

# Lahore's encounter with *Naegleria fowleri*: Unveiling health hazards and heightened concerns

Dear Editor,

I am writing to draw attention to the alarming situation of the *Naegleria fowleri* outbreak in Pakistan. *N. fowleri*, an amphizoic amoeba, has the ability to survive in free water bodies, soil, and even within the human central nervous system.<sup>1</sup> This deadly amoeba has been linked to water-related activities such as swimming, diving, and other recreational water sports.<sup>1</sup> Its pathogenesis involves entry through the nasal cavity, where it attaches to the nasal mucosa, and then moves along the olfactory nerve, eventually reaching the olfactory nerve bulbs in the central nervous system. The resulting primary amoebic meningoencephalitis (PAM), often referred to as “brain-eating,” has a staggering fatality rate of approximately 98%, leading to death within 3–7 days due to increased intracranial pressure and brain herniation.<sup>2</sup>

The first case of PAM in Pakistan was reported in 2008.<sup>3</sup> The number of *N. fowleri* cases in Pakistan has exceeded the number of cases reported in the United States in the last half-century in just one decade. The reported number of deaths due to PAM was six in 2017, one in 2018, 15 in 2019, six in 2020, and four in 2022. No deaths associated with PAM were reported in 2021.<sup>4</sup> Over the past decade, the number of *N. fowleri* cases in Pakistan has significantly increased, with reported deaths reaching concerning levels.<sup>3</sup> In 2023 cases have been rising at an alarming rate.<sup>3</sup> On July 2, 2023, Lahore reported its first case of *N. fowleri* confirmed with polymerase chain reaction testing of cerebrospinal fluid, highlighting the urgency of addressing this issue.<sup>5</sup> This patient had a history of swimming in a local pool recently, yet the source could not be confirmed, and died on the third day of his admission. With high summer temperatures soaring up to 49°C in July, the use of air conditioners, water coolers, and unclean swimming pools has surged, contributing to the spread of this deadly amoeba.

Furthermore, Pakistan is still recovering from the aftermath of massive floods in 2022, affecting a substantial portion of the agricultural land and straining the country's healthcare system.<sup>4</sup> The vulnerable population is already facing the challenges of waterborne diseases, including dengue. An outbreak of *N. fowleri* could exacerbate the burden on the healthcare infrastructure, leading to dire consequences.<sup>6</sup>

To address this critical situation, immediate action is essential. A well-designed awareness campaign must be launched urgently to

educate the public about the emergence of *N. fowleri*. People should be discouraged from using local canals, unclean swimming pools, and deep nasal cleaning during ablation practice. Proper maintenance of room air coolers and air conditioners and drinking boiled water are crucial to prevent the growth and transmission of the amoeba. Water and sanitation agencies should monitor the major water bodies including drinking water and other resources. Moreover, the health department in collaboration with infection control and the public health department must develop a comprehensive policy to combat this outbreak effectively and form a committee to track the sources of contamination. Considering the fatal nature, poor prognosis, lack of a pharmacological cure, and resistant and unique strain, a preventive approach would be the best course of action to escape the deadliest outcomes.<sup>5,6</sup>

## AUTHOR CONTRIBUTIONS

**Ahmad Zain:** Conceptualization; formal analysis; writing—original draft; writing—review and editing. **Fatima Ashfaq:** Writing—original draft; writing—review and editing. **Masood Azhar:** Writing—original draft; writing—review and editing.

## CONFLICT OF INTEREST STATEMENT

The authors declare no conflict of interest.

## DATA AVAILABILITY STATEMENT

As the submitted article is a letter to the editor, there is no additional saved data available. All the data have been extracted from the cited articles.

Ahmad Zain<sup>1</sup>

Fatima Ashfaq<sup>2</sup> 

Masood Azhar<sup>3</sup> 

<sup>1</sup>Department of Medicine,  
Services Institute of Medical Sciences, Lahore, Pakistan

<sup>2</sup>Department of Radiology,  
Stanford University School of Medicine, Stanford, California, USA

<sup>3</sup>Department of Medicine,  
King Edward Medical University, Mayo Hospital, Lahore, Pakistan

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**Correspondence**

Masood Azhar, Department of Medicine, King Edward Medical University, Mayo Hospital, Lahore, Pakistan.  
Email: [masood\\_azhar@hotmail.com](mailto:masood_azhar@hotmail.com)

**ORCID**

Fatima Ashfaq  <http://orcid.org/0000-0003-2710-6174>

Masood Azhar  <http://orcid.org/0000-0001-9124-880X>

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