

The effect of plant-based omega-3 fatty acids in patients with non-alcoholic fatty liver disease. A systematic review and meta-analysis

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Non-alcoholic fatty liver disease (NAFLD), an important non-communicable disease (NCD), affecting around 25% of the world population and approximately 30% of western populations, represents a major challenge to public health^(1,2). Lifestyle modification to lose 7%–10% of total body weight by diet and exercise is the first-line treatment for NAFLD⁽³⁾. The addition of omega-3 (*n*-3) fatty acids offer benefits to NAFLD biomarkers⁽⁴⁾. However, the effects of plant-based *n*-3 fatty acids are yet to be determined. The aim of this systematic review and meta-analysis was to evaluate potential benefits of plant-based *n*-3 supplementation on NAFLD biomarkers and parameters. The review followed the PRISMA checklist for systematic reviews and meta-analysis, used Cochrane Collaboration search strategies^(5,6), and is registered with PROSPERO (CRD42021251980) Searches were made using SCOPUS, PubMed and CINAHL with criteria including terms relating to plant-based *n*-3 interventions in adults, adolescents and children diagnosed with NAFLD. Titles and abstracts were screened for relevance by two independent review authors (EM and KEL). The searches identified 982 articles, which reduced to 60 upon abstract and title screening. Application of inclusion/exclusion criteria led to identification of six key studies (eight publications). The identified adult studies (*n* = 3) were completed in Iran, used flaxseed *n*-3 sources (alpha-linolenic acid (ALA)) with study durations of twelve weeks.

The child and adolescent studies (*n* = 3) were completed in Italy, used algal oil *n*-3 sources (docosahexaenoic acid (DHA)) with minimum study duration of twelve weeks, maximum six months. Hypocaloric diets and/or lifestyle interventions were prescribed for all participants in intervention or control/placebo groups. The results of the meta-analysis showed plant-based *n*-3 fatty acid supplementation interventions gave significant reductions in biomarkers for alanine aminotransferase (ALT), (WMD –8.04; (CI –14.70 –1.38), *p* = 0.02), low density lipoprotein cholesterol (WMD –8.75 (CI –17.53, 0.04); *p* = 0.05) and blood triglycerides (WMD –37.51; (CI –66.85, 8.17); *p* = 0.01), alongside body composition markers BMI, waist circumference and total weight (*p* < 0.05) in NAFLD patients. However, the meta-analysis showed high heterogeneity. Due to the small number of studies, it was not possible to separate the effects of ALA and DHA and the results could not be delimited for the effects of weight loss. Further research is needed to identify the most effective plant-based *n*-3 supplement sources in NAFLD patient biomarkers including ALA, eicosapentaenoic acid (EPA) and DHA and to establish whether plant-based *n*-3 supplementation offers improvements with and without weight loss targeted lifestyle interventions.

References

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