

Higher Diet Quality Linked to Less Cognitive Decline

Pauline Anderson | May 19, 2015

A diet considered high in quality according to a healthy eating index preserves cognition in patients at high risk for cardiovascular disease and mental decline, results of a new study suggest.

The research extends findings of previous studies, as it included a large cohort of middle-aged and elderly subjects from 40 countries, said lead author Andrew Smyth, MMedSc, research fellow, Population Health Research Institute, McMaster University, Hamilton, Ontario, Canada.

"The take-home message from this study is that high diet quality, which is consistent with current healthy eating guidelines, is associated with a reduced risk of cognitive decline and suggests that healthy eating may reduce the risk of cognitive decline in addition to the previously reported associations with cardiovascular disease," Dr Smyth told *Medscape Medical News*.

The new analysis was published online May 6 in *Neurology*.

40 Countries

The study included participants in two parallel, multinational, double-blind, randomized trials with similar protocols conducted in 733 centers in 40 countries that investigated ramipril, an angiotensin-converting enzyme inhibitor, and telmisartan, an angiotensin receptor blocker.

The studies were the Ongoing Telmisartan Alone and in Combination with Ramipril Global Endpoint Trial (ONTARGET) and the Telmisartan Randomized Assessment Study in ACE Intolerant Subjects With Cardiovascular Disease (TRANSCEND) study.

These trials included 31,456 subjects aged 55 years and older with a history of one or more of coronary, cerebral, or peripheral artery disease or high-risk diabetes mellitus. The primary outcome in both trials was the first occurrence of the composite of cardiovascular disease death, nonfatal myocardial infarction, nonfatal stroke, or hospitalization for congestive heart failure.

For the current analysis, only those participants who had completed a Mini-Mental State Examination (MMSE) at baseline and at least once during follow-up were included.

The researchers defined cognitive decline as a decrease of 3 or more points in the MMSE score, computed by subtracting the score at the last follow-up visit from the baseline score.

For dietary information, researchers used food intake information recorded in a qualitative Food Frequency Questionnaire containing 20 items. With this information, they assessed diet quality using the modified Alternative Healthy Eating Index.

This index scores seven aspects of the diet, each with a minimum score of 0 and a maximum score of 10, with a higher score indicating adherence to current dietary guidelines.

Table. Adherence to Dietary Guidelines

Food Item	Minimum (0)	Maximum (10)
Fruits (servings/day)	0	4

Vegetables (servings/day)	0	5
Nuts and soy protein (servings/day)	0	1
Ratio of fish/(meat+eggs)	0	4
Whole grain (servings/day)	0	≥3
Fried foods (servings/day)	≥4	≤0.5
Alcohol		
Men (servings/day)	0 or >3.5	1.5-2.5
Women (servings/day)	0 or >2.5	0.5-1.5

Researchers divided subjects into quintiles according to their index score.

The study did not focus on the Mediterranean diet but, rather, on diet "quality," said Dr Smyth. "We did not explore the effect of any specific diet, and as such, a high-quality diet does not automatically correspond to the Mediterranean diet."

The analysis included 27,860 participants with a median modified Alternative Healthy Eating Index score of 24.4 and a mean baseline MMSE score of 27.7.

During 5 years of follow-up, cognitive decline occurred in 16.8% of participants. After adjusting for known confounding factors such as systolic blood pressure, history of stroke, and diabetes, the highest quintile of modified Alternative Healthy Eating Index — or the healthiest diet — was associated with a reduction in risk for cognitive decline compared with the least healthy diet (hazard ratio [HR], 0.76; 95% confidence interval [CI], 0.66 - 0.86; $P < .01$).

The reduced risk continued after excluding those with a major cardiovascular event (HR, 0.77; 95% CI, 0.67 - 0.89), those with cancer (HR, 0.76; 95% CI, 0.66 - 0.88), those with a baseline MMSE score of less than 24 (HR, 0.74; 95% CI, 0.65 - 0.85), and those with cognitive decline during the first 2 years (HR, 0.65; 95% CI, 0.53 - 0.79).

The researchers did not adjust for caloric intake because of the effect of multicollinearity, said Dr Smyth. "Caloric intake, [body mass index], and physical activity are highly correlated, and adjusting for all three variables has been shown to increase the risk of over-adjustment."

According to Dr Smyth, the most likely explanation for the link between a healthy diet and better cognitive function is through improved cardiovascular function. This, he said, seems to be supported by the observation that the healthiest diet was linked to reduced risk for four subdomains of the MMSE: copying (copying a diagram made of two intersecting pentagons, with participants scoring correctly if they draw two shapes with five sides that overlap), attention and calculation, registration (participants score one point for each item remembered and repeated), and writing.

"It's likely that the beneficial association between diet and cognitive decline is mediated through effects on cardiovascular pathways, including cardiovascular risk factors such as blood pressure, glucose and lipid levels, as well as effects on inflammation," said Dr Smyth. "These MMSE components have a preferential association with vascular cognitive function."

The study did not explore which food or food element in the healthy diet contributed most to the reduced cognitive decline, said Dr Smyth. And because it is an observational study, it cannot establish causation, and so cannot rule

out the possibility that it is not just the healthy diet, but the accompanying lifestyle choices, such as being physically active and not smoking, that help reduce cognitive decline.

"We included smoking, [body mass index,] and physical activity as covariates in our multivariable adjusted models, to take this into consideration," said Dr Smyth. "However, residual confounding cannot be entirely ruled out."

Asked to comment on the study, Neelum Aggarwal, MD, associate professor, Neurology, Rush University Medical Center, Chicago, Illinois, noted that cognitive function was a secondary/exploratory outcome of studies that were looking mainly at cardiovascular events.

"I am always a bit hesitant to draw generalized comments about cognitive change when the study was not designed to look at cognition," she told *Medscape Medical News*.

She also pointed out that the study used the MMSE, which "is notoriously not sensitive to measure mild cognitive changes" including mild cognitive impairment.

"This study had two cognitive determinations, and thus talking about decline is a bit risky, in that we know in healthy cohorts, fluctuation can occur in cognitive testing over time," said Dr Aggarwal. "Ideally, more cognitive endpoints would have been helpful. Typically, in our studies at Rush and other groups, we do three cognitive measures if we are using cognitive function changes as our endpoints."

The Montreal Cognitive Assessment would have been a better measure than the MMSE, she added.

However, the study also had "clear strengths," including its large sample size and use of a "standard" Food Frequency Questionnaire that looks at quartiles or quintiles and is used in "lots of analyses and types of data analyses," said Dr Aggarwal.

Using an international cohort may have benefits (eg, the results are more likely to be generalizable), but it also has also potential drawbacks (eg, the diet Food Frequency Questionnaires may differ between groups, and it is unclear if that could affect results), she said.

The study was supported by Boehringer Ingelheim. Dr Smyth has disclosed no relevant financial relationships. Disclosures for coauthors appear in the paper.

Neurology. Published online May 6, 2015. Abstract

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Cite this article: Higher Diet Quality Linked to Less Cognitive Decline. *Medscape*. May 19, 2015.

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