

AAIC 2014 Research Highlights: New data on possible protective behaviors and dementia risk factors

As we begin to more clearly understand the effects of behavior and health on the risk for Alzheimer's disease and other dementias, our opportunities for risk reduction grows. Scientists advanced that knowledge in July at the Alzheimer's Association International Conference® 2014 (AAIC®) in Copenhagen. According to their research, lifestyle interventions may improve memory and thinking in middle-age and older adults and could help protect against the development of Alzheimer's disease and dementia in later life.

Game on: cognitive stimulation and brain health

Participation in mentally challenging activities in middle age may help protect against the development of Alzheimer's disease and dementia later in life, according to Stephanie Schultz and colleagues¹ from the Wisconsin Alzheimer's Institute and the Wisconsin Alzheimer's Disease Research Center. Participants — 329 cognitively normal middle-aged adults (mean age=60.3 years, 69 percent women) with a genetic predisposition (40 percent) or parental family history of Alzheimer's (70 percent) — self-reported their current level of engagement in cognitively stimulating activities. Investigators found that higher levels of participation, especially playing games like cards, checkers, crosswords or other puzzles, were significantly associated with:

- A greater volume in several brain regions involved in Alzheimer's disease, including the hippocampus.
- Better cognitive performance in tests of immediate memory, verbal learning and memory, and speed and flexibility.

These findings suggest that, for some individuals, engagement in cognitively stimulating activities, especially those involving games and puzzles, might be a useful approach for preserving brain structures and cognitive functions that are vulnerable to Alzheimer's disease.

This is your brain on exercise

Exercise has been associated with possible cognitive health benefits,² but there has been a lack of prospective cohort studies. Researchers from the Mayo Clinic Study of Aging reported on two prospective trials that followed participants for approximately three years. Nathaneal Feder and colleagues³ examined the relationship between exercise and risk of new cases of dementia in 280 older adults (median age=81) with mild cognitive impairment (MCI). Study participants completed a questionnaire on the frequency and intensity of exercise during their lifetime. After following participants for about three years (range 2.5–5.3 years), investigators found:

Exercise intensity	Example
Light exercise	Leisurely walking after dinner
Moderate exercise	Regular biking
Vigorous exercise	Downhill skiing, mountain biking

- Moderate physical exercise in middle age was associated with a significantly decreased risk of MCI progressing to dementia.
- Decreased risk of progression did not hold true for light or vigorous exercise in middle age, or for any level of physical activity in late life.

In a second report from the Mayo Clinic Study of Aging, Janina Krell-Roesch and colleagues⁴ followed 1,830 older adults with normal cognition to see if physical exercise affected the risk of new cases of MCI. Participants underwent neurological evaluations and cognitive tests and completed a self-reported questionnaire about physical exercise habits in mid-life and late-life. After following study participants for an average of 3.2 years, investigators found that a significant decreased risk of incident MCI was associated with:

- Light or vigorous physical exercise in mid-life (moderate was only marginally significant).
- Light or moderate physical exercise in late-life.

These results are intriguing and may indicate that the intensity of physical exercise in mid-life versus late life may protect against MCI and dementia to a different extent, but more research is needed before drawing conclusions.

Putting it all together

Although evidence for the positive effect of individual lifestyle interventions is growing, large controlled trials looking at modifying multiple risk factors have been needed. Miia Kivipelto, M.D., Ph.D., and colleagues⁵ reported on the first study to show that a structured program that addresses a variety of risk factors simultaneously can improve memory and thinking in older adults at risk for cognitive impairment and Alzheimer's. The prospective randomized controlled clinical trial, known as the Finnish Geriatric intervention Study to Prevent Cognitive Impairment and Disability (FINGER), followed 1,260 older adults (60–77 years) over two years. The treatment group participated in a program of physical activity, nutritional guidance, cognitive training, social activities and management of heart health risk factors (Figure 1).

The control group received regular health advice. After two years, compared to the control group, the intervention group had significantly better cognitive performance, including:

- Overall cognition as measured by a comprehensive neuropsychological test battery (NTB) composite Z score ($p < 0.05$).
- Cognitive performance in each specific domain, including memory ($p < 0.05$), executive function ($p < 0.05$), psychomotor speed ($p < 0.05$).
- Drop-out rate = 11 percent after two years.

Researchers plan a seven-year follow-up study to evaluate the longer term effects on dementia and Alzheimer's disease incidence and will include biomarkers, such as brain imaging with MRI and PET.

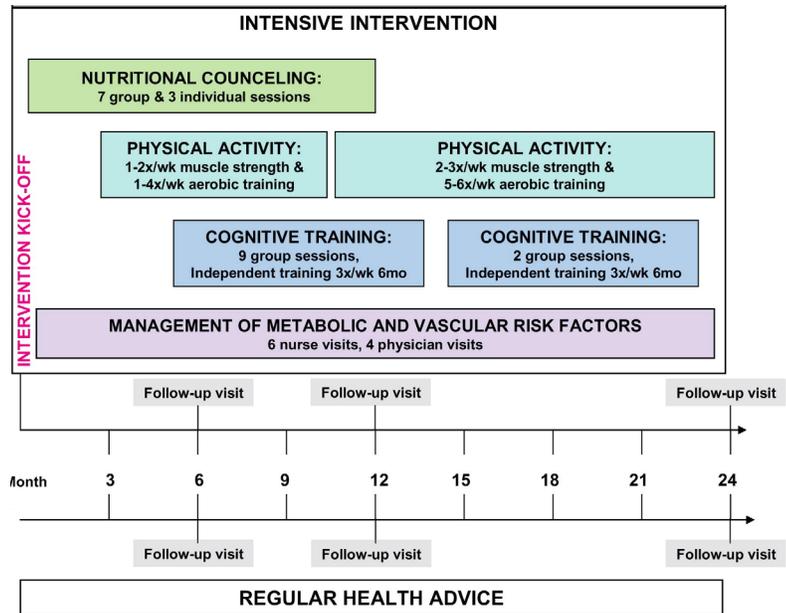


Figure 1. FINGER protocol (Kivipelto M et al. Alzheimer's & Dementia. 2013. With permission.)

Conclusion

While these study results are promising, we need larger, longer-term studies in different and diverse populations to identify which behavior and health changes affect the risk for dementia and at what age they are most effective. When clinicians can recommend specific evidence-based lifestyle modifications to their patients to delay or prevent dementia, it could be a significant step forward in addressing the Alzheimer's epidemic.

References

1. Alzheimer's Association International Conference (AAIC) 2014. Participation in cognitively-stimulating activities is associated with brain structure and cognitive function in preclinical Alzheimer's disease. Abstract IC-01-03. Presented July 12, 2014.
2. Daviglus M, Bell C, Berrettini W, et al. National Institutes of Health State-of-the-Science Conference Statement: Preventing Alzheimer's Disease and Cognitive Decline. Bethesda, MD: National Institutes of Health; 2010. Available at: <http://consensus.nih.gov/2010/alzabstracts.htm>.
3. Alzheimer's Association International Conference (AAIC) 2014. Physical Exercise and the Outcome of Incident Dementia: The Mayo Clinic Study of Aging. Abstract PT-153. Presented July 14, 2014.
4. Alzheimer's Association International Conference (AAIC) 2014. Physical exercise in mid-life versus late life may have differential impact on the outcome of incident mild cognitive impairment: The Mayo Clinic Study of Aging. Abstract PT-149. Presented July 14, 2014.
5. Alzheimer's Association International Conference (AAIC) 2014. A Multidomain Two-Year Randomized Controlled Trial to Prevent Cognitive Impairment - the FINGER study. Abstract O1-05-04. Presented July 13, 2014.