

The specter of cholera in Libya and North Africa: Natural disasters and anthropization threaten human health during recent years

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Libya • cholera • Natural disaster • Public health anthropization • Environmental ethics

Summary

Introduction. According to data from the World Health Organization (WHO), in the last year cholera has re-emerged in various areas of the planet, particularly in Africa. The resurgence of this disease is closely linked to poor hygiene, which is sometimes the result of wars or environmental disasters, as in Lebanon and Syria since autumn 2022 and today in Libya.

Discussion. The spread of cholera is chiefly caused by the presence of contaminated water, in environments with inadequate hygiene and sanitation. Another cause, however, is the lack of access to adequate vaccination and treatment campaigns.

Method. In this short paper, the authors highlight the possibility of a resurgence of epidemic cholera in Libya, especially in light of the consequences of the devastating cyclone Daniel and the simultaneous collapse of two dams upstream of the city of Derna. They also highlight the concern that cholera and other infec-

tious diseases may also spread in Morocco, which was hit by a severe earthquake on 8 September last. The focus of the paper is the awareness that the spread of epidemic diseases is very often linked to human actions, which may trigger or exacerbate the effects of natural disasters.

Conclusions. Since these events have devastating effects both on the environment and on people and their psychophysical balance, it is evident that we need to devote greater attention to the health of the planet, to which the health and survival of the human species is strictly and inextricably linked. Indeed, disasters related to phenomena of anthropization facilitate the spread of infectious diseases, placing a heavy burden on local and global health organizations and the health of entire populations. A change of course is therefore essential, in that human actions must be aimed at limiting rather than aggravating the spread of diseases.

Fig. 1. Barry Commoner* - The proper use of science is not to conquer nature but to live in it.



* Barry Commoner (May 28, 1917 – September 30, 2012) was an American cellular biologist, college professor, and politician. He was a leading ecologist and among the founders of the modern environmental movement.

Introduction

In September 2023, Northern Africa was struck by two huge natural disasters. On September 8, a devastating 6.8 magnitude earthquake hit the High Atlas Mountain range, killing over 2,800 people and injuring thousands more. Two days later, between 10 and 11 September, Cyclone Daniel hit the eastern coasts of Libya, bringing torrential rain and winds of up to 180 km/h and causing devastation.

The damage caused by Cyclone Daniel was frighteningly aggravated by the fact that the storm caused the simultaneous collapse of two dams upstream of the city of Derna, in Cyrenaica. Over 33 million cubic metres of water burst from the reservoirs, flooding large areas and killing thousands; around 6,000 perished in the city of Derna alone, and 10,000 people are still missing.

In addition, almost 40,000 people in the north-east of the country have been left homeless. However, the final balance will not be drawn up for a long time yet, in view of the scenes of bodies piled up in the streets, corpses continually washed up by the sea and entire areas swept away by the fury of the water.

Morocco was hit by an unpredictable natural disaster, destroying the ancient buildings, which had not been

constructed to withstand an earthquake. In the case of Libya, by contrast, the disaster can be ascribed both to climate change, which is disrupting Mediterranean weather patterns, and to anthropization, which determined, among other things, the construction of reservoirs dangerously close to a city; in the event of the collapse of the dams, the inhabitants would have no escape, as unfortunately happened.

Health policies and public health strategies in a global context: the emergence of diseases such as cholera

As the Worldwide Fund for Nature has pointed out, “Cyclone Daniel was the killer, but the instigators of the devastating floods that caused thousands and thousands of victims in Libya (shocking figures) are climate change, bad or non-existent land planning and the lack of warning systems” [1, 2]. The country’s unstable political situation also hinders the implementation of adequate and effective preventive health policies and, in the event of necessity, results in shortages of relief services, with the real possibility of being unable to prevent the spread of deadly epidemics.

Just a few months ago, we outlined the risk of cholera in Syria, which in February 2023 was also hit by a destructive earthquake; this exacerbated the difficult social and health situation of the country, which has been racked by a bloody war for 12 years [3]. Both the war and the earthquake have caused the displacement of large masses of the population, who live in refugee camps where the hygiene situation is totally out of control. Indeed, in Syria (excluding the north-west), 103,123 cases of cholera were recorded from 1 January to 5 August 2023 [4].

Like Syria, Lebanon also reported to the World Health Organization a cholera epidemic which, within a few weeks at the end of 2022, had reached significant numbers, mainly affecting children under the age of 5 years [5].

Between October 2022 and June 2023, 8,007 cases of cholera were recorded in Lebanon [6].

The situation of Pakistan should also be remembered: from 2022, due to earthquakes and severe drought, the cholera outbreak is overwhelming what remains of the provinces of Sindh, Belucistan e Punjab.

confirmed cases of cholera are currently 290, while the suspected cases are over 2000, only in the first 5 months of the year, when outbreaks in the three regions were confirmed.

Certainly, it is a country where cholera is endemic but the rapid increase in cases of cholera requires a careful surveillance in particular in province of Sindh where many cases of disease have been recorded: 234, into the area there is the largest city of Pakistan called Karachi, a very important crossroads for maritime and air transport so there is a high probability of spread of the disease to other countries [7].

Cholera came back in Haiti after the previous epidemic of 2016, the hurricane “Matthew” was devastating and caused a strong spread of cholera.

“Between 2 October and 6 December last year, the Ministry of Public Health and Population of Haiti reported a total of 13.672 cases of suspected disease of cholera, (including 283 death) (the mortality rate was 2,05%) from all ten departments of the country” [8].

After years of steady decline, cholera is re-emerging in various areas of the planet. Indeed, according to WHO data, “28 countries have reported cases since the beginning of 2023”. During the same period in 2022, 16 countries reported cases [9].

“The WHO African Region remains the most severely affected, with 16 countries reporting cholera cases since the beginning of 2023. The outbreaks in many Southeast African countries, including Burundi, Malawi, Mozambique, South Africa and Zimbabwe, appear to have stabilized in recent weeks. In the Democratic Republic of the Congo, the number of cases is plateauing at over 950 cases each week at the national level, with some regional variations, with the majority of cases concentrated in North Kivu, South Kivu, and Tanganyika” [10, 11] (Figs. 2-3).

There are many of these states that has also been a resurgence of other infectious diseases in recent months, such as poliomyelitis, which returned to Africa after the WHO declared Africa polio-free on 25 August 2020 [12, 13].

In this scenario, the Libyan tragedy has significantly exacerbated the risk of outbreaks of cholera and other infectious diseases, as well as of dehydration and malnutrition. Indeed, in the areas hit by the cyclone and the flood, corpses and animal carcasses still litter the streets, while others are buried under meters of mud. Most infrastructure and hospitals are impracticable and access to safe water is extremely limited. Moreover, the practice of burying large numbers of corpses in improvised mass graves can also lead to serious problems, owing to the possible contamination of groundwater. Thus, the priorities today are to provide shelter, food and clean water, primary medical care, and also psychological assistance. There is also a serious risk that the number of victims could more than double.

Cholera is an acute intestinal infection caused by consuming the bacterium *Vibrio cholera* which can be present in contaminated food or water.

Cholera is due to water-related diseases caused by undrinkable water and lack of hygiene, and there are villages where people have no choice, in fact cholera transmission is closely linked to inadequate access to clean water and sanitation facilities.

Cholera also causes an extremely virulent disease, and it is a very aggressive disease; it can cause severe diarrhea, dehydration and even death. Clean water and good hygiene are important to prevent it. In order to control cholera epidemics and reduce the number of deaths, it is essential to careful monitoring hygienical conditions in the communities, the access to clean drinking water and

Fig. 2. Cholera cases reported by WHO between early 2022 and 15 August 2023 in some countries in the African region (Source: WHO. Multi-country outbreak of cholera, External situation report #6 - 6 September 2023).

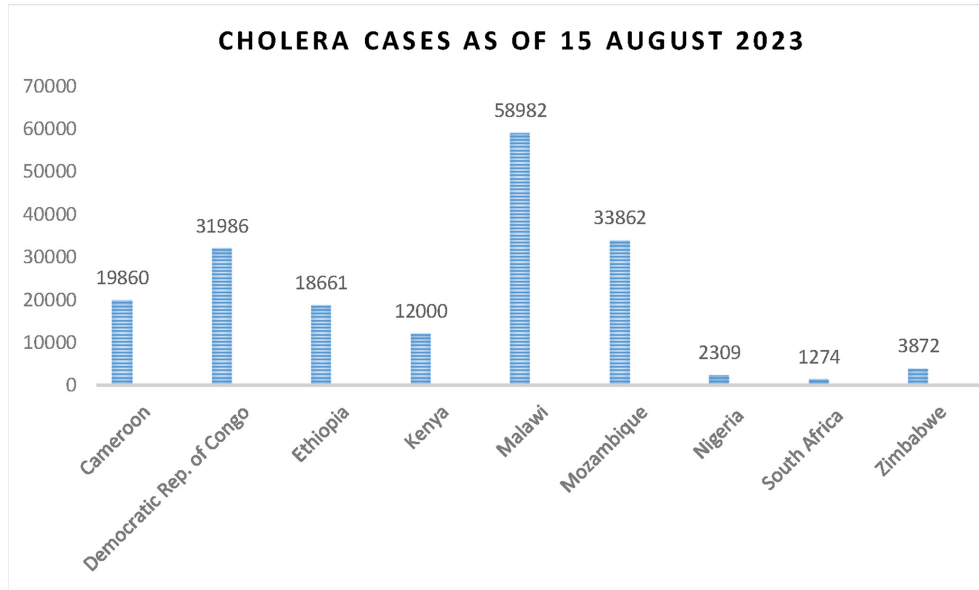
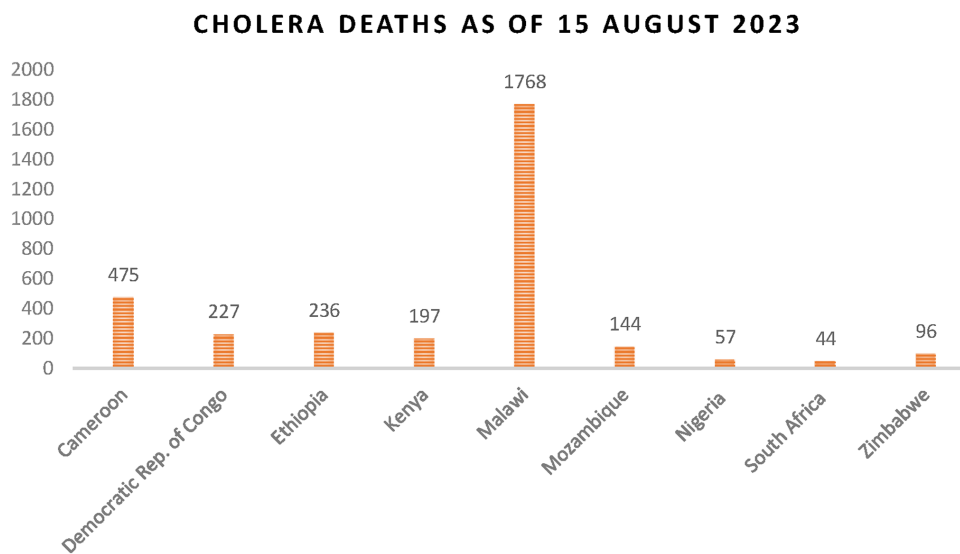


Fig. 3. Cholera deaths reported by WHO between early 2022 and 15 August 2023 in some countries in the African Region (Source: WHO. Multi-country outbreak of cholera, External situation report #6 - 6 September 2023).



strengthen and spread treatment and vaccines against cholera. Furthermore, an interdisciplinary approach is recommended in health surveillance of life and work environment.

A cholera epidemic would make this situation even more dramatic, overwhelming the survivors of this enormous tragedy, the causes of which lie not only in the force of nature but also in man's improper management of the territory and resources.

Earthquakes are natural phenomena that leave us shocked and helpless. But events like the disaster in Derna are often aggravated by "human factors".

Libya is one of the most arid countries in the world; only

5% of its territory receives at least 100 millimetres of rain per year. Hence, 95% of Libya's water supply comes from underground aquifers. Moreover, the ongoing civil war only exacerbates this situation of vulnerability. Indeed, water distribution networks have been partly destroyed and waste management has been practically paralysed, significantly increasing the risk of water-borne diseases, including cholera [14].

As has been pointed out, "66% of the population living in Libya is subject to water stress – that is, a temporary or prolonged condition of lack of water – while more than 10% of the population does not have access to safe drinking water and sanitation services" [15];

understandably, this situation has negative repercussions in terms of public health.

For this reason, back in 2020, UNICEF raised the alarm regarding the increased probability of outbreaks of cholera and other infectious diseases linked to the shortage of water [16], especially among those displaced by inter-ethnic fighting and among the migrants imprisoned in detention camps.

Ethics, environmental prevention and human behaviour: a long obstacle course

The need to reverse the trend in human behaviour, both of individuals and populations, is evident.

As regards the public health programme and the social impact the efforts of government and health authorities must focus on improving access to clean water, adequate sanitation facilities, strengthening the surveillance and control system for these diseases. In some cases, they are complemented by systematic early identification of different cases and needs, resolution and best solutions of most common problems.

All this has already been established and planned by current “Ending Cholera Road Map” of 2017.

“Ending Cholera-A Global Roadmap to 2030 operationalizes the new global strategy for cholera control at the country level and provides a concrete path toward a world in which cholera is no longer a threat to public health. By implementing the strategy between now and 2030, the Global Task Force on Cholera Control (GTFCC) partners will support countries to reduce cholera deaths by 90 percent. With the commitment of cholera-affected countries, technical partners, and donors, as many as 20 countries could eliminate disease transmission by 2030” [17, 18].

At the same time, we must safeguard our planet and tackle the risks associated with the specific features of certain areas, in order to ensure the safety of the people who live there. But to do so, it is above all necessary for man to reappraise and correct his way of relating to and “using” our planet, which is the only one we have. Understanding this simple but fundamental reality should prompt us to adopt lifestyles that are environmentally sustainable.

Human health, too, depends on the health of the planet, its animals and plants. By taking care of the Earth, we take care of ourselves and other people.

Environmental disasters, whether caused or exacerbated by human actions, expose the limits of our capacity for prevention and treatment. Indeed, when hospitals and healthcare facilities are destroyed, when enormous masses of people migrate in search of safer places to live, when prevention campaigns cannot be implemented, when clean water, basic hygiene, medicines, and healthcare personnel are in short supply, it becomes extremely difficult to respond effectively to multiple and simultaneous epidemics. And the repercussions on populations are enormous.

- Firstly, there is the risk of contracting one of the infectious diseases that appear during the various disasters.
- Secondly, those people who are already ill see their treatment interrupted.
- Thirdly, normal prevention programmes break down.
- And finally, psychological problems afflict those who are hardest hit or weakest.

Conclusions

In light of our brief reflection, we believe it is essential to propose a focus on these problems, which mainly involve the environmental sphere, but which also have repercussions on public health as a whole. This chain of events must be broken, as far as this lies within human capabilities. Man needs to change his behaviour, his building techniques, and his territorial and environmental planning activities. Such modifications would certainly improve our ability to manage the health of populations and to deal with complex emergencies.

“Like music and art, love of nature is a common language that can transcend political or social boundaries”.
(Jimmy Carter)**

Fig. 4. James Earl Carter Jr., Jimmy Carter** – Plains, 1^o October 1924.



** Jimmy Carter served as the 39th President of the United States from 1977 to 1981. He was awarded the 2002 Nobel Peace Prize for work to find peaceful solutions to international conflicts, to advance democracy and human rights, and to promote economic and social development.

[The biography for President Carter and past presidents is courtesy of the White House Historical Association].

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The authors declare no conflict of interest.

Authors' contributions

DO; designed the study; DO: conceived the study; DO and MM: drafted the manuscript; DO, MM and CM: critically revised the manuscript. DO and CM: performed a search of the literature; furthermore: MM: methodology; DO and CM: validation and data curation; CM: formal analysis; MM and CM: final editing. All authors critically revised the manuscript. All authors have read and approved the latest version of the paper for publication.

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