

# Diabetes duration and severity associated with brain atrophy

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Type 2 diabetes may be associated with brain degeneration, according to a new multicenter study published online in the journal *Radiology*. The study also found that, contrary to common clinical belief, diabetes may not be directly associated with small vessel ischemic disease, where the brain does not receive enough oxygenated blood.

"We found that patients having more severe [diabetes](#) had less brain tissue, suggesting [brain atrophy](#)," said lead author R. Nick Bryan, M.D., Ph.D., professor of radiology at the Perleman School of Medicine at the University of Pennsylvania. "They did not seem to have more vascular disease due to the direct effect of diabetes."

According the American Diabetes Association (ADA), nearly 26 million people in the United States have diabetes, and 1.9 million more are diagnosed with the disease each year. Type 2 is the most common form of diabetes. In [type 2 diabetes](#), either the pancreas does not produce enough insulin or the cells ignore the insulin that is produced. The ADA estimates that, based on current trends, as many as one in three American adults will have diabetes in the year 2050.

"As diabetes becomes more common, better understanding of the disease and its management becomes even more important in order to minimize its effect on patient health," Dr. Bryan said.

For the study, Dr. Bryan and colleagues used [magnetic resonance imaging](#) (MRI) to investigate the association between severity and

duration of type 2 diabetes mellitus and brain structure in 614 patients (mean age 62 years) at four participating centers (University of Minnesota, Minneapolis, Minn.; Wake Forest Medical School, Winston-Salem, N.C.; Columbia University, New York, N.Y.; and Case Western Reserve University, Cleveland, Ohio). The mean duration of disease in the study group was 9.9 years. The researchers specifically tested whether more severe diabetes was inversely correlated with brain volumes and positively correlated with ischemic lesion volumes.

The results showed that longer duration of diabetes was associated with brain volume loss, particularly in the gray matter. However, the study found no association of diabetes characteristics with [small vessel](#) ischemic disease in the brain.

"Diabetes duration correlated primarily with brain atrophy," Dr. Bryan said. "Stated another way, our results suggested that, for every 10 years of diabetes duration, the [brain](#) of a patient with diabetes looks approximately two years older than that of a non-diabetic person, in terms of gray matter volume."

The researchers noted that their findings may have implications for future decline of cognitive function in patients with diabetes and raise the possibility that such cognitive changes might not be strongly related to vascular dementia but to neurodegenerative disorders, such as Alzheimer's disease.

**More information:** "Effect of Diabetes on Brain Structure: The Action to Control Cardiovascular Risk in Diabetes MR Imaging Baseline Data" *Radiology*, 2014.

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