

New research shows diabetes and worse blood sugar control are associated with long-term cognitive decline

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A new study of some 5,000 older people in the UK has shown that rates of long-term cognitive decline are steeper in those who have diabetes compared with people with normal blood sugar control, and that efforts to delay the onset of diabetes and/or control blood sugar levels might prevent subsequent progression of brain function decline.

The study, based on the English Longitudinal Study of Ageing, is by Dr Wuxiang Xie, School of Public Health, Imperial College London, London, UK, and Peking University Clinical Research Institute, Beijing, China, and colleagues, and is published in *Diabetologia*, the journal of the European Association for the Study of Diabetes (EASD).

While other studies have linked [cognitive decline](#) with [diabetes](#), this study is one of the largest to establish the direct relationship between HbA1c (levels of glycated haemoglobin, a measure of overall blood sugar control) and subsequent risk of cognitive decline.

The authors used data from wave 2 (2004-2005) to wave 7 (2014-2015) of the English Longitudinal Study of Ageing (ELSA) for their analysis. Cognitive function was assessed at baseline (wave 2) and reassessed every 2 years at waves 3-7. Computer modelling was then used to establish any possible associations.

The study contained 5189 participants (55% women, mean age 66 years)

with baseline HbA1c levels ranging from 15.9 to 126.3 mmol/mol (3.6-13.7%). Current cut-offs for defining diabetes using HbA1c are 6.5% and above.

The mean follow-up duration was eight years and the mean number of cognitive assessments was five. The analysis revealed that a 1 mmol/mol increase in HbA1c was significantly associated with an increased rate of decline in global cognitive z scores, memory z scores and executive function z scores, all signs of cognitive function decline.

The results remained statistically significant even after adjustment for baseline age, sex, total cholesterol, HDL (good) cholesterol, triacylglycerol, high-sensitivity C-reactive protein, body mass index (BMI), education, marital status, depressive symptoms, current smoking, alcohol consumption, high blood pressure, heart disease, stroke, chronic lung disease and cancer.

While cognitive function declined with age (as expected) in all of the participants, whether diabetic or not, compared with participants with [normal blood sugar](#) control, the global cognitive decline associated with prediabetes and diabetes was significantly increased. Similarly, memory, executive function and orientation z scores showed an increased rate of cognitive decline with diabetes.

Significantly, the rate of cognitive decline was directly linked to a person's HbA1c status (with higher HbA1c meaning higher rate of cognitive decline), whether or not they were diabetic according to their HbA1c status at baseline.

The authors say: "In conclusion, our study provides evidence to support the association of diabetes with subsequent cognitive decline. Moreover, our findings show a linear correlation between circulating HbA1c levels and cognitive decline, regardless of diabetic status. Future studies are

required to determine the long-term effects of maintaining optimal glucose control on cognitive decline in people with diabetes...Our findings suggest that interventions that delay diabetes onset, as well as management strategies for [blood sugar control](#), might help alleviate the progression of subsequent cognitive decline over the long-term."

More information: Fanfan Zheng et al. HbA1c, diabetes and cognitive decline: the English Longitudinal Study of Ageing, *Diabetologia* (2018). [DOI: 10.1007/s00125-017-4541-7](https://doi.org/10.1007/s00125-017-4541-7)

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