Poor glycaemic control associated with accelerated cognitive decline

Rates of cognitive decline were greater in patients with diabetes and prediabetes compared with those who were normoglycaemic, in the English Longitudinal Study of Ageing (ELSA).

ELSA is a prospective, nationally representative cohort study of men and women aged 50 and over living in England. Data from the wave 2 cohort (2004-05) to wave 7 (2014-15) were analysed.

Of an initial 9,432 participants, 5,189 were eligible for the analysis, after exclusions for failure to have a baseline clinical assessment, incomplete records for HbA_{1c} or cognitive tests, or failure to complete follow-up. Their mean age was 65.6 years and just over half (55%) were women. Of these 5,189 participants, 1,190 (22.9%) were classified as having prediabetes and 446 (8.6%) as having diabetes.

The mean follow-up period was 8.1 ± 2.8 years. Cognitive function was assessed at baseline, and every two years. The mean number of cognitive assessments was 4.9 ± 1.5, these measured global cognition, memory, executive function and orientation.

Adjustment was made for multiple variables including: baseline age, sex, total cholesterol, HDL cholesterol, triacylglycerol, high sensitivity C-reactive protein, BMI, education, marital status, depressive symptoms, current smoking, alcohol consumption, hypertension, CHD, stroke, chronic lung disease and cancer.

Following adjustment, each 1 mmol/mol increase in HbA_{1c} was significantly associated with an increased rate of decline in z scores for:

- Global cognition - 0.0009 SD/year (95% CI:- 0.0014 to - 0.0003)
- Memory - 0.0005 SD/year (95% CI: - 0.0009 to - 0.0001)
- Executive function - 0.0008 SD/year (95% CI: - 0.0013 to - 0.0004).

The rate of cognitive decline in participants with diabetes was greater than that in participants with prediabetes, and both showed greater rates of cognitive decline than those participants who were normoglycaemic. Compared with the normal group, scores for global cognition, memory, executive function and orientation all declined at a greater rate, see table 1, below.

This large prospective population-based study, which controlled for many variables, showed a significant difference in decline in cognitive function that is proportional to HbA_{1c}.

Optimal control of glycaemia not only reduces the risk of future vascular disease but may also lower the risk of dementia.

In recent years, the overall number of patients being newly diagnosed with dementia in each age group has been decreasing.[1] The total number of cases continues to rise because the average age of the population is rising, even though the incidence of dementia is falling. One reason for this decrease in incidence is thought to be the improved management of cardiovascular risk factors in midlife. The findings from this study, linking diabetes control and cognitive decline, support the view that 'What's good for the heart is good for the brain.'

The study authors conclude: 'Our study provides evidence to support the association of diabetes with subsequent cognitive decline. Moreover, our findings show a linear correlation between circulating HbA_{1c} 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 function in people with diabetes.'

DR MATTHEW LOCKYER

Zheng F, Yan L, Yang Z et al. HbA_{1c}, diabetes and cognitive decline: the English Longitudinal Study of Ageing. *Diabetologia* 25 January 2018. https://doi.org/10.1007/s00125-017-4541-7

REFERENCE

1 Ahmadi-Abharire S, Guzman-Castillo M, Bandosz P et al. Temporal trend in dementia incidence since 2002 and projections for prevalence in England and Wales to 2040: modelling study. *BMJ* 2017;358:j2856

»

Table 1

Mean difference in rate of change in cognitive decline - *z* scores (SD/year)

	Mean difference (95% CI) in rate of change by baseline diabetes status			
	Normal (n = 3,553)	Prediabetes (n = 1,190)	Diabetes (n = 446)	P for trend
Global cognitive z score	0.000 (ref)	-0.012 (-0.022 to -0.002)	-0.031 (-0.046 to -0.015)	< 0.001
Memory z score	0.000 (ref)	-0.002 (-0.009 to 0.005)	-0.015 (-0.026 to -0.003)	0.030
Executive function z score	0.000 (ref)	-0.008 (-0.016 to 0.000)	-0.022 (-0.034 to -0.009)	< 0.001
Orientation z score	0.000 (ref)	-0.011 (-0.022 to 0.000)	-0.023 (-0.041 to -0.006)	0.003