

Arsenic in Drinking Water Raises Diabetes Risk

By Amanda Gardner
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Inorganic arsenic from natural mineral deposits contaminates much drinking water. Individuals exposed to enough arsenic can develop cancer, among other conditions, experts note.

TUESDAY, Aug. 19 (HealthDay News) -- High levels of arsenic in urine may be linked with a higher risk of developing type 2 diabetes, researchers report.

The findings, published in the Aug. 20 issue of the *Journal of the American Medical Association*, are the first to link low-level exposure to arsenic with type 2 diabetes prevalence in the United States.

"This suggests that arsenic would play a role in the development of diabetes," said lead researcher Dr. Ana

Navas-Acien, assistant professor of environmental health science at the Bloomberg School of Public Health at Johns Hopkins University. "But there clearly needs to be additional research conducted because our study has certain limitations. We are conducting those studies now, but that's going to take a few years."

"This is a good base for future research but it's a small sample size and doesn't look at dose-response," added Rajat Sethi, assistant professor of pharmaceutical sciences with the Texas A&M Health Science Center's Irma Lerma Rangel College of Pharmacy, in Kingsville. "A lot of research still needs to be done."

Inorganic arsenic from natural mineral deposits contaminates much drinking water. Individuals exposed to enough arsenic can develop cancer, among other conditions, experts note.

According to background information in the study, about 13 million people in the United States live in areas with a concentration of inorganic arsenic in the public water supply that exceeds recommended levels.

In animal studies, high concentrations of arsenic affected glucose and insulin mechanism -- key factors in type 2 diabetes.

And, epidemiologic studies in Taiwan, Bangladesh and Mexico, which have relatively high levels of inorganic arsenic in drinking water, have associated arsenic with the development of diabetes.

It's unclear, however, if lower levels of arsenic might have a similar effect. In areas such as Taiwan and Bangladesh, arsenic levels in drinking water are above 100 micrograms per liter, while in the United States the safety standard is only 10 micrograms per liter.

"In terms of magnitude, people in Taiwan and Bangladesh are exposed to at least 10 times higher levels compared to people in the U.S.," Navas-Acien said. "We were interested in investigating if arsenic exposure at low and moderate levels could be related to diabetes."

After analyzing 788 U.S. adults aged 20 or older, the study authors found that people with type 2 diabetes had a 26 percent higher level of total arsenic in their urine than participants without type 2 diabetes.

People with the highest levels of arsenic were almost 3.6 times more likely to have diabetes than people with the lowest levels, the researchers found.

Those with the highest levels of dimethylarsinate (a compound into which inorganic arsenic is metabolized) had 1.5 times the risk of diabetes as those with the lowest levels. This was after adjusting for organic arsenic compounds such as arsenobetaine and arsenosugars, which come primarily from seafood.

"When we adjusted for diabetes risk factors and for markers of seafood intake, we found this moderate-to-strong relationship between arsenic and the prevalence of diabetes," Navas-Acien said.

In the United States, the main sources of inorganic arsenic are contaminated drinking water and food. An estimated 8 percent of public water supply systems in the United States may have arsenic levels higher than 10 micrograms per liter while 14 percent may have levels exceeding 2 micrograms per liter, the researchers said.

"There are still many Americans with arsenic in drinking water at levels above safety standards," said Navas-Acien. "This reinforces how important it is that all drinking water is below this standard. The good news is that we can actually do something to eliminate arsenic from water."

Small, rural and semi-rural communities may be at especially high risk for high arsenic levels in drinking water, Navas-Acien.

More information

For more on arsenic in the water supply, visit the [U.S. Environmental Protection Agency](#).

SOURCES: Ana Navas-Acien, M.D., Ph.D., assistant professor, environmental health science, Bloomberg School of Public Health, Johns Hopkins University, Baltimore; Rajat Sethi, Ph.D., assistant professor, pharmaceutical sciences, Texas A&M Health Science Center Irma Lerma Rangel College of Pharmacy, Kingsville; Aug. 20, 2008, Journal of the American Medical Association