


www.cambridge.org/dmp

Mariana Helou MD¹ , Mayar Khalil MD¹ and Rola Husni MD²

¹Division of Emergency, Department of Internal Medicine, Lebanese American University, School of Medicine, Beirut, Lebanon and ²Division of Infectious Diseases, Department of Internal Medicine, Lebanese American University, School of Medicine, Beirut, Lebanon

Report from the Field

Cite this article: Helou M, Khalil M, Husni R. The cholera outbreak in Lebanon: October 2022. *Disaster Med Public Health Prep.* **17**(e422), 1–2. doi: <https://doi.org/10.1017/dmp.2023.76>.

Keywords:

cholera; outbreak; infection

Corresponding author: Rola Husni;

Email: roula.husni@lau.edu.lb.

Abstract

In recent years, Lebanon has been struggling with a socioeconomic crisis exacerbated by population displacement after the Syrian crisis, which put a significant burden on its healthcare system. An additional challenge has been the response to a cholera outbreak— a deadly waterborne disease transmitted through the fecal-oral route that usually manifests as severe watery diarrhea and can rapidly progress to death. After reports of a cholera outbreak in Syria were disclosed in September 2022, the Northern Governorate of Lebanon too began reporting cases immediately after, and the first case was confirmed on October 6, 2022. The outbreak rapidly spread to other parts of the country. As of December 9, 2022, a total of 5105 suspected cholera cases with 23 associated deaths were reported across Lebanon. An estimated 45% of these cases were of children and adolescents below the age of 15 years. With the start of the vaccination campaign, awareness programs emphasizing adequate sanitation and clean water sources have become an urgent need.

Introduction

Lebanon is a Mediterranean country in the Middle East with 6.7 million residents as of November 25, 2022, based on the latest United Nations data.¹ The majority of its inhabitants (78%) live in urban areas.¹ Compared to other countries, Lebanon has the largest immigration rate per capita, with 1.5 million refugees from Syria and 13715 refugees of other nationalities.² Syria, located on Lebanon's northeast border, has been facing a civil war since 2011, which has damaged most of the country's water treatment plants, pumping stations, and water towers.^{3,4} This has caused severe water shortages in the country, leading to dependence on unsafe water sources.^{3,5} Due to the Syrian crisis coinciding with a major population displacement, Lebanon suffered from resource scarcity that limited its capacity to provide adequate and consistent healthcare services. With increased burden on the healthcare system, thousands of people were at risk of contracting various communicable diseases.⁶ Since late 2019, Lebanon's healthcare system has struggled because of the socioeconomic crisis and political instability in the country.⁷

Discussion

Cholera is a waterborne disease with fecal–oral mode of transmission. Following the ingestion of contaminated food, water, and shellfish in rare cases, *Vibrio cholera* can cause intestinal infection. Cholera usually manifests as severe watery diarrhea, which can lead to dehydration, hypovolemic shock, and even death just hours after the onset of symptoms.^{5,8} Disease transmission is usually linked to insufficient access to clean water sources; an increased risk of transmission can be due to humanitarian crises such as population displacement, settlement in camps or overcrowded areas, and disruptions in water systems and sanitation. The World Health Organization (WHO) observed that cholera cases have continued to rise over the last few years; in 2020, a total of 323369 cases and 857 deaths were reported in 24 countries.⁹

In 2022, a cholera outbreak occurred in Syria, with a total of 936 suspected cases and 8 deaths reported between August 25 and September 10.^{5,8} Immediately afterward, cases began to emerge in Lebanon, and the numbers started to rise. The economic crisis and limited access to clean water and proper sanitation exacerbated the vulnerability of both the host and refugee populations in the country.^{8,10} As stated by Fabrizio Carboni (Regional Director, Near and Middle East, International Committee of the Red Cross), 'A public health emergency is the last thing these 2 countries need.'¹¹ The first case of cholera in Lebanon was confirmed on October 6, 2022.^{8,12} As of December 9, 2022, the country had reported a total of 5105 suspected cholera cases (of which 600 were laboratory-confirmed) and 23 associated deaths.^{8,12} The outbreak was initially confined to the northern districts but rapidly spread to all other governorates.^{8,12} As of December 20, 2022, the majority of cholera cases were predominantly reported from Akkar and the Northern Governorates and a lesser proportion was from Mount Lebanon, Bekaa, and Baalbek.⁸ Among those affected, those below the age of 15 years accounted for more than 50% of

© The Author(s), 2023. Published by Cambridge University Press on behalf of Society for Disaster Medicine and Public Health, Inc. This is an Open Access article, distributed under the terms of the Creative Commons Attribution licence (<http://creativecommons.org/licenses/by/4.0/>), which permits unrestricted re-use, distribution and reproduction, provided the original article is properly cited.

SDMPH
SOCIETY FOR DISASTER MEDICINE & PUBLIC HEALTH

these cases: under 5 years (25%), between 5 and 14 years (19%), between 15 and 24 years (15%), between 25 and 44 years (22%), and above the age of 44 years (19%).⁸

A report dated December 9, 2022, stated that 21% of the suspected and confirmed cholera cases required hospitalization.⁸ On that date, 25 hospital beds were allocated for cholera patients in the country.⁸ It was reported that 97% of patients presenting to the hospital setting for suspected cholera were symptomatic. The serotype *Vibrio cholera* O1 was identified as the *V. cholera* strain, similar to the one in Syria.⁸

The actual public health concern in Lebanon is the country's inability to curb the outbreak and manage the cases. While treating cholera patients, the country must also decrease the incidence of the resistance and growth of multidrug-resistant organisms. Some reports have been published about multi drug-resistant cholera.^{13–15} The challenge surrounding this disease is that its organism can become resistant and then transmit such resistance through plasmids to other organisms, aggravating the threat of antimicrobial resistance globally.

As cases started to rise in Lebanon, the United Nations International Children's Emergency Fund, the WHO, non-governmental organization (NGO) partners, and the Ministry of Public Health (MOPH) developed a joint response plan to control the situation.⁸ This led to the establishment of the National Cholera Task Force, headed by the MOPH, including specialists from other ministries along with representatives from various NGOs.⁸ Despite shortages in cholera vaccines, the WHO supported the MOPH in securing enough doses for high-risk cases.¹⁰ The vaccination campaign was launched on November 4, 2022, starting with prisoners and followed by frontline healthcare workers in endemic-affected areas. The campaign will continue with larger populations of refugees and host communities.⁸

Meanwhile, rehabilitation efforts have begun with targeting water supply systems in the most affected areas. Items for water testing were provided, and water purification tablets were distributed to 2700 households throughout the country.¹¹ The hospitals receiving cholera cases, mainly the national public hospitals, were instructed on the new protocols for infection control and case management.¹¹ The WHO has also provided these hospitals with laboratory reagents, treatment kits, and rapid diagnostic tests.

The WHO task force also conducted training sessions at the national level for the early detection of suspected cases, adequate isolation, and rapid initiation of treatment.¹⁰

Conclusion

The cholera outbreak in Lebanon is a major public health emergency. The country's vaccination campaign is just 1 solution, which can be further strengthened by awareness campaigns that discuss adequate sanitation and water source intakes.

Authors contribution. Authors have contributed equally in the writing.

All authors had full access to all of the data in the study and can take responsibility for the integrity and accuracy of the data.

Abbreviations. ICRC, International Committee of the Red Cross; WHO, World Health Organization; UNICEF, United Nations of International Children's Emergency Fund; NGO, Non- Governmental Organization; MOPH, Ministry of Public Health

References

1. **Worldometer.** Lebanon population (live). *Worldometers.info*. Accessed December 15, 2022. <https://www.worldometers.info/world-population/lebanon-population>
2. **United Nations High Commissioner for Refugees (UNHCR).** *Refugee data finder*. Accessed December 15, 2022. <https://www.unhcr.org/refugee-statistics/>
3. **Devi S.** War driving cholera in Syria. *Lancet*. 2022;400(10357):986. doi: 10.1016/S0140-6736(22)01836-0
4. **Nations Online.** Map of Lebanon, Middle East. Accessed March 1, 2023. https://www.nationsonline.org/oneworld/map/lebanon_map.htm
5. **Ahmed SH, Nashwan AJ.** Cholera outbreak amid civil war: a public health crisis in Syria. *J Infect Public Health*. 2022;15(12):1484-1485. doi: 10.1016/j.jiph.2022.11.013
6. **Hammoud S, Onchonga D, Amer F, et al.** The burden of communicable diseases in Lebanon: trends in the past decade. *Disaster Med Public Health Prep*. 2022;16(5):1725-1727. doi: 10.1017/dmp.2021.200
7. **Farran N.** Mental health in Lebanon: tomorrow's silent epidemic. *Ment Health Prev*. 2021;24:200218. doi: 10.1016/j.mhnp.2021.200218
8. **OCHA.** *Lebanon cholera outbreak situation report no 7; December 10, 2022.* *Reliefweb.int*. Accessed December 10, 2022. <https://reliefweb.int/report/lebanon/lebanon-cholera-outbreak-situation-report-no-7-10-december-2022>
9. **World Health Organization (WHO).** *Weekly epidemiological record*. 2021;96(37):445-460. Accessed December 20, 2022. <https://apps.who.int/iris/handle/10665/345267>
10. **United Nations (UN).** *Cholera spreading throughout Lebanon, WHO warns*. Published November 1, 2022. <https://news.un.org/en/story/2022/11/1130067>
11. **International Committee of the Red Cross (ICRC).** *Syria and Lebanon hit by cholera: preventing the collapse of essential infrastructure is imperative to avoid devastating health and humanitarian consequences*. Published November 3, 2022. <https://www.icrc.org/en/document/syria-and-lebanon-hit-by-cholera>
12. **Republic of Lebanon, Ministry of Public Health (MOPH).** *Cholera in Lebanon*. Accessed February 27, 2023. <https://moph.gov.lb/en/Pages/2/64577/cholera-surveillance-in-lebanon>
13. **Alam MT, Mavian C, Paisie TK, et al.** Emergence and evolutionary response of *Vibrio cholerae* to novel bacteriophage in Democratic Republic of the Congo. *Emerg Infect Dis*. 2022;28(12):2482-2490. doi: 10.3201/eid2812.220572
14. **Abdelaziz Gobarah DE, Helmy SM, Mahfouz NB, et al.** Virulence genes and antibiotic resistance profile of vibrio species isolated from fish in Egypt. *Vet Res Forum*. 2022;13(3):315-321. doi: 10.30466/vrf.2021.520767.3117
15. **Taviani E, van den Berg H, Nhassengo F, et al.** Occurrence of waterborne pathogens and antibiotic resistance in water supply systems in a small town in Mozambique. *BMC Microbiol*. 2022;22(1):243. Published 2022. doi: 10.1186/s12866-022-02654-3