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Largest study widens rice, arsenic link in Bangladesh

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An unprecedented probe into high levels of arsenic in Bangladesh's groundwater strengthens suspicions that eating rice boosts exposure to the poison, scientists said on Monday.

Samples provided by 18,470 volunteers living in an arsenic -contaminated district showed that those who ate large amounts of rice had higher levels of arsenic in their urine than those who ate little rice, they said.

In addition, the big rice-eaters also had more symptoms of arsenic toxicity, such as skin lesions.

The paper, published in the peer-reviewed journal *PLOS One*, is the biggest-ever probe into whether arsenic-tainted groundwater in Bangladesh poses a risk for people who consume rice, the staple food.

The study demonstrates "arsenic in water and the food chain is a serious problem", said Parvez Haris, a specialist in environmental biomedicine at De Montfort University in the central English city of Leicester.

"(It) also shows that exposure to arsenic from rice can have harmful effects on human health, as it correlated with increased prevalence and incidence of skin lesions."

Arsenic in groundwater in parts of Bangladesh is a growing concern, say watchdogs.

The toxic element occurs in water naturally—the problem is that tens of millions of rural dwellers are exposed to it through shallow wells drilled in the 1970s in "access-to-water" programmes.

Most investigations have focused on the risk from drinking water, but there is now widening interest in whether the poison can also be passed on in rice, through irrigated fields.

The study was conducted in the district of Araihazar, Dhaka state.

Arsenic levels in the local rice were not determined in the study, although contamination of the area's water is well known. There are nearly 6,000 wells in an area of just 25 square kilometres (9.6 square miles).

"We recommend people in Araihazar and other parts of Bangladesh, who consume as much as 1.6 kilos (3.5 pounds) of cooked rice daily, to reduce their dependence on rice as their main source of calorie intake, to diversify their diet by for example increasing their intake of wheat and consuming rice varieties that are low in arsenic," said Haris.

"We have previously shown that rice from (the) Sylhet region of Bangladesh has lower arsenic content as does aromatic rice."

The work could also have implications for other parts of the world where there can be relatively high levels of arsenic in rice, said the authors. Parts of Cambodia, China, India and Vietnam fall into this category.

Haris's team previously found a link between arsenic and rice consumption among a small number of Bangladeshis who lived in Britain.

The new paper takes the exploration farther, as it draws on a much wider

sample of people living in Bangladesh itself.

Research carried out among 417 villagers in India's West Bengal, published last July, found signatures of genetic damage in urinary-tract cells.

The signatures, called micronuclei, are tiny pieces of DNA that are left over from when a cell replicates and fails to copy its genetic code properly.

The more frequently these mistakes occur, the higher the risk of cancer.

In the villagers, micronuclei frequency rose with increasing arsenic levels in rice, a trend that held for men and women, and also for tobacco and non-tobacco users.

Even small amounts of arsenic, over a long time, can cause cancer of the bladder, kidney, lung or skin, previous research has found.