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*Cochrane Database of Systematic Reviews* 2012, Issue 6. Art. No.: CD005379.
DOI: 10.1002/14651858.CD005379.pub3.

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[Intervention Review]

# Omega 3 fatty acid for the prevention of cognitive decline and dementia

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**Editorial group:** Cochrane Dementia and Cognitive Improvement Group.
**Publication status and date:** Edited (no change to conclusions), published in Issue 9, 2012.

**Citation:** Sydenham E, Dangour AD, Lim WS. Omega 3 fatty acid for the prevention of cognitive decline and dementia. *Cochrane Database of Systematic Reviews* 2012, Issue 6. Art. No.: CD005379. DOI: 10.1002/14651858.CD005379.pub3.



## ABSTRACT

### Background

Evidence from observational studies suggests that diets high in omega-3 long-chain polyunsaturated fatty acids (PUFA) may protect people from cognitive decline and dementia. The strength of this potential protective effect has recently been tested in randomised controlled trials.

### Objectives

To assess the effects of omega-3 PUFA supplementation for the prevention of dementia and cognitive decline in cognitively healthy older people.

### Search methods

We searched ALOIS - the Cochrane Dementia and Cognitive Improvement Group's Specialized Register on 6 April 2012 using the terms: "omega 3", PUFA, "fatty acids", "fatty acid", fish, linseed, eicosapentaenoic, docosahexaenoic.

### Selection criteria

Randomised controlled trials of an omega-3 PUFA intervention which was provided for a minimum of six months to participants aged 60 years and over who were free from dementia or cognitive impairment at the beginning of the study. Two review authors independently assessed all trials.

### Data collection and analysis

The review authors sought and extracted data on incident dementia, cognitive function, safety and adherence, either from published reports or by contacting the investigators for original data. Data were extracted by two review authors. We calculated mean difference (MD) or standardised mean differences (SMD) and 95% confidence intervals (CI) on an intention-to-treat basis, and summarised narratively information on safety and adherence.

### Main results

Information on cognitive function at the start of a study was available on 4080 participants randomised in three trials. Cognitive function data were available on 3536 participants at final follow-up.

In two studies participants received gel capsules containing either omega-3 PUFA (the intervention) or olive or sunflower oil (placebo) for six or 24 months. In one study, participants received margarine spread for 40 months; the margarine for the intervention group contained

omega-3 PUFA. Two studies had cognitive health as their primary outcome; one study of cardiovascular disease included cognitive health as an additional outcome.

None of the studies examined the effect of omega-3 PUFA on incident dementia. In two studies involving 3221 participants there was no difference between the omega-3 and placebo group in mini-mental state examination score at final follow-up (following 24 or 40 months of intervention); MD -0.07 (95% CI -0.25 to 0.10). In two studies involving 1043 participants, other tests of cognitive function such as word learning, digit span and verbal fluency showed no beneficial effect of omega-3 PUFA supplementation. Participants in both the intervention and control groups experienced either small or no cognitive declines during the studies.

The main reported side-effect of omega-3 PUFA supplementation was mild gastrointestinal problems. Overall, minor adverse events were reported by fewer than 15% of participants, and reports were balanced between intervention groups. Adherence to the intervention was on average over 90% among people who completed the trials. All three studies included in this review are of high methodological quality.

**Authors' conclusions**

Direct evidence on the effect of omega-3 PUFA on incident dementia is lacking. The available trials showed no benefit of omega-3 PUFA supplementation on cognitive function in cognitively healthy older people. Omega-3 PUFA supplementation is generally well tolerated with the most commonly reported side-effect being mild gastrointestinal problems.

Further studies of longer duration are required. Longer-term studies may identify greater change in cognitive function in study participants which may enhance the ability to detect the possible effects of omega-3 PUFA supplementation in preventing cognitive decline in older people.

## PLAIN LANGUAGE SUMMARY

**Fish oils for the prevention of dementia in older people**

Dementia is a progressive illness which mainly affects older people. Previous research from observational studies has suggested that increased consumption of fish oils rich in omega-3 long-chain polyunsaturated fatty acids (omega-3 PUFA) may reduce the chance of developing dementia, while other studies show no effect. Oily fish, such as salmon, mackerel, herring and sardines are a rich source of omega-3 PUFA which are essential for brain development.

The authors of this review included studies where healthy participants over the age of 60 years who were cognitively healthy at the start of the study were randomly assigned to receive extra omega-3 PUFA in their diet or a placebo (such as olive oil). The main outcomes of interest were new cases of dementia diagnosed during the study period, cognitive decline, side-effects, and adherence to the intervention.

The authors included three randomised controlled trials involving 3536 participants. In two studies participants were randomly assigned to receive gel capsules containing omega-3 PUFA or olive or sunflower oil for six or 24 months. In the third study, participants were randomly assigned to receive tubs of margarine spread for 40 months (regular margarine versus margarine fortified with omega-3 PUFA).

None of the studies examined the effect of omega-3 PUFA on new dementia cases over the study period. In two studies involving 3221 participants there was no difference between the omega-3 PUFA and placebo group in mini-mental state examination score at final follow-up. In two studies (1043 participants), other tests of cognitive function such as word learning, digit span and verbal fluency showed no beneficial effect of omega-3 PUFA supplementation. Participants in both the intervention and control groups experienced little or no cognitive decline during the studies.

The main reported side-effect of omega-3 PUFA supplementation was mild gastrointestinal problems, but overall minor symptoms were reported by fewer than 15% of participants, and people in the control group were just as likely to report symptoms as those receiving an omega-3 PUFA supplement. Adherence to the supplementation protocol was high in all trials with on average over 90% of supplements being apparently consumed by trial participants. All three studies included in this review were of high methodological quality, and so the findings are unlikely to be due to chance or bias.

The results of the available studies show no benefit for cognitive function with omega-3 PUFA supplementation among cognitively healthy older people. Omega-3 PUFA supplements may have other health benefits, and the authors comment that consumption of fish is recommended as part of a healthy diet.

Longer studies are required, during which greater changes in cognitive function may occur, to enable researchers to identify possible benefits of omega-3 PUFA in preventing cognitive decline.