

Naegleria Fowleri-Prevention is the best cure

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Respected Editor, With the temperatures rising every summer and the quality of water deteriorating in Pakistan and specially Karachi the 'brain-eating amoeba' *Naegleria fowleri* was on rise during this summer too. Six cases of primary amoebic meningoencephalitis (PAM) caused by *N. fowleri* were reported which took at least 5 lives in 2022.¹

Naegleria fowleri is a non-parasitic, thermophilic, disease-causing flagellate amoeba. *N. fowleri* can tolerate high temperatures (up to 45%) and mainly consumes bacteria due to which it is usually found in warm freshwater bodies.² The stage in which it is considered most infective is the trophozoite stage which is also its reproductive stage and it requires favourable conditions for this stage to be exhibited.² The main route of entry for *N. Fowleri* is the olfactory route when water contaminated with this pathogen is forcefully inhaled during water-related activities like swimming and ablution etc.²

Signs and symptoms of PAM are similar to those of viral or bacterial meningitis including fever, headache, stiff neck, vomiting, anorexia, and seizures. This is the reason *Naegleria fowleri* is also commonly known as "brain-eating amoeba". This similarity makes it difficult for physicians to diagnose it early. PAM can cause death within 3 to 7 days after the symptoms appear.³

After the first case of PAM which was reported in 2008, approximately 150 cases have been reported from Karachi alone. In only a decade, the number of PAM cases in Pakistan exceeded those reported in the USA in half a century (i.e. 142 cases between 1968 and 2019).⁴ Aga Khan University Hospital, Karachi, Pakistan has observed a death rate of approximately 20 deaths per year due to PAM in Pakistan.⁵

Naegleria fowleri can be killed by chlorinating water and the ensuing disease and deaths can be eliminated but due to the failure of the Karachi Water and Sewerage Board before supplying it to houses and then the use of that water for bathing and ablution, this pathogen continues to cause deaths every year.⁶

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According to the WHO, free chlorine having residual concentration equal to or more than 0.5 mg/L, at pH less than 8.0 and 20°C, after a contact time of at least 30 minutes is effective for chlorine disinfection. The government should make sure that this level of chlorine is maintained throughout the distribution system.²

Individually, people can adopt some precautionary steps to prevent getting infected by this amoeba. People should avoid the use of untreated tap water and filter the water (using a filter having an absolute pore size of 1 µm or less than that) before rinsing the nasal passages during ablution etc. or use distilled bottles of water for this purpose instead.²

When taking part in recreational activities like swimming, people should make sure that the swimming pools are properly chlorinated and they should avoid getting water up the nose, and try to avoid water-related activities when the water temperature is high as in summer.⁷

Following the advice of health experts, people should clean their underground and overhead water tanks before the start of summer every year.⁸ According to the directions of PMA representatives, people should also use chlorine tablets (one tablet in 1,000 gallons of water) for the purpose of disinfection.⁹ But since chlorine price can be out of reach for many people, they can use two tablespoons of bleach powder, make a paste of it with water, and put it into their water tanks at night which would be enough for 500 to 1,500 gallons of water and kill *Naegleria*.⁹

Awareness should be created among people regarding these precautionary measures against *N. Fowleri* through television and social media advertisements, putting up and distributing pamphlets in schools, workplaces, mosques, etc. Due to the 98 cure.

The high mortality rate of PAM and the lack of diagnostic and healthcare facilities in developing countries like Pakistan, prevention against this pathogen is the best cure.

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