

Naegleria fowleri in 2023: A rising threat to Pakistan

Varsha¹, Dev Kumar², Hersha³

Madam, *Naegleria fowleri*, i.e., brain-eating amoeba, is a single-cell, free-living parasite that resides in soil and warm freshwater bodies such as lakes, rivers, and hot springs. It enters the nasal cavity from contaminated water, uses the olfactory nerve to reach the brain, and causes a deadly infection called primary amoebic meningoencephalitis (PAM), with a mortality rate higher than 97% even with treatment.^{1,2} It causes symptoms similar to those of other bacterial and viral meningitis, such as fever, headache, vomiting, altered level of consciousness and coma, followed by death in the span of a week to 10 days.¹ There are 20 strains of *Naegleria* world worldwide, but only *N. fowleri* is dangerous to humans.¹

In 2008, the first case was reported from Karachi, Pakistan.² By 2019, the number had reached 146² and the cases have been increasing until now. In 2023, eight cases have been reported from May to August, among which seven are from the province of Sindh and one from Punjab.^{3,4,6} The available data shows that two deaths were due to recreational water activities and others because of contaminated tap water.^{3,4} This pathogenic amoeba commonly infects men, and the majority of cases were in people aged 26 to 45 years.¹ Of all the reported cases this year, one was a 32-year-old female, and seven were males in the age 19-45 years.^{3,4,6} The increasing global warming and higher authorities' negligence towards WHO recommended chlorination (0.1-10 mg/L) of domestic water supply are contributing factors to the higher burden of *Naegleria fowleri* cases in Karachi, the largest metropolitan city of Pakistan.⁵

The new lethal strain of *N. fowleri*, named as Karachi-NF001, has been found in one patient who travelled from

¹Dow Medical College, Dow University of Health Sciences, Karachi, Pakistan;

²2nd Year MBBS Student, Karachi Medical and Dental College, Karachi,

Pakistan; ³Jinnah Sindh Medical University, Karachi, Pakistan.

Correspondence: Varsha. e-mail: varshaa998@yahoo.com

ORCID ID. 0009-0002-5469-2316

Submission complete: 08-09-2023

Review began: 22-11-2023

Acceptance: 22-11-2023

Review end: 22-11-2023

Saudi Arabia to Karachi in 2019.² These emerging cases concern strict actions against this problem and the need to alert the Karachi Water and Sewerage Board (KWSB) regarding consistent chlorination from April to October.⁵ The monsoon season (May to September) is the best time to spread awareness regarding its prevention and update the current status of *N. fowleri* in our country. The general public should be encouraged to use boiled or sterilised water for ablution and avoid aquatic activities in non-chlorinated water during the summer season.³ Besides that, all underground and overhead water tanks in homes, hospitals, shopping malls, schools, offices, etc. should be cleaned once a year.³

Disclaimer: None.

Conflict of interest: None.

Funding disclosure: None.

DOI: <https://doi.org/10.47391/JPMA.10724>

References

1. Tabassum S, Naeem A, Gill S, Mumtaz N, Khan MZ, Tabassum S, et al. Increasing cases of *Naegleria fowleri* during the time of COVID 19; an emerging concern of Pakistan. *Int J Surg* 2022;105:106881. doi: 10.1016/j.ijisu.2022.106881.
2. Saleem T, Jamal SB, Alzahrani B, Basheer A, Wajid Abbasi S, Ali M, et al. In-silico drug design for the novel Karachi-NF001 strain of brain-eating amoeba: *Naegleria fowleri*. *Front Mol Biosci* 2023; 10:e1098217. doi: 10.3389/fmolb.2023.1098217.
3. Ilyas F. Young man dies from brain-eating amoeba in Karachi. News release. The Dawn News Media Center. [Online] 2023 [Cited 2023 August 19]. Available from URL: <https://www.dawn.com/news/1763552>
4. Chaudhry A. First suspected case of *Naegleria* in Lahore. News release. The Dawn News Media Center. [Online] 2023 [Cited 2023 August 19]. Available from URL: <https://www.dawn.com/news/1762872>
5. Karim AM, Yasir M, Ullah I, Lee JH, Lee SH. Important factors causing high fatal cases of *Naegleria fowleri* primary amoebic meningoencephalitis in Pakistan. *Int J Infect Dis* 2020;97:230-2. doi: 10.1016/j.ijid.2020.05.094
6. News Desk. Pakistan: 7th *Naegleria fowleri* case reported in Karachi. News release. The Outbreak News Today Media Center. [Online] 2023 [Cited 2023 August 24]. Available from URL: <https://outbreaknewstoday.com/pakistan-7th-naegleria-fowleri-case-reported-in-karachi-84995/>

Author Contribution:

V and H: Writing and literature review

DK: Concept, literature review