

**Naegleria fowleri strikes Karachi: A wake-up call for water safety**Hania Fatima<sup>1</sup>, Maryam Shaukat<sup>2</sup>

*Madam*, In a worrying development, Karachi has reported its first fatality of 2025 from *Naegleria fowleri*, the notorious "brain-eating amoeba". A 36-year-old woman from Gulshan-e-Iqbal tragically lost her life on 23 February, just five days after the onset of symptoms.<sup>1</sup>

*Naegleria fowleri* is a free-living, thermophilic microorganism that thrives in warm environments, tolerating temperatures up to 46°C (115°F).<sup>2</sup> It is commonly found in untreated freshwater sources such as lakes, rivers, hot springs, and poorly maintained swimming pools.<sup>2</sup> It infects humans when contaminated water enters the nasal passages, enabling the amoeba to travel along the olfactory nerve to the brain via the cribriform plate. Once in the brain, it triggers severe inflammation, cerebral oedema, and tissue necrosis, leading to rapid deterioration and, in most cases, death within just five days.<sup>3</sup> With a fatality rate exceeding 98%, infections caused by this amoeba are almost always deadly.<sup>2</sup> In the United States, fewer than 10 cases of an acute, fulminant and rapidly fatal CNS infection known as Primary Amoebic Meningoencephalitis (PAM) are reported annually, yet Karachi alone has seen over 100 fatalities in the past decade.<sup>3</sup> The newly reported case is especially concerning as the patient had no known exposure to recreational water sources. Her only contact with water was through ablution (wuzu) at home, raising serious questions about potential contamination in domestic water supplies.

The majority of Pakistan's population, particularly in rural areas, relies on unfiltered and non-chlorinated groundwater, providing an ideal breeding ground for *Naegleria fowleri*. In a predominantly Muslim country where ritual ablution (wuzu) is widely practised, the use of contaminated water further heightens the risk of infection. Karachi's arid, subtropical climate, prolonged summers

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**Submission completed:** 10-04-2025 **1st Revision received:** 19-04-2025

**Acceptance:** 10-05-2025

**2nd Revision received:** 09-05-2025

(March–October), poor water surveillance, and inadequate chlorination create optimal conditions for the amoeba's proliferation, making outbreaks increasingly likely.<sup>3,5</sup> While Karachi Water & Sewerage Board (KWSB) has initiated strategies towards chlorination, private water tankers remain largely unregulated and public awareness is limited.

Without urgent intervention, the growing burden of *Naegleria fowleri* infections will lead to increased mortality, economic strain, pressure on the healthcare system, and public distrust, ultimately deepening Pakistan's socio-economic challenges.<sup>4</sup> It is, therefore, imperative that the government adopts a sustained approach to ensure consistent water chlorination and mandatory testing of reservoirs, pipelines, and private tankers. Additionally, citizens should follow safe water practices, including treating water before nasal rinsing and avoiding unchlorinated swimming areas, to minimise the risk of infection.

**Disclaimer:** None.

**Conflict of interest:** None.

**Funding disclosure:** None.

**DOI:** <https://doi.org/10.47391/JPMA.30748>

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**Author Contribution:**

**HF:** Responsible for writing.

**MS:** Responsible for reviewing and editing.