

Decades of type 1 diabetes linked to mild drop in cognition

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People who live with type 1 diabetes for very long duration show signs of mild decreases in cognitive abilities, primarily in memory, compared to those who don't have the disease, Joslin Diabetes Center researchers have shown.

The study compared Joslin 50-year Medalists, who have lived successfully with type 1 [diabetes](#) for at least that long, with other people of similar age with type 2 diabetes or without diabetes, says Gail Musen, Ph.D., an assistant investigator in Joslin's Research Division. The work is the first to evaluate whether cognitive function is changing in an aging group of people who have successfully managed their type 1 diabetes, a very complex [disease](#) associated with many complications, for from 50 to more than 80 years.

The mild cognitive declines don't appear in clinical signs for these Medalists, who remain in the normal range of function for people their age, emphasizes Musen, who is lead author on the paper about the work published in *Diabetes Care*.

Joslin investigators also examined how various measures of cognitive health among these Medalists might correspond to common diabetes complications. Most strikingly, "the memory changes are associated with cardiovascular disease," says Hillary Keenan, Ph.D., a former principal investigator on the Medalist study and corresponding author on the paper.

The scientists tested and compared cognition in 82 Medalists, 31 age-matched individuals with type 2 diabetes and 30 age-matched non-diabetic controls. Their investigation included standard tests for memory, psychomotor speed and executive function (higher cognitive processes involved in decision-making).

The memory tests required participants to recall a list of words immediately after presentation as well as after a 30-minute delay. Performance was significantly but not dramatically lower in people with either form of diabetes than in people lacking the disease. While this has been known for people with type 2 diabetes, the changes in memory in aging people with type 1 diabetes had not been clearly established.

In the psychomotor test, the researchers looked at how quickly and well subjects inserted small key-shaped pegs into similarly shaped slots that have been rotated to require fine motor dexterity. Medalists on average performed slightly worse than those without diabetes. This diminished performance was associated with proliferative diabetic retinopathy, an advanced form of eye disease. (However, it didn't reflect poorer vision, since Medalists wore their corrective lenses.)

The executive-function test scored how quickly and accurately participants put scrambled letters and numbers into a given order. Here the Joslin team also saw a tendency of slightly worse results among Medalists than their peers without diabetes.

"Overall, nobody among the Medalists needs to worry; this is a very healthy group that's showing minimal signs of cognitive decline," Musen stresses. "However, these small deficits may be avoidable with self-care behaviors that help minimize diabetes complications."

Previous research on the Medalists has consistently found that moderate physical exercise is linked to a reduction in cardiovascular disease. The latest findings provide yet another incentive for people with type 1 diabetes to pursue physical exercise, in addition to following general guidelines for healthcare and diabetes management, says Keenan.

With the incidence of type 1 diabetes on the rise, Joslin continues to examine the long-term effects of the disease on cognition and other complications, says George King, MD, Joslin's Chief Scientific Officer and Director of Research Division. "We want to further study this population, to better understand these processes and find therapies to protect against them," he says. "Since both eye and cardiovascular diseases in diabetic patients are treatable, we are very hopeful the cognitive decline in type 1 diabetes is also preventable."

Provided by Joslin Diabetes Center

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