Dietary intake of fatty acids and fish in relation to cognitive performance at middle age

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FROM ABSTRACT

Objective: To examine the associations of fatty acid and fish intake with cognitive function.

Methods: Data are from a cross-sectional population-based study among 1,613 subjects ranging from 45 to 70 years old.

From 1995 until 2000, an extensive cognitive battery was administered and compound scores were constructed for memory, psychomotor speed, cognitive flexibility (i.e., higher order information processing), and overall cognition. A self-administered food-frequency questionnaire was used to assess habitual food consumption.

The risk of impaired cognitive function according to the energy-adjusted intake of fatty acids was assessed with logistic regression, adjusting for age, sex, education, smoking, alcohol consumption, and energy intake.

Results: Marine omega-3 polyunsaturated fatty acids (PUFA) (eicosapentaenoic acid and docosahexaenoic acid) were inversely related to the risk of impaired overall cognitive function and speed.

Higher dietary cholesterol intake was significantly associated with an increased risk of impaired memory and flexibility.

Conclusions: Fatty fish and marine omega-3 PUFA consumption was associated with a reduced risk and intake of cholesterol and saturated fat with an increased risk of impaired cognitive function in this middle-aged population.

THESE AUTHORS ALSO NOTE:

Dietary factors influence cognitive function and subsequently the risk of dementia.

Antioxidant intake is associated with a lower risk of dementia.

Saturated fat and cholesterol intake are associated with a higher risk of dementia.
Moderate fish consumption with omega-3 polyunsaturated fatty acid (PUFA) intake is related to a reduced risk of dementia, in particular Alzheimer disease (AD).

“This association may be attributable to several mechanisms, such as an anti-inflammatory effect of omega-3 PUFA, a decrease in the risk of cardiovascular disease, or an increase in the neuroplasticity of nerve membranes.”

The preclinical or subclinical phase of declining cognitive function precedes clinically apparent AD by decades. [IMPORTANT]

“For the present study we used data on intake of fatty fish, total fat, saturated fat, cholesterol, monounsaturated fatty acids (MUFA), PUFA, the most important omega-6 PUFA (linoleic acid), and the three most important omega-3 PUFA (docosahexaenoic acid [DHA], eicosapentaenoic acid [EPA], and alpha-linolenic acid).”

“Cognitive function was assessed using a neuropsychological test battery measuring global cognitive function and specific cognitive domains, such as memory function, speed of cognitive processes, and cognitive flexibility, which consisted of higher order information processing and complex speed tasks.”

RESULTS

“The adjusted mean daily intake of fatty fish and the marine omega-3 PUFA (EPA and DHA) was lower among subjects with impairment in overall cognition.”

“Higher dietary cholesterol intake was significantly associated with an increased risk of impaired memory and flexibility.”

There was no clear association between the intake of total PUFA, linoleic acid, alpha-linolenic acid, and MUFA and cognitive function. [THIS IS IMPORTANT: it indicates that the mono-fats in olive oil, the omega-6 fat linolenic acid, and the omega-3 fat found in plant sources like flax and hemp oil (alpha-linolenic acid), were not associated with improved cognitive function.]

There was a significance for the relation between increased cholesterol intake and reduced cognition, speed, and flexibility.

DISCUSSION

“This population-based study among middle-aged men and women showed that dietary cholesterol and to a lesser extent saturated fatty acid intake were associated with an increased risk of impaired cognitive function.”

“Fatty fish and EPA and DHA consumption were associated with a decreased risk of cognitive impairment.”
“These associations were independent of differences in age, sex, education, smoking, total energy intake, and cardiovascular risk factors.”

“MUFA, total PUFA, linoleic acid, alpha-linolenic acid, and total fat intakes were not clearly related to cognitive function.”

[This is very important. Recall that alpha-linolenic acid is the plant based omega-3 fatty acid found in flax and hemp oil.]

“Various studies showed that subjects with mild cognitive impairment progressed to dementia or AD at a rate of 10 to 15% per year.” [IMPORTANT]

“The most consistent findings from epidemiologic and clinical studies so far seem to be that cholesterol and (saturated) fat are positively and fish and marine omega-3 PUFA inversely associated with dementia and cognitive impairment.”

“A high dietary intake of cholesterol and saturated fat increases the risk of cardiovascular diseases and atherosclerosis, and thus possibly also of cognitive impairment, whereas omega-3 PUFA may be inversely associated with impaired cognitive function because they lower the risk of cardiovascular disease, including stroke.”

Processing speed is one of the best early preclinical signs of AD, and fish and the marine omega-3 PUFA were predominantly associated with processing speed.

“Marine omega-3 PUFA may affect speed and cognition through inflammation, because they act as anti-inflammatory agents by inhibiting the synthesis of cytokines and mitogens.” [IMPORTANT]

“Neuropathologic and epidemiologic evidence is accumulating that inflammatory processes are involved in the pathogenesis of cognitive decline.” [IMPORTANT]

“Further hypotheses on the effect of marine omega-3 PUFA concern membrane fluidity, neurotransmission, and synaptic plasticity.”
KEY POINTS FROM DAN MURPHY

1) Marine omega-3 polyunsaturated fatty acids eicosapentaenoic acid and docosahexaenoic acid improve cognitive function and speed.

2) Moderate fish consumption with omega-3 polyunsaturated fatty acid intake reduces the risk of dementia, particularly Alzheimer disease.

3) High dietary cholesterol and saturated fat intake is significantly associated with an increased risk of impaired cognitive function.

4) Increased antioxidant intake is associated with a lower risk of dementia.

5) Omega-3s help the brain because they are anti-inflammatory and increase the neuroplasticity of nerve membranes. Inflammatory processes are involved in the pathogenesis of cognitive decline.

6) Olive oil, the omega-6 fat linolenic acid, and the omega-3 fat found in plant sources like flax and hemp oil (alpha-linolenic acid), are not associated with improved cognitive function. Strict vegetarians should be aware of this.