



## EDİTÖRE MEKTUP / LETTER TO THE EDITOR

### Pakistan floods: an insight into health hazards and preventive measures

Pakistan selleri: sağlık tehlikeleri ve önleyici tedbirler hakkında bir fikir

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*Cukurova Medical Journal 2022;47(4):1774-1775*

To the Editor,

In Pakistan, the frequency and intensity of floods have drastically increased over the past years, but there is limited epidemiological data on the health hazards marked by the earlier floods. The increased frequency of flooding means that Pakistan will face a more heightened ratio of hazardous diseases. The flooding in the year 2010 was declared the biggest calamity in Pakistan which affected nearly 20 million people besides the economy, the healthcare system, and the overall infrastructure of the country. Past flooding has also exposed major policy and implementation gaps in flood management in the country. According to the CNN report, recent flooding has hit many cities of Pakistan affecting nearly thirty-three million (15%) of the population killing over 1000 people and injuring around 1,527 since mid-June 2022 in several cycles of torrential rains and floods<sup>1</sup>.

Flooding often creates a conducive environment (breeding ground) by altering the balance of the environment to promote the development of numerous pathogens and vectors. Presently there is an outbreak of waterborne and mosquito bite diseases in the flood victims, but no data has reported the occurrence ratio of such diseases in Pakistan yet. These diseases may be due to new and modified microbes or pathogens. Floods precipitate several vector-borne diseases, particularly spread by mosquito bites, which can breed in stagnant flood water. Mosquito bites are responsible for the spread of viruses and parasites likely chikungunya, dengue,

dirofilariasis, Japanese encephalitis, lymphatic filariasis, malaria, rift valley fever, ross river, yellow fever, and zika<sup>2</sup>.

Flood transports several kinds of bacteria, parasites, and viruses into clean water, resulting in waterborne diseases. Waterborne diseases are acquired by people while bathing, drinking water, washing, or consuming foodstuff exposed to contaminated water. The microbes and pathogens in contaminated water or food may have adverse effects on human health, for instance, diseases, disabilities, or deaths. Waterborne diseases have a variety of symptoms. Diarrhea and vomiting are the most reported symptoms of waterborne illness. While other recognized waterborne infections are cryptosporidiosis, cyclosporiasis, escherichia coli infection, hemolytic uremic syndrome, giardiasis, harmful algal blooms, hot tub rash (pseudomonas dermatitis/folliculitis), legionellosis, naegleria fowleri, norovirus infection, shigellosis, swimmer's ear, and swimmer's itch<sup>3</sup>. Dirty water, poor hygiene, crowded living conditions, and hazardous food can cause diarrhoeal diseases in flood victims residing in tents or shelters<sup>4</sup>.

A study reported an increased number of diseases in the five flood-prone districts of Pakistan and identified a weak and inadequate health system capacity at the district level in providing essential healthcare services during floods<sup>5</sup>. Several disaster management authorities are established at local, provincial, and federal levels to manage disasters, but health management seems reactive rather than proactive in terms of providing health services.

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Geliş tarihi/Received: 14.09.2022 Kabul tarihi/Accepted: 16.10.2022

Floodwaters possess immediate dangers, but displacement and poor living conditions have more long-term effects on the health of flood victims<sup>6</sup>. Pakistan needs to improve the capacity of healthcare systems to effectively cater to the required healthcare service during floods<sup>7</sup>.

These flooding problems occur not only in developing countries like Pakistan but the flooding of New Orleans after Hurricane Katrina in the year 2005 also led to several health issues in the developed United States of America. Fortunately, the Pakistani government and Army are playing a significant role in helping people to migrate to safer places and providing them with shelter, meals, and adequate medical care. But preventing waterborne diseases and mosquito bites will be a challenging task for Pakistan. The long-term health effects of flooding on the Pakistani population are currently under-represented. Several measures on an urgent basis are required to combat diseases. Government shall provide safety nets, and Environmental Protection Agency (EPA) approved insect repellents likely picaridin, oil of lemon eucalyptus, para-menthane-diol, and 2-undecanone to flood victims for protection against mosquito bites. Water must be drained through suction pumps in big pits which must be covered with mosquito-repellent oils to stop mosquitoes from laying eggs in stagnant water. Government shall provide clean water for bathing and drinking to the flood victims.

We suggest establishing the epidemiological data of flood victims to explore the prevalent waterborne and mosquito-bite diseases to establish the cause-effect relationship between hazardous diseases and flooding in Pakistan. We anticipate that long-term strategies including adequate emergency measures, comprehensive risk assessment, early warning of rain systems, and a structured healthcare system must be implemented for preventing health hazards after

flooding in Pakistan. We must also be mindful of the long-term trends that have led to the current disaster.

**Yazar Katkıları:** Çalışma konsepti/Tasarımı: AR, NS, YS; Veri toplama: AR; Veri analizi ve yorumlama: AR; Yazı taslağı: AR, NS, YS; İçeriğin eleştirel incelenmesi: AR, NS, YS; Son onay ve sorumluluk: AR, NS, YS; Teknik ve malzeme desteği: AR; Süpervizyon: AR, NS, YS; Fon sağlama (mevcut ise): yok.

**Hakem Değerlendirmesi:** Editoryal değerlendirme.

**Çıkar Çatışması:** Yazarlar çıkar çatışması beyan etmemişlerdir.

**Finansal Destek:** Yazarlar finansal destek beyan etmemişlerdir.

**Author Contributions:** Concept/Design: AR, NS, YS; Data acquisition: AR; Data analysis and interpretation: AR; Drafting manuscript: AR, NS, YS; Critical revision of manuscript: AR, NS, YS; Final approval and accountability: AR, NS, YS; Technical or material support: AR; Supervision: AR, NS, YS; Securing funding (if available): n/a.

**Peer-review:** Editorial review.

**Conflict of Interest:** Authors declared no conflict of interest.

**Financial Disclosure:** Authors declared no financial support

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