

# Stressed out? Study suggests it may affect memory, brain size in middle age

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Credit: Nik Shuliahin, CC0

Middle-aged people with high levels of a hormone called cortisol in their blood have impaired memory when compared to those with average levels of the hormone, even before symptoms of memory loss started to show, according to a study published in the October 24, 2018, online issue of *Neurology*, the medical journal of the American Academy of Neurology. People with high levels of the hormone also had lower brain volume than those with regular cortisol levels.

Cortisol, produced by the adrenal glands, helps the body respond to stress. It can also help reduce inflammation, control [blood](#) sugar and blood pressure, regulate metabolism and help with immune response. High [cortisol levels](#) can be caused by stress, medical conditions or medications.

"Cortisol affects many different functions so it is important to fully investigate how high levels of the hormone may affect the brain," said study author Justin B. Echouffo-Tcheugui, MD, Ph.D., of Harvard Medical School in Boston, Mass.

For the study, researchers identified 2,231 people with an average age of 49 who were free of dementia. At the beginning of the study, each participant had a psychological exam and assessments for memory and thinking skills. Their memory and thinking skills were tested again an average of eight years later.

Participants also provided a blood sample, taken in the morning after a period of fasting. Researchers measured [cortisol](#) levels in the blood and then divided participants into low, middle and high groups, with those in the middle group having cortisol levels in the normal range, between 10.8 and 15.8 micrograms per deciliter (µg/dL).

A total of 2,018 participants also had an MRI brain scan to measure brain volume.

After adjusting for age, sex, smoking, and body mass index, researchers found that people with high levels of cortisol had lower scores on tests of memory and thinking skills than those with normal levels of cortisol. High cortisol was also linked to lower total brain volume. Those with [high cortisol](#) had an average total cerebral brain volume of 88.5 percent of total cranial volume compared to 88.7 percent of total cranial volume in those with normal levels of cortisol. No links were found between low

cortisol levels and memory or brain size.

"Our research detected [memory](#) loss and [brain](#) shrinkage in middle-aged people before symptoms started to show, so it's important for people to find ways to reduce stress, such as getting enough sleep, engaging in moderate exercise, incorporating relaxation techniques into their daily lives, or asking their doctor about their cortisol levels and taking a cortisol-reducing medication if needed," said Echouffo-Tcheugui. "It's important for physicians to counsel all people with higher cortisol levels."

Limitations of the study include that cortisol levels in the blood were measured only once and may not represent long-term exposure to the hormone. Also, participants were mostly middle-aged with European ancestry so results do not reflect the population as a whole.

Provided by American Academy of Neurology

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