

A common condition

'It's in our rivers and in our cups. There's no escape': the deadly spread of salt water in Bangladesh

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Kidney disease is on the rise in coastal communities, where some have no choice but to drink and cook with contaminated water

Sayed Ahmed and his wife Amena Khatun by the Rupsha River in Khulna, Bangladesh. All photos by Farzana Hossen

Shadows dance across large, concrete chambers while the sound of dripping water echoes in the distance. A rusty metal staircase leads up to an empty water tower overlooking Bangladesh's mighty Rupsha River. This water treatment plant was once a beacon of hope for the community; today the site lies abandoned, the only sign of life the daily activity of its resident caretaker, Sayed Ahmed.

Commissioned by the local government division for rural development to recycle contaminated water, the plant on the outskirts of the city of Khulna was designed to supply fresh water to 5,000 people. When construction began in 2005, Ahmed was offered employment as a security guard.

Sayed Ahmed bends over to attend to some equipment at the wastewater treatment plant. Ahmed works as a security guard at the local wastewater treatment plant

"I was excited when I first got the job," he says. "The new water plant was the talk of the town and everyone was hopeful about the benefits it would bring." But the project stalled in 2010 – due to high costs and internal politics, according to an engineer involved who did not want to be named – and shortly afterwards, everybody left. Only Ahmed remained; he has been guarding the derelict site for nearly two decades.

The site has since been handed over to Khulna City Corporation which did not respond to requests for comment.

As their children grew up and moved out, Ahmed and his wife, Amena Khatun, enjoyed spending their afternoons down by the river, watching the world go by. But six months ago, their quiet life was turned upside down.

After her hands and feet became swollen, Khatun was diagnosed with chronic kidney disease (CKD) – a serious, progressive disease that involves a gradual loss of kidney function. The couple were shocked to learn that Khatun's kidneys hadn't been working properly for nearly seven years and that her heart, lungs and central nervous system were already severely affected.

Although the 65-year-old already had high blood pressure and showed symptoms of fatigue, achy

muscles and shortness of breath, neither she nor her doctor had been concerned about her kidney health. But further tests revealed high levels of protein in Khatun's urine.

The consumption of saline water in coastal Bangladesh has long been associated with various health risks, including [hypertension](#), respiratory problems and [pre-eclampsia](#), but its effect on kidney health remains relatively unknown.

Q&A

Why is the world's freshwater getting saltier?

Freshwater is essential for drinking, irrigation and healthy ecosystems. As sea levels rise, freshwater systems around the world are increasingly being contaminated with saline water, gradually contaminating the soil, and wreaking havoc on lands, lives and livelihoods.

These salts can be dissipated by rainfall, but climate breakdown is increasing the frequency and severity of extreme weather events, including droughts and heatwaves. This leads to more intensive use of groundwater for drinking and irrigation, which further depletes freshwater sources and allows even more salt to leach into the soil.

The climate crisis drives salinisation in several ways. Ocean temperatures are rising, and [warmer water takes up more space](#). Ice sheets and glaciers are melting and flowing into the oceans. Rising water salinity is already influencing agricultural production and internal migration, particularly in low-lying coastal areas.

Average sea levels have risen by more than 8 inches (20cm) since 1880, with about three of those inches gained in the last 25 years. Even with significant reductions in greenhouse gas emissions, [research suggests](#) that sea levels could increase by a foot by 2050.

This process is already pushing salty water onshore along coastlines, from Bangladesh to the Mississippi delta, and will continue to affect more regions across the globe as the threat of climate breakdown increases.

Chronic kidney disease is a major public health issue worldwide but studies suggest a higher prevalence ([22%](#)) among Bangladeshis than the global average ([10%](#)). "Most people with CKD don't even know they have it," says Dr Abu Mohammed Naser, an environmental health professor at the University of Memphis. "Many miss early diagnosis, as often they don't experience symptoms until the disease has already advanced considerably."

As Bangladesh's third-largest city, Khulna, on the banks of the Rupsha and Bhairab rivers, was once the economic heartland of the south-western region, known for its jute mills, shipyards and thriving fishing industry. But frequent floods, cyclones and tidal surges are having an adverse effect on the city's freshwater resources, with saline intrusion resulting in a shortage of clean and safe water. Meanwhile on land, a booming shrimp-cultivation industry – which has earned Khulna its reputation as Shrimp City – is contaminating remaining freshwater repositories.

The Rupsha River. Frequent floods, cyclones and tidal surges are having an adverse effect on Khulna's freshwater resources

For people like Ahmed and Khatun, there is no choice but to continue using contaminated water. Around Khulna's Notun Bazar area, residents regularly use saline water for cooking, drinking and bathing. "Salt water surrounds us," says Ahmed. "It's in our rivers, in our [tubewells](#) and in our drinking cups – there's no escaping it."

In 2017, Naser investigated the effects of water salinity on kidney health in coastal areas of south-western Bangladesh, including Khulna. Measuring urinary sodium and total protein in the urine samples of 1,185 trial participants from 532 households, as well as their salt intake from drinking water sources, Naser found that 37% had mild proteinuria (elevated levels of protein in their urine) while 20% had moderate or substantial proteinuria.

“This shows that drinking-water sodium and urinary sodium are associated with increased protein excretion, which is a powerful marker for kidney disease,” he says. More recently, Naser conducted a [further study](#) comparing the effects of extreme heat on kidney health between men and women in Bangladesh. Using urine biomarkers, his team linked ambient temperature data from local weather stations to participants’ health outcomes.

“Various studies have reported that men globally are particularly at high risk of developing kidney disease since a large number involved in outdoor work have direct sun exposure for a prolonged time,” says Naser. “But our findings suggest that women in tropical regions are just as susceptible to the effects of high ambient temperature exposure as men.”

Khatun was diagnosed with chronic kidney disease – a serious, progressive disease that involves a gradual loss of kidney function

[New research](#) on river water salinity in coastal Bangladesh looked into records spanning the past three decades from a network of 86 monitoring stations, the largest dataset analysed to date, and found that the increasing salinisation of freshwater resources in the region is putting the livelihoods and health of local populations under greater threat.

“The global climate crisis is essentially a water crisis,” says Dr Mohammad Shamsudduha, a scientist and associate professor at University College London’s institute for risk and disaster reduction, who was involved in the research. “Although water salinity in south-western Bangladesh is highly seasonal and varies substantially between wet and dry seasons, in recent times, there has been a trend in rising salinity.”

This April was Bangladesh’s [hottest on record](#), with average temperatures of 40-42C across all districts. Khulna was particularly [affected](#), with extreme heat resulting in a rise in hospital admissions, forcing patients to occupy corridors and stairways as wards ran out of beds.

“These coastal communities are suffering the double burden of climate change,” says Naser. “On one hand, high temperatures cause profound sweating, loss of body fluid, and dehydration – and on the other, there’s no suitable water for them to drink and rehydrate. This water crisis has become a major health hazard with deadly consequences.”

Sitting up in her bed, wrapped in a red shawl, Khatun flicks through her medical notes, trying to make sense of her situation. “The pain is so intolerable, I’m not able to sleep or eat,” she says. The food her daughter brought remains untouched on the bedside table among scattered papers and pills.

Since her diagnosis, her health has deteriorated. She was told she needed to start dialysis immediately, and continue up to three times a week. To avoid the long waiting list at the local government hospital she went to a private clinic where each dialysis session costs 5,000 taka (£34). The family have now used up all their savings and have had to take out a loan. To cover the additional costs of medication, Khatun has been skipping dialysis sessions.

Dialysis capacity across health facilities in Bangladesh remains inadequate to meet the current and projected needs of CKD patients, according to [research](#).

As the evening draws to a close, Ahmed walks Khatun to the riverbank, where they watch the sun set over the river. Behind them looms the forlorn structure of an abandoned water plant that once showed promise but now tells a story of neglect.

Although the Bangladesh government and local partners have introduced initiatives to improve access to safe drinking water in south-western Bangladesh, the situation in Khulna is expected to worsen.

“There is seriously not enough vigorous research being done in this area. A deeper understanding of the links between heat, water salinity and kidney health can enable timely interventions and better health outcomes,” says Naser. “If we don’t see an improvement in water quality, we can expect an increase in kidney-related diseases in the future.”

Thaslima Begum *in Khulna*

P.S.

- The Guardian. Fri 24 May 2024 07.00 CEST:
<https://www.theguardian.com/global-development/article/2024/may/24/its-in-our-rivers-and-in-our-cups-theres-no-escape-the-deadly-spread-of-salt-water-in-bangladesh>
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