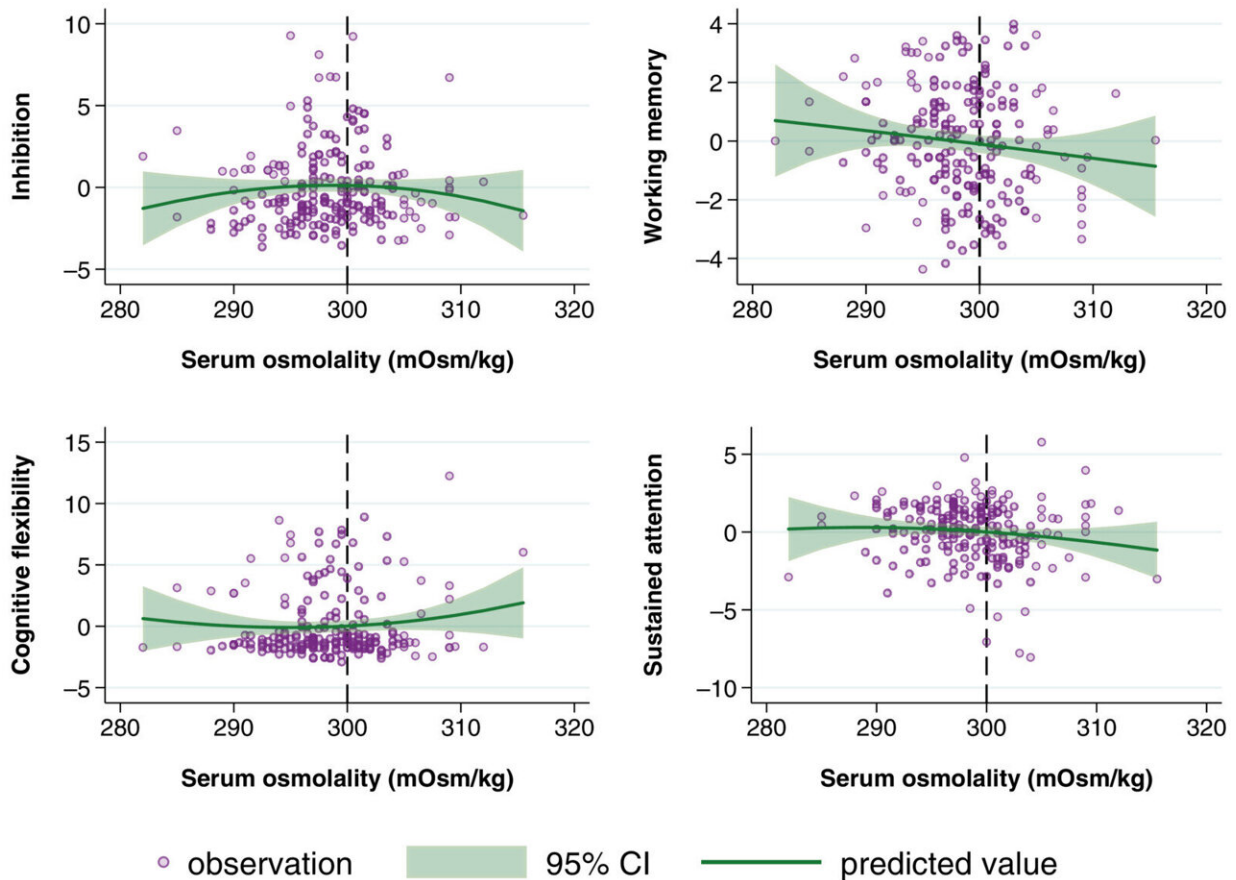


# Dehydration in middle-aged and older adults may lead to attention challenges

May 23 2024, by Emily Eng



Functional polynomial fit plot examining the association between serum osmolality and inhibition, working memory, cognitive flexibility, and sustained attention z-scores pooled for the three visits. Reference line >300 mOsm/kg is classified as dehydration. Credit: *American Journal of Human Biology* (2024). DOI: 10.1002/ajhb.24051

Dehydration can lead to a wide array of mild to severe symptoms, from temporary inconveniences on mood to life-threatening concerns.

Researchers in the Penn State Department of Biobehavioral Health studied how dehydration affects cognitive performance.

They found that even [mild dehydration](#) can diminish a person's ability to pay attention to tasks over time. The findings underscore the importance of proper hydration to the healthy functioning of people as they age.

The research team found that typical dehydration—the levels of dehydration that occur during nonstrenuous, everyday activities—reduced individuals' abilities to pay attention for tasks over 14 minutes but did not have any significant effect on other executive functions, such as working memory.

The [results](#) were published in the *American Journal of Human Biology*.

Led by Asher Rosinger, associate professor of biobehavioral health and anthropology and director of the Water, Health and Nutrition Lab, and Kyle Murdock, associate professor of biobehavioral health, the researchers assessed 78 adults, aged 47 to 70 years old, all of whom had adequate access to [safe drinking water](#), three times over three months.

"We chose to study middle-aged and [older adults](#) because this is the age group where we start to see risk of cognitive decline," Rosinger said.

Previous research has raised concerns about the impact of dehydration on cellular health, kidney function, biological acceleration of age, risk of chronic disease and early mortality. It has also produced mixed results on [cognitive performance](#), according to Rosinger.

Unlike previous studies that induced participants' dehydration, this study did not manipulate hydration status and instead assessed ad libitum

dehydration—adults' naturally occurring dehydration from real-life, typical functions. Participants were asked to avoid high-fat foods, caffeine and exercise on the days they were assessed to capture their level of dehydration without these influences.

To determine hydration status, the researchers analyzed the balance of dissolved particles, such as sodium or potassium, and water—called serum osmolality—in blood samples from each participant at three time points.

In Rosinger's study, adults with serum osmolality over 300 milliosmoles per kilogram were defined as dehydrated. Dehydrated individuals experienced diminished ability to sustain attention. At each assessment, at least 29% and up to 39.1% of the group was dehydrated.

During each assessment, study participants completed surveys and four neurological tests that measured their inhibition, working memory, cognitive flexibility and sustained attention. The researchers found that the more dehydrated the participant, the worse they did on the sustained attention task.

"This suggests that if a person is, on a daily basis, drinking less water than their body needs, it may take them slightly longer to complete certain long tasks with slightly more errors," Rosinger said.

The results did not indicate any significant connection between dehydration and inhibition, working memory or cognitive flexibility.

"The good news is that dehydration was only associated with poorer performance for tasks requiring sustained attention," Rosinger said. "It shows that in daily life when adults are not experimentally dehydrated—such as sitting in a sauna or going for an hour bike ride without drinking water—their cognitive performance on short tasks is

not different than those who are better hydrated."

The study's primary finding of dehydration only impacting longer tasks has daily implications. Because job responsibilities are often tasks needing sustained attention without breaks in-between, Rosinger emphasizes that hydration is key for proper cognitive function for these kinds of tasks.

"It is important that older adults drink water regularly," Rosinger said. "This will improve their ability to maintain sustained attention, and it might give them a boost when they're at work when they're reading that email from a colleague that drones on and on but includes action items or when they are just doing an intense version of the daily crossword with their friends."

Rosinger explained that more awareness regarding hydration could benefit this population, especially as prior Penn State [research](#) revealed that, as people age, their feeling of thirst in response to dehydration gradually decreases.

"The relationship between hydration and cognitive performance is particularly important in middle-aged and older adults given that they are more vulnerable to dehydration," Rosinger said. "They start to drink less water."

The results also raise concerns for the breadth of impacts on people's physiological and cognitive health, Rosinger noted, especially for those without reliable access to safe water.

"A big part of my research career has been spent trying to understand the coping strategies individuals and households employ to meet their water needs when they don't have access to clean water and the resulting health consequences or trade-offs," said Rosinger, who studies water insecurity

and challenges with water accessibility in addition to hydration needs.

"One of the things I've seen is that they often will either restrict the amount of water they consume or switch to less healthy beverages that they perceive are safer, like sugary drinks."

Rosinger said he plans to continue investigating how hydration impacts adults who are vulnerable to dehydration, with the ultimate goal of improving access to clean, healthy and trustworthy water people can use to meet their water needs. His future work aims to understand how extreme climatic events and climate change affect access to clean water and how interventions can be applied to improve health and well-being.

"This issue is going to be increasingly important as temperatures increase under future climatic scenarios, which will increase water needs," Rosinger said. "I would recommend older adults pay attention—pun intended—to how much water they consume."

**More information:** Asher Y. Rosinger et al, Ad libitum dehydration is associated with poorer performance on a sustained attention task but not other measures of cognitive performance among middle-to-older aged community-dwelling adults: A short-term longitudinal study, *American Journal of Human Biology* (2024). [DOI: 10.1002/ajhb.24051](https://doi.org/10.1002/ajhb.24051)

Provided by Pennsylvania State University

Citation: Dehydration in middle-aged and older adults may lead to attention challenges (2024, May 23) retrieved 16 June 2024 from <https://medicalxpress.com/news/2024-05-dehydration-middle-aged-older-adults.html>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.