thi-Qar province and also study demographic factors.

**Methods:** Data were collected from the records of the Statistics Unit at the Public Health Laboratory. The epidemiological data were collected from the beginning of December 2023 to the end of March 2024.

**Results:** A total of 319 cases were recorded, including 184 (57.7%) males and 135 (42.3%) females. The number of people who recovered was 256 (80.3%), whereas the number of deceased cases recorded was 63 (19.7%). The highest rate of infection appeared in the age group of 20–39 years (41.4%), and the lowest proportion (11.0%) was in the  $\geq 60$  years age group. According to occupation, housewives had the highest proportion (37.9%). Total annual infections were recorded at 4.7%, 50.8%, and 44.5%, respectively.

**Conclusion:** The study highlighted the epidemiological features. The results indicate patterns in the distribution of cases across demographic and geographic variables. We conclude from the current study that occupational and home exposure, especially among housewives, are among the most common cases of hemorrhagic fever.

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## Introduction

Viral hemorrhagic fevers (VHFs) are a group of illnesses caused by four families of viruses, namely - Arenaviridae, Bunyaviridae, Filoviridae and Flaviviridae [1]. This is a profile of enveloped viruses; some of the viruses cause mild illness, while others are life-threatening and thus the degree of clinical illness considerably varies [2]. The first documented case of CCHF in Iraq occurred in 1979. Iraqi health authorities issue several hundred cases of CCHF every year, but the growing disease burden set off alarm bells in early 2022. It gets even worse in Iraq where they farm actually cattle. Most of the people who infected were shepherds or butchers or had contact with them. The infection is accompanied by fever, headache, muscle pain and bleeding [6]. CCHF is an acute tick-borne zoonotic disease caused by the Crimean-Congo virus (CCHFV), a member of the genus Nairovirus in Family Nairoviridae [7]. Typically, the typical cases begin with headache, fever, malaise and gastrointestinal symptoms/bleeding following by shock and multi-organ system failure (severe form), although 60–80% of infections are asymptomatic [8]. Indeed, CCHF has the widest geographical spread, being limited to the distribution of vector hard ticks (mainly *Hyalomma marginatum*) in Africa, Asia and Europe [9]. Turkey and Iran, neighbouring northern and eastern sites of Iraq, reported as endemic areas to CCHF [10], also both reported incident outbreaks and an increasing number of cases registered, respectively [11]. Human infection with CCHF in Iraq was first reported in 1979, and outbreaks of the disease have occurred sporadically since then, with intervals of no recorded cases. While there were 0 cases in 2008, 2014, 2016, and 2017 (the first reported case was in September at that point), the most cases on record in one year is ten — seen only in 2020. This has been due to a major increase in case numbers reported during the last 2 years, with 19 laboratory-confirmed cases in Iraq in 2021 and relative high number of laboratory-confirmed cases from this year till now (June), with reporting of 108 cases by the Ministry of Health/ Iraq [12]. Due to the spread of haemorrhagic fever in Thi-Qar province, which has lost control over it, and also annual infection rates fluctuate. Therefore, the study aimed to determine the prevalence of hemorrhagic fever cases in Thi-Qar province for 3 years. In addition, to study the demographic factors' effect on the infection.

## Materials and Methods

### Data collection

This study is a retrospective descriptive-analytical

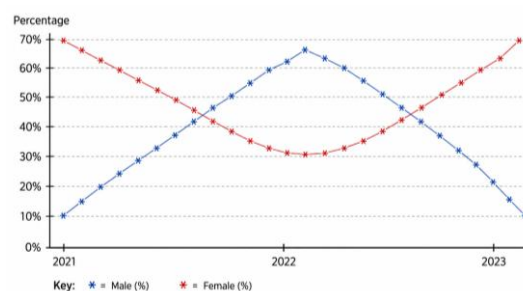
study conducted to assess the prevalence of hemorrhagic fever in Thi-Qar province. This research was conducted in the Public Health Laboratory, after obtaining approval to conduct the research from the Nasiriyah Technical Institute, then sending it to the Research and Development Department in the Thi-Qar Health Office. Data were collected from the records of the Statistics Unit at the Public Health Department in Thi-Qar province. The data collection period extended from the beginning of December 2023 to the end of March 2024.

### Statistical analysis

The number and percentages of different variables were presented using study parameters. The data were analyzed with SPSS Version 22. Chi-square test is used to analyze the variables to determine whether there exist an association exists between those variables or not. The significance level was set at  $P \leq 0.05$ .

## Results

As a result of the importance of the matter, the present study aimed to describe the sociodemographic, epidemiological, and clinical characteristics of hemorrhagic fever cases in a sample of 319 patients. In terms of age distribution, the highest proportion of cases was observed in the 20–39 years age group (41.4%), followed by individuals aged 40–59 years (31.7%). This is consistent with previous studies that highlight young and middle-aged adults as more susceptible, possibly due to greater occupational exposure or increased involvement in livestock handling and meat processing. The relatively lower proportions among those under 20 (16.0%) and over 60 (11.0%) may reflect reduced exposure or protective factors such as less outdoor activity or better awareness among older populations. The sex distribution revealed that males (57.7%) were more frequently affected than females (42.3%) and showed that (53.3%, 42.6%, 40.8%) of cases in 2021, 2022 and 2023 were female respectively while (46.7%, 57.4%, 59.2%) were male this deference was not



**Figure 1.** Gender distribution of CCHF cases by Year (2021- early 2024).

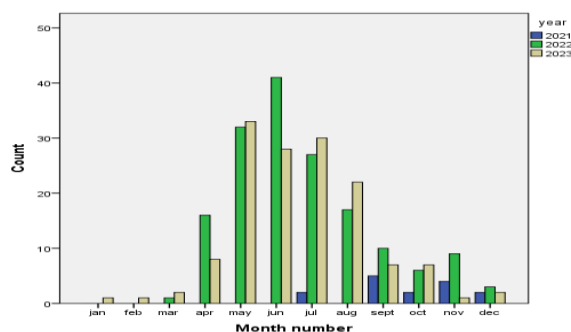
**Table 1.** Distribution of the study sample by socio-demographic for patients.

| Var.                 | Groups             | Freq. | %     |
|----------------------|--------------------|-------|-------|
| Age Groups           | <20 years          | 51    | 16.0  |
|                      | 20-39 years        | 132   | 41.4  |
|                      | 40-59 years        | 101   | 31.7  |
|                      | ≥60 years          | 35    | 11.0  |
|                      | Total              | 319   | 100.0 |
| Sex                  | Female             | 135   | 42.3  |
|                      | Male               | 184   | 57.7  |
|                      | Total              | 319   | 100.0 |
| Patients' occupation | Butcher            | 39    | 12.2  |
|                      | Child              | 3     | 0.9   |
|                      | Cleaner work       | 1     | 0.3   |
|                      | Cooker             | 2     | 0.6   |
|                      | Earners            | 52    | 16.3  |
|                      | Employee           | 22    | 6.9   |
|                      | house wife         | 121   | 37.9  |
|                      | Livestock breeders | 44    | 13.8  |
|                      | Military           | 5     | 1.6   |
|                      | Student            | 30    | 9.4   |
|                      | Total              | 319   | 100.0 |

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statistically significant with chi sq. value (0.887) and p value (0.645). Regarding occupational distribution, housewives constituted the largest proportion (37.9%) of infected cases (Figure 1). This is an important finding, potentially linked to household slaughtering practices, which was also supported by the high percentage (57.1%) of cases reporting slaughtering animals inside their homes. Other prominent occupational groups included earners, livestock breeders, and butchers, all of which involve close interaction with animals or animal products Table 1.

Epidemiologically, the highest infection was reported in 2022 (50.8%), with a slight decrease in 2023 (44.5%) and a low incidence in 2021 (4.7%) (Table 2). Notably, the highest number of cases occurred during

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summer months, which supports the seasonal nature of tick activity and increased human-animal interaction during that time (Fig. 2).

Modes of transmission were primarily contact with animals (58.6%) and raw meat (40.8%). Contact with positive human cases was minimal (0.6%), reinforcing the zoonotic nature of the disease. These findings align with the literature emphasizing the importance of animal reservoirs and poor meat-handling practices in hemorrhagic fever outbreaks. The geographic analysis showed that rural residents constituted 46.1% of the sample, and the statistical test indicated a significant association between the type of area and year of infection ( $p = 0.015$ ). This finding highlights how environmental and occupational exposures differ between urban, suburban, and rural settings, with rural areas likely facing higher vector exposure due to proximity to livestock and an open environment Table 2.

The presence of animals near homes (64.9%) and ticks in barns (64.3%) were major risk factors identified, further supporting the hypothesis that environmental and vector-borne exposures play a key role in disease transmission. The percentage low for cases reporting prior infections in the area (12.5%) and direct contact with other infected persons (3.8%) further confirms the limited role of human-to-human transmission in this context Table 3.

Interestingly, the analysis did not reveal statistically significant differences in infection rates by sex ( $p = 0.645$ ) or age group ( $p = 0.46$ ) across the years. However, the significant variation in infection rates by type of area ( $p = 0.015$ ) suggests that geographic and environmental factors may influence exposure risk more strongly than demographic characteristics alone. The analysis showed a relationship between age group and years, with no statistically significant relationship

**Table 2.** Distributions Epidemiological of hemorrhagic fever cases.

| Var.                 | Groups        | Freq. | %    |
|----------------------|---------------|-------|------|
| Year                 | 2021          | 15    | 4.7  |
|                      | 2022          | 162   | 50.8 |
|                      | 2023          | 142   | 44.5 |
|                      | Total         | 319   | 100. |
| Mode of Transmission | Animal        | 187   | 58.6 |
|                      | Positive case | 2     | 0.6  |
|                      | Raw meat      | 130   | 40.8 |
|                      | Total         | 319   | 100  |
| Types of area        | Rural         | 147   | 46.1 |
|                      | suburban      | 66    | 20.7 |
|                      | Urban         | 106   | 33.2 |
|                      | Total         | 319   | 100  |

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**Table 3.** Risk factors of infection with hemorrhagic fever.

| Var.                        | Symptoms                                                                  | Yes | %    | No  | %    |
|-----------------------------|---------------------------------------------------------------------------|-----|------|-----|------|
| Clinical<br>Risk<br>Factors | Are there animals near the residence?                                     | 207 | 64.9 | 112 | 35.1 |
|                             | Are there ticks on animals or in barns?                                   | 205 | 64.3 | 114 | 35.7 |
|                             | Was an animal slaughtered during the current month inside the house?      | 182 | 57.1 | 137 | 42.9 |
|                             | Is there any contact with a similar case?                                 | 12  | 3.8  | 307 | 96.2 |
|                             | Are there any confirmed previous infections in the same residential area? | 40  | 12.5 | 279 | 87.5 |

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(chi-sq. value =5,65 and p value =0,46 Table 4.

## Discussion

According to this study, the number of infections and death cases stands at 63, while the number of recoveries reached 265 cases. The age distribution observed shows a high rate of infection in the age group (20–39) years, followed by the (40–59) years, suggesting that working-age adults are disproportionately affected. This may be attributed to their increased exposure through occupational activities, which are usually young people, such as farming, animal handling, or household responsibilities involving raw meat processing. The most productive segment of society is the most vulnerable to infection;

this result agrees with Kodama et al [16], while our study disagrees with Ding et al [17]. Sex -based differences showed a higher frequency of cases among males compared to females, which, although not statistically significant, corresponds with the tendency of males to be employed in outdoor or high-risk occupations such as Livestock breeders or butchers are more susceptible to infection, this is similar studies with Al-Khafaji et al [18] in Thi-Qar, while our study disagrees with Qian et al [19] in China. Nonetheless, the significant proportion of female cases—especially among housewives underscores the relevance of domestic exposure, particularly due to home-based animal slaughtering practices, This results agrees with other studies to Hazim et al [20] that males are more affected than females and the workforce in Iraq’s animal sector majority of males, and the professions most at risk are farmers and housewives, Study conducted from 1995 to 2015 reported by Sharifi Fard et al, in Khuzestan that high occupational groups at risk, were housewives and farmers [21]. Seasonal trends were apparent, with increased incidence during summer months, consistent with heightened vector activity (e.g., ticks) and increased animal-human interactions in warmer seasons, our study agrees with other research studies that summer has the highest incidence of infections and tick activity with rising temperature [27] The result showed the relationship between the region and infections, high number of infections in rural areas, The reason for this is a lack of health awareness in rural areas, increased contact with livestock and animals, and a lack of health supervision, unlike in urban areas, this study agrees with several studies that rural areas are more susceptible to infection [22]. This pattern is observed in most viral and parasitic infections; it is more prevalent in rural areas due to a lack of health and monitoring services, a finding corroborated by a recent study, Flaih, M. H, et al [28]. In table 3 showed the risk factors were through direct contact with animals or proximity to the place of residence, as well as slaughtering some livestock inside homes, in addition to the presence of previous cases and contact with them, and these are certain reasons for the occurrence of infections, and this study agrees with the opinion of a study in Turkestan region [29], There may be fluctuations in the ratios between males and females

**Table 4.** Relationship between the age group and those infected with hemorrhagic fever.

| Var.        | 2021  |      | 2022  |      | 2023  |      |
|-------------|-------|------|-------|------|-------|------|
|             | Freq. | %    | Freq. | %    | Freq. | %    |
| <20 years   | 4     | 26.7 | 24    | 14.8 | 23    | 16.2 |
| 20-39 years | 8     | 53.3 | 62    | 38.3 | 62    | 43.6 |
| 40-59 years | 3     | 20   | 57    | 35.2 | 41    | 28.9 |
| ≥60 years   | 0     | 0    | 19    | 11.7 | 16    | 11.3 |
| Total       | 15    | 100  | 162   | 100  | 142   | 100  |

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Chi sq.= 5.65 P value = 0.46

from one year to another, as the proportion of females was higher in 2021, while males were higher in 2022 and 2023, which means that there are no significant differences between the sexes, and the reasons for the differences are due to reasons we mentioned previously, such as occupational exposure and environmental conditions, and Not because of sex itself, studies have agree with Hazim et al [20]. We notice significant differences, which confirms that the type of region is an influential factor in the spread of hemorrhagic fever. The increase in 2023 may be in the urban area, suggesting the possibility of the disease being transmitted from rural to urban regions. The increase in some cases in urban areas may be due to the migration of livestock breeders from rural to urban areas to sell animals, especially during Eid al-Adha and other religious occasions. Our study agrees with Abdulrahman et al in Iraq [30].

## Conclusion

This study identified key risk groups and transmission pathways associated with hemorrhagic fever in the study area. We conclude from the current study that occupational and home exposure, especially among housewives, is the most common cause of hemorrhagic fever. Therefore, practices related to the occupational pattern play a crucial role in the transmission of infection. These results necessitate strengthening public health interventions through health education and awareness about disease transmission, improving control measures and monitoring systems, especially in rural areas and promoting safe animal handling practices. Future studies should focus on vector ecology, community awareness, and the effectiveness of local surveillance systems to mitigate disease outbreaks.

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## Conflicts of Interest

The authors report there are no competing interests to declare.

## References

- [1] Racsá LD, Kraft CS, Olinger GG, Hensley LE. Viral hemorrhagic fever diagnostics. *Clinical Infectious Diseases*. 2016;62(2):214-9. [DOI: 10.1093/cid/civ792]
- [2] Aslam M, Abbas RZ, Alsayeqh A. Distribution pattern of Crimean–Congo hemorrhagic fever in Asia and the Middle East. *Frontiers in public health*. 2023;11:1093817. [DOI: 10.3389/fpubh.2023.1093817]
- [3] Saadoon SJ, Al-Hamdani MM, Shahin M, Elrayess R, Abdelfatah H, Mostafa F. Surgical site infection: The Physiological Changes & the Effect of Using Preoperative Antibiotic Prophylaxis in Orthopedic Surgeries. *Bulletin of Pharmaceutical Sciences Assiut University*. 2026. [DOI: 10.21608/bfsa.2026.462834.3038]
- [4] Mostafa FM, Azab MM, Abdelrahman A. Role of toll like receptor 9 in developing systemic lupus erythematosus. *Records of Pharmaceutical and Biomedical Sciences*. 2023;7(2):19-22. [DOI: 10.21608/rpbs.2022.178195.1194]
- [5] Al-Abri SS, Al Abaidani I, Fazlalipour M, Mostafavi E, Leblebicioglu H, Pshenichnaya N, et al. Current status of Crimean-Congo haemorrhagic fever in the World Health Organization Eastern Mediterranean Region: issues, challenges, and future directions. *International journal of infectious diseases*. 2017;58:82-9. [DOI: 10.1016/j.ijid.2017.02.018]
- [6] Belobo JTE, Kenmoe S, Kengne-Nde C, Emoh CPD, Bowo-Ngandji A, Tchatchouang S, et al. Worldwide epidemiology of Crimean-Congo Hemorrhagic Fever Virus in humans, ticks and other animal species, a systematic review and meta-analysis. *PLoS neglected tropical diseases*. 2021;15(4):e0009299. [DOI: 10.1371/journal.pntd.0009299]
- [7] Abdiyeva K, Turebekov N, Dmitrovsky A, Tukhanova N, Shin A, Yeraliyeva L, et al. Seroepidemiological and molecular investigations of infections with Crimean–Congo haemorrhagic fever virus in Kazakhstan. *International Journal of Infectious Diseases*. 2019;78:121-7. [DOI: 10.1016/j.ijid.2018.10.015]
- [8] Eslava M, Carlos S, Reina G. Crimean-Congo hemorrhagic fever virus: An emerging threat in Europe with a focus on epidemiology in Spain. *Pathogens*. 2024;13(9):770. [DOI: 10.3390/pathogens13090770]
- [9] Portillo A, Palomar AM, Santibáñez P, Oteo JA. Epidemiological aspects of Crimean-Congo



- hemorrhagic fever in Western Europe: what about the future? *Microorganisms*. 2021;9(3):649. [DOI: 10.3390/microorganisms9030649]
- [10] Baghdadi GA, Aakef IR, Mahdi SG, Khaleel RI. Crimean-Congo haemorrhagic fever in Iraq. *Eastern Mediterranean Health Journal*. 2024;30(8):570-6. [DOI: 10.26719/2024.30.8.570]
- [11] Celina SS, Italiya J, Tekkara AO, Černý J. Crimean-Congo haemorrhagic fever virus in ticks, domestic, and wild animals. *Frontiers in veterinary science*. 2025;11:1513123. [DOI: 10.3389/fvets.2024.1513123]
- [12] Al Salihi K, Mahmoud Z, Younise M, Hussain T. A Review on Crimean-Congo Hemorrhagic Fever With Special Focus On Iraqi Outbreaks. *Mirror*. 2023;2023:00121-01. [Link]
- [13] Hmmod A, Abdulhameed M, Chekhyor A. Retrospective Investigation of Crimean-Congo Hemorrhagic Fever (CCHF) in Thi-Qar Province from Year 2022 to 2023. *Basrah Journal of Veterinary Research*. 2025;24(1):88-99. [DOI: 10.23975/bjvr.2025.155858.1177]
- [14] Hewson R. Understanding viral haemorrhagic fevers: virus diversity, vector ecology, and public health strategies. *Pathogens*. 2024;13(10):909. [DOI: 10.3390/pathogens13100909]
- [15] Samadi A, Safi MA. Knowledge and risky behaviors of Kabul city butchers regarding Crimean-Congo hemorrhagic fever. *CABI One Health*. 2024;3(1). [DOI: 10.1079/cabionhealth.2024.0007]
- [16] Kodama C, Alhilfi RA, Aakef I, Khamasi A, Mahdi S, Hasan HM, et al. Epidemiological analysis and potential factors affecting the 2022–23 Crimean-Congo hemorrhagic fever outbreak in Iraq. *European journal of public health*. 2025;35(Supplement\_1):i6-i13. [DOI: 10.1093/eurpub/ckae147]
- [17] Ding S, Niu G, Xu X, Li J, Zhang X, Yin H, et al. Age is a critical risk factor for severe fever with thrombocytopenia syndrome. *PloS one*. 2014;9(11):e111736. [DOI: 10.1371/journal.pone.0111736]
- [18] Al-Khafaji SH, Panahi MH, Baghdadi G, Mehrabi Y, Hashemi S, Delpisheh A, et al. Epidemiologic Features and Risk Factors for Crimean-Congo Hemorrhagic Fever in Dhi Qar Province, Iraq. *Cureus*. 2024;16(5). [DOI: 10.7759/cureus.61445]
- [19] Qian J, Wei J, Ren L, Liu Y, Feng L. Sex differences in incidence and fatality of severe fever with thrombocytopenia syndrome: A comparative study based on national surveillance data of China. *Journal of Medical Virology*. 2023;95(3):e28632. [DOI: 10.1002/jmv.28632]
- [20] Ali Hazim M, Rafal Abbas K, Faris L. Epidemiological Profile of Crimean-Congo Hemorrhagic Fever, Iraq, 2018. *Journal of Science in Medicine and Life*. 2024;2(2):86-95. [Link]
- [21] Sharififard M, Alavi SM, Salmanzadeh S, Safdari F, Kamali A. Epidemiological survey of Crimean-Congo hemorrhagic fever (CCHF), a fatal infectious disease in Khuzestan province, Southwest Iran, during 1999-2015. *Jundishapur journal of microbiology*. 2016;9(5):e30883. [DOI: 10.5812/jjm.30883]
- [22] Hashim AH, Kassab MA, Hbaiel MK. Epidemiological investigation, patient risk factors, and geographic association with Crimean-Congo hemorrhagic fever among patients In Thi-Qar Province, Iraq, 2021-2024. *Microbes and Infectious Diseases*. 2025;6(4):6223-8. [DOI: 10.21608/mid.2025.377836.2729]
- [23] Sabir DK, Mohammad SH, Khwarahm NR, Arif SK, Tawfeeq BA. Epidemiological study of the 2023 Crimean-Congo hemorrhagic fever outbreak in Iraq. *IJID One Health*. 2024;2:100017. [DOI: 10.1016/j.ijidoh.2024.100017]
- [24] Al-Khafaji ZAI, FIRAT M, Mohammed MM, Al-Tae RAM, Al-Tae AA, Al-Humairi AK, et al. Demographic Study and Risk Factors Associated With Crimean-Congo Hemorrhagic Fever among Patients in Thi-Qar, Iraq. [DOI: 10.7759/cureus.61445]
- [25] Alhilfi RA, Khaleel HA, Raheem BM, Mahdi SG, Tabche C, Rawaf S. Large outbreak of Crimean-Congo haemorrhagic fever in Iraq, 2022. *IJID regions*. 2023;6:76-9. [DOI: 10.1016/j.ijregi.2023.01.007]
- [26] Al-Rubaye D, Al-Rubaye TS, Shaker M, Naif

- HM. Recent outbreaks of crimean–congo hemorrhagic fever (CCHF) In Iraq. *Sci Arch*. 2022;3:109-12. [DOI: 10.47587/SA.2022.3205]
- [27] Motashar FM, Rashid BA, Sajem KG, Akef IR. Epidemiology of Crimean-Congo hemorrhagic fever in Iraq from 2021 to 2023. *Iranian Journal of War & Public Health*. 2024;16(2). [DOI: 10.58209/ijwph.16.2.207]
- [28] Flaih MH, Othman RA, Hameed AT, Hussein KR. Prevalence of intestinal parasitic infections for six years (2015–2020) in Thi-Qar Province, Iraq. *Journal of Parasitic Diseases*. 2025;49(3):652-8. [DOI: 10.1007/s12639-025-01787-2]
- [29] Abuova GN, Berdaliyeva FA, Polukchi TV, Aliyev DS, Raymkulov GS, Kulemin MV, et al. Seroprevalence of Crimean-Congo hemorrhagic fever virus in the population of Turkestan region. *Le Infezioni in Medicina*. 2024;32(1):83. [DOI: 10.53854/liim-3201-11]
- [30] Abdulrahman MA. Crimean-Congo hemorrhagic fever, a real health problem in Iraq? *IJID regions*. 2025;14:100588. [DOI: 10.1016/j.ijregi.2025.100588]