The connection between water and human biology is more important now than ever

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A researcher at Penn State is developing a way to consistently research water and its effects on human biology and health.

"While water has been studied in many different ways across fields, and different aspects of water or risks of dehydration have been studied by

different researchers in human biology, there has been no unifying body of work to date bringing all the different facets together in one place," said Asher Rosinger, the Ann Atherton Hertzler Early Career Professor in Global Health and director of the Water, Health and Nutrition Lab at Penn State.

Rosinger and his colleague Alexandra Brewis, President's Professor at Arizona State University, have proposed a framework for studying the "human biology of water" in a special issue of the *American Journal of Human Biology*, released today (Jan. 15).

"Studying the connection between water and human biology is more important now than ever with changing climates and projections of increased water and food insecurity facing a growing global population," Rosinger said. "We put this special issue together to focus on this increasingly timely issue as well as provide a tool kit so that comparing data across studies becomes more feasible, providing future research questions for others to build on."

There are many pieces of the puzzle associated with human health and its relationship to water, from how much water a person needs to survive as well as to be healthy, to the psychological stress associated with acquiring water.

The physiological and the mental health effects of experiences surrounding water on humans are not yet fully understood, as well as how these experiences change future behaviors, noted Rosinger.

"This emerging framework of the 'human biology of water' we present ... recognizes that access and use of water extends into every domain of human biology and health—nutrition, stress, development, reproduction, lactation, growth, infectious and chronic disease morbidity, mortality, life history, adaptation, physiology and behavior," Rosinger and Brewis

write in the introduction article of the issue. "That is, the quantity and quality of our water are woven into the intersections between human health, culture, and biology, just as they are for food."

Twelve separate articles in the special issue begin to address the variation in access to clean water across the globe and how it affects human health, both mentally and biologically.

One of the research articles is authored by Rosinger, examining how adaptations, early life environments and the life course can affect homeostasis of water in the body.

Rosinger looks at the existing research on body water homeostasis and water intake, in both human and animal models. He finds that early life influences, including in utero and through lactation, may affect thirst setpoints for life and that water insecurity may affect water consumption patterns, but that there is also a lot of flexibility in water intake.

"We are only beginning to understand the far-reaching implications of people's experiences with water," Rosinger said. "It will be increasingly important for research to examine these issues in a wide range of environments and with diverse populations to further uncover how experiences surrounding water problems differ or are similar, and how they affect health not only in the short-term but also in the long-term, across generations."

More information: Asher Y. Rosinger et al. Life and death: Toward a human biology of water, *American Journal of Human Biology* (2019). DOI: 10.1002/ajhb.23361

Asher Y. Rosinger. Biobehavioral variation in human water needs: How adaptations, early life environments, and the life course affect body water homeostasis, *American Journal of Human Biology* (2019). DOI:

10.1002/ajhb.23338