

Indications for Omega-3 Long Chain Polyunsaturated Fatty Acid in the Prevention and Treatment of Cardiovascular Disease



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Background

The National Heart Foundation of Australia (NHFA) 2008 review on omega-3 long-chain polyunsaturated fatty acids (LCPUFA) made recommendations with respect to supplementation for primary and secondary prevention of cardiovascular disease. Since then, new findings have been published regarding the relationship between omega-3 polyunsaturated fatty acids, including supplementation, and cardiovascular health.

Methods

A literature search was undertaken in PubMed and Medline, for literature published between January 1, 2007 and August 31, 2013.

Results and Conclusions

A total of eight research questions were developed and, using the National Health and Medical Research Council's evidence assessment framework, conclusions were made in relation to dietary intake of fish and omega-3 LCPUFA for cardiovascular health.

In the evidence published since 2007, this summary of evidence concludes that dietary intake of fish was found to be mostly consistent with respect to protection from heart disease and stroke. Higher fish intake was associated with lower incident rates of heart failure in addition to lower sudden cardiac death, stroke and myocardial infarction.

In relation to omega-3 LCPUFA supplementation, neither a beneficial nor adverse effect was demonstrated in primary or secondary prevention of coronary heart disease (CHD). Although the evidence continues to be positive for the role of omega-3 LCPUFA in the treatment of hypertriglyceridaemia and a modest positive benefit in heart failure. No further evidence was found to support the consumption of 2 g alpha-linolenic acid (ALA)/day over the current Australian guidelines for 1 g/day.

Keywords

Fish oil • Omega-3 polyunsaturated fatty acid supplements • Fish consumption • Cardiovascular disease • Recent evidence.

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Introduction

In 2008, the National Heart Foundation of Australia (NHFA) position statement [1] on omega-3 long-chain polyunsaturated fatty acids (LCPUFA) recommended Australian adults should consume 500 mg combined docosahexaenoic acid (DHA) and eicosapentaenoic acid (EPA) and 2 g alpha-linolenic acid (ALA) per day for primary prevention of cardiovascular disease, 1000 mg EPA/DHA and 2 g ALA per day for secondary prevention, and 1-4 g EPA/DHA per day for treatment of hypertriglyceridaemia.

In recent years, intervention trials with omega-3 LCPUFA supplements have started to trend towards no effect at least with respect to primary and secondary prevention of coronary heart disease (CHD). These outcomes have been perplexing, based on the established benefits of omega-3 LCPUFA on potential mechanistic cardiovascular pathways.

In view of the addition of new research to the evidence base, and questions of uncertainty regarding dietary and/or supplementation of omega-3 LCPUFA for heart health, the National Heart Foundation of Australia implemented a review of the literature published since the 2008 Position Statement. Major publications are evaluated in the current paper and lend support to the Foundation's changed recommendations in 2014.

This 2014 summary updates the evidence for omega-3 LCPUFA, and provides guidance for health professionals on dietary intake of fish and omega-3 LCPUFA supplements.

Methodology

The literature search was undertaken in PubMed and Medline, for literature published between January 1, 2007 and August 31, 2013. The literature searches used key search

words including but not limited to "exp Eicosapentaenoic Acid/ or exp Fatty Acids, Omega-3/ or exp Docosahexaenoic Acids/" AND "exp Platelet Aggregation/ or exp Endothelium, Vascular/", "exp Stroke/", "exp Arrhythmias, Cardiac/ OR exp Atrial Fibrillation/ OR exp Tachycardia, Ventricular/", "exp Triglycerides/", "myocardial infarction", "coronary event", "coronary disease", "coronary heart disease", "heart failure", and "exp Cardiovascular Diseases/ and exp alpha-Linolenic Acid/". This report deals with those aspects where adequate evidence was available for grading. Searches were limited to clinical trials, cohorts, comparative studies, meta-analyses, multicentre studies, randomised controlled trials (RCT) or systematic reviews. Animal studies were excluded as were studies with inappropriate study design (i.e. cross-sectional survey or narrative review) or small-sized or underpowered. Literature published in 2007 was cross-checked with the 2008 Position Paper to avoid duplication. A desktop review was undertaken to identify and review clinical and dietary guidelines relevant to cardiovascular health, and for guidelines relevant for other conditions.

The evidence statements and the recommendations made in this consensus statement have been graded according to National Health and Medical Research Council guidelines [2] (Table 1). Assessing the evidence for omega-3 LCPUFA was based on intervention studies with supplements of one or two major fatty acids or on observational studies that documented consumption of fish. The 'intervention' hierarchy of evidence was used and preferred as the key criterion of efficacy. Using this hierarchy of evidence, the randomised controlled trials (RCTs)/meta-analyses outcomes are judged to be a higher level than prospective cohort studies (no higher than C) by definition although alternative higher level gradings have been recently put forward by the NHMRC.

Table 1 National Health and Medical Research Council: Evidence Hierarchy and Assessment Matrix¹.

Level of evidence	Study design (Intervention)
I	A systematic review of Level II studies
II	Evidence obtained from at least one properly designed RCT.
III-1	Evidence obtained from well-designed, pseudo RCTs (alternate allocation or some other method).
III-2	Evidence obtained from comparative studies with concurrent controls and allocation, not randomised cohort studies, case-control studies or interrupted time series with a control group.
III-3	Evidence obtained from comparative studies with historical control, two or more single-arm studies, or interrupted time series without a parallel control group.
IV	Evidence obtained from case series, either post-test or pre-test and post-test.
Grade of Recommendation	Description
A	Body of evidence can be trusted to guide practice
B	Body of evidence can be trusted to guide practice in most situations
C	Body of evidence provides some support for recommendation(s) but care should be taken in its application
D	Body of evidence is weak and recommendation must be applied with caution

¹ Adapted from source: National Health and Medical Research Council. NHMRC additional levels of evidence and grades for recommendations for developers of guidelines. 2009.

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