

Brain Training Protects Against Cognitive Decline, Dementia

Megan Brooks | July 25, 2016

TORONTO — A cognitive training program targeting speed of processing in healthy elderly adults cut the risk for dementia nearly in half over a 10-year period in the Advanced Cognitive Training for Independent and Vital Elderly (ACTIVE) study.

"We believe this is the first time a cognitive training intervention has been shown to protect against cognitive impairment or dementia in a large, randomized controlled trial," Jerri Edwards, PhD, of the School of Aging Studies and Byrd Alzheimer's Institute, University of South Florida, in Tampa, said in a statement.

Dr Edwards presented 10-year results from the ACTIVE study here at Alzheimer's Association International Conference (AAIC) 2016.

"Real-World Benefits"

Conducted at six sites in the United States, the ACTIVE study assessed the effect of three different cognitive training programs on time to incident dementia in 2785 community-dwelling adults aged 65 years and older (average age, 73.6 years at baseline) who had no evidence of cognitive impairment or dementia at entry.

After completing baseline tests of memory, reasoning, and speed-of-processing abilities, the participants were randomly allocated to classroom-based memory strategies, classroom-based reasoning strategies, computerized speed-of-processing training, or a noncontact control group.

In memory training, participants were taught mnemonic strategies for remembering word lists and sequences of items, text material, and main ideas and details of stories.

Reasoning training focused on the ability to solve problems that follow a serial pattern, such as identifying the pattern in a letter or number series or understanding the pattern in an everyday activity such as prescription drug dosing or travel schedules.

In speed-of-processing training, participants underwent intensive, adaptive, computerized training that was designed to improve the speed and accuracy of visual information processing while expanding the visual area over which a person could pay attention and make rapid decisions.

Individuals in the cognitive training groups completed up to 10 1-hour training sessions over 5 weeks. Some individuals received booster training sessions (an additional four sessions about 1 year after the original training, and four more sessions about 3 years after the original training). Cognitive and functional changes were reassessed immediately following the training sessions and at 1, 2, 3, 5, and 10 years.

Altogether, 331 participants developed dementia. Dementia incidence was 14% in the control group, 12.1% in those completing 10 or fewer speed-of-processing sessions, and 8.2% in those who completed 11 to 14 speed-of-processing training sessions.

After 10 years, only the speed-of-processing training had a statistically significant effect on cognition. Participants in this group were 33% less likely than control participants to develop cognitive impairment or dementia (hazard ratio [HR], 0.67; 95% confidence interval [CI], 0.49 - 0.91; $P = .012$).

Significant effects of speed training sessions remained after adjustment for age, sex, race, mental status, physical function, depressive symptoms, and diabetes (HR, 0.92; 95% CI; 0.87 - 0.98; $P = .013$).

Speed training reduced risk for dementia by 8% per session completed, Dr Edwards reported. Those who completed 11 or more sessions were 48% less likely to develop dementia over time than the control participants (HR, 0.52; 95% CI, 0.33 - 0.82; $P = .005$).

There is evidence that speed-of-processing training has real-world benefits, Dr Edwards noted, citing studies that have shown that such training yields quicker reaction times and safer on-road driving, reduced at-fault crashes, and maintenance of driving ability with age, as well as improvements in everyday functional performance, protection against depression, and better self-rated health.

Strong Evidence

"The Alzheimer's Association believes there is sufficiently strong evidence to conclude that lifelong learning and certain types of cognitive training may reduce the risk of cognitive decline," Maria C. Carrillo, PhD, Alzheimer's Association chief science officer, said in a statement. "These new 10-year findings are evidence that it may hold true for dementia as well as cognitive decline."

In an interview with *Medscape Medical News*, Penny Dacks, PhD, director, Aging and Alzheimer's Prevention, at the Alzheimer's Drug Discovery Foundation, said, "There are a lot of different cognitive training games that are out there. They are widely available, and they are often overhyped. There is no question about that. But this study gives some strong evidence that at least some types of cognitive training can indeed protect people from cognitive decline.

"Better speed of processing," Dr Dacks noted, "may just in general assist with other aspects of cognition. This could be one important component of an effective cognitive intervention strategy.

"We need more research to know who might be helped and by what kind of training," Dr Dacks said. "We know from a lot of epidemiology, for example, that people who have lived lives that are cognitively enriched, whether through their jobs or additional education, seem to be protected from dementia with a later onset or a lower risk. This study fits with those kinds of strategies to think that cognitive training can in fact be helpful, and it's safe."

The speed training used in the ACTIVE study is available as an exercise called Double Decision. It is one of the exercises in BrainHQ (www.brainhq.com), an online cognitive training program from Posit Science. The ACTIVE study was funded by the National Institutes of Health (NIH). Dr Edwards has relationships with Posit Science and Visual Awareness Inc and currently serves on the data safety and monitoring board for NIH grants awarded to employees of Posit Science.

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