

Association of Type 2 Diabetes, According to the Number of Risk Factors Within Target Range, With Structural Brain Abnormalities, Cognitive Performance, and Risk of Dementia

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Oral session I, breakout room 1: 01

ASSOCIATION OF TYPE 2 DIABETES, ACCORDING TO THE NUMBER OF RISK FACTORS WITHIN TARGET RANGE, WITH STRUCTURAL BRAIN ABNORMALITIES, COGNITIVE PERFORMANCE AND RISK OF DEMENTIA

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Background: Type 2 diabetes is associated with increased risks of cognitive dysfunction and brain abnormalities. The extent to which risk factor modification can mitigate these risks is unclear. We investigated the associations between incident dementia, cognitive performance and brain abnormalities among individuals with type 2 diabetes, according to the number of risk factors within target range, compared to controls without diabetes.

Methods: Prospective data from UK Biobank of 87,856 individuals (n=10,663 diabetes/n=77,193 controls; baseline 2006-2010; dementia follow-up until February, 2018). Analysis was replicated using data from the Netherlands (the Maastricht Study; cohort with oversampling of type 2 diabetes; examination 2010-2019; cross-sectional data). Individuals with type 2 diabetes were categorized according to the number of seven risk factors within target range (nonsmoking; guideline-recommended levels of HbA1c, blood pressure, BMI, albuminuria, physical activity, diet). Outcomes were incident dementia, domain-specific cogni-

tive performance, white matter hyperintensity volume and total brain volume.

Results: After a mean follow-up of 9.0 years, 147 (1.4%) individuals with diabetes and 412 (0.5%) controls had incident dementia. Compared to controls, individuals with type 2 diabetes had a higher incidence of dementia (HR:1.88 (95% CI:1.55;2.27)). Among individuals with diabetes, excess dementia risk decreased stepwise for a higher number of risk factors within target range. Among individuals with type 2 diabetes who had 5-7 risk factors on target, compared to controls (incidence rate per 1,000 person-years 0.62 (95% CI:0.56; 0.68)), the absolute rate difference per 1,000 person-years for dementia was 0.20 (-0.11; 0.52) and the hazard ratio for dementia was 1.32 (0.89; 1.95). Similarly, differences in processing speed, executive function, and brain volumes were progressively smaller for a higher number of risk factors within target range; these results were replicated in the Maastricht Study.

Conclusions: Among individuals with type 2 diabetes, excess dementia risk, lower cognitive performance and brain abnormalities decreased stepwise for a higher number of risk factors within target range.

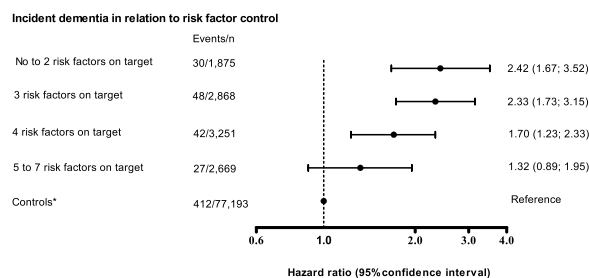


Figure 1. UK Biobank: adjusted hazard ratios for incident dementia according to the number of risk factors within target range among individuals with type 2 diabetes as compared to controls.

Results show the risk of dementia among participants with type 2 diabetes according to the number of risk factors within target range as compared to controls. The following seven risk factors were considered with cutoff values based on recommendations in current clinical guidelines: glycated hemoglobin level (cutoff value, <53 mmol/mol (<7%)), systolic and diastolic blood pressure (cutoff value, <130 mmHg for systolic blood pressure and <80 mmHg for diastolic blood pressure), body mass index (cutoff value, ³20 and <25 kg/m²), smoking (being a nonsmoker), albuminuria (absence of micro- or macroalbuminuria), physical activity (cutoff value, ³150 minutes per week moderate-to-vigorous physical activity) and dietary habits (optimal as defined by the 5-item healthy diet -score of the American Heart Association). All analyses adjusted for age, sex and education. * Controls were defined as individuals without diabetes or prediabetes.