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Maternal prenatal and/or postnatal n-3 long chain polyunsaturated fatty acids (LCPUFA) supplementation for preventing allergies in early childhood (Review) Copyright © 2015 The Cochrane Collaboration. Published by John Wiley & Sons, Ltd. Trusted evidence. Informed decisions. Better health.

[Intervention Review]

Maternal prenatal and/or postnatal n-3 long chain polyunsaturated fatty acids (LCPUFA) supplementation for preventing allergies in early childhood

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ABSTRACT

Background

Allergies have become more prevalent globally over the last 20 years. Dietary consumption of n-3 (or omega 3) long chain polyunsaturated fatty acids (LCPUFA) has declined over the same period of time. This, together with the known role of n-3 LCPUFA in inhibiting inflammation, has resulted in speculation that n-3 LCPUFA may prevent allergy development. Dietary n-3 fatty acids supplements may change the developing immune system of the newborn before allergic responses are established, particularly for those with a genetic predisposition to the production of the immunoglobulin E (IgE) antibody. Individuals with IgE-mediated allergies have both the signs and symptoms of the allergic disease and a positive skin prick test (SPT) to the allergen.

Objectives

To assess the effect of n-3 LCPUFA supplementation in pregnant and/or breastfeeding women on allergy outcomes (food allergy, atopic dermatitis (eczema), allergic rhinitis (hay fever) and asthma/wheeze) in their children.

Search methods

We searched the Cochrane Pregnancy and Childbirth Group's Trials Register (6 August 2014), PubMed (1966 to 01 August 2014), CINAHL via EBSCOhost (1984 to 01 August 2014), Scopus (1995 to 01 August 2014), Web of Knowledge (1864 to 01 August 2014) and ClinicalTrials.gov (01 August 2014) and reference lists of retrieved studies.

Selection criteria

We included randomised controlled trials (RCTs) evaluating the effect of n-3 LCPUFA supplementation of pregnant and/or lactating women (compared with placebo or no treatment) on allergy outcomes of the infants or children. Trials using a cross-over design and trials examining biochemical outcomes only were not eligible for inclusion.

Data collection and analysis

Two review authors independently assessed eligibility and trial quality and performed data extraction. Where the review authors were also investigators on trials selected, an independent reviewer assessed trial quality and performed data extraction.

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Main results

Eight trials involving 3366 women and their 3175 children were included in the review. In these trials, women were supplemented with n-3 LCPUFA during pregnancy (five trials), lactation (two trials) or both pregnancy and lactation (one trial). All trials randomly allocated women to either a n-3 LCPUFA supplement or a control group. The risk of bias varied across the eight included trials in this review with only two trials with a low risk of selection, performance and attrition bias.

N-3 LCPUFA supplementation showed a clear reduction in the primary outcome of any allergy (medically diagnosed IgE mediated) in children aged 12 to 36 months (risk ratio (RR) 0.66, 95% confidence interval (CI) 0.44 to 0.98; two RCTs; 823 children), but not beyond 36 months (RR 0.86, 95% CI 0.61 to 1.20; one RCT, 706 children). For any allergy (medically diagnosed IgE mediated and/or parental report), no clear differences were seen in children either at 12 to 36 months (RR 0.89, 95% CI 0.71 to 1.11; two RCTs, 823 children) or beyond 36 months of age (RR 0.96, 95% CI 0.84 to 1.09; three RCTs, 1765 children).

For the secondary outcomes of specific allergies there were no clear differences for food allergies at 12 to 36 months and beyond 36 months, but a clear reduction was seen for children in their first 12 months with n-3 LCPUFA (both for medically diagnosed IgE mediated and/or parental report). There was a clear reduction in medically diagnosed IgE-mediated eczema with n-3 LCPUFA for children 12 to 36 months of age, but not at any other time point for both medically diagnosed IgE mediated and medically diagnosed IgE mediated, and medically diagnosed IgE mediated and/or parental report.

There was a clear reduction in children's sensitisation to egg and sensitisation to any allergen between 12 to 36 months of age when mothers were supplemented with n-3 LCPUFA.

In terms of safety for the mother and child, n-3 LCPUFA supplementation during pregnancy did not show increased risk of postpartum haemorrhage or early childhood infections.

Authors' conclusions

Overall, there is limited evidence to support maternal n-3 LCPUFA supplementation during pregnancy and/or lactation for reducing allergic disease in children. Few differences in childhood allergic disease were seen between women who were supplemented with n-3 LCPUFA and those who were not.

PLAIN LANGUAGE SUMMARY

Fish oil (n-3 or omega-3) for pregnant mothers or breastfeeding mothers to prevent allergies in their young children

Fish and fish oil are the major sources of omega-3 long chain fatty acids. Dietary marine omega-3 fatty acid supplements during pregnancy may change the immune system of the newborn before allergic responses are established, particularly for those with a genetic predisposition to the production of the immunoglobulin E (IgE) antibody. Individuals with IgE-mediated allergies have both the signs and symptoms of the allergic disease and a positive skin prick test (SPT) to the allergen.

Allergy is an important public health problem that places a burden on individuals, society and healthcare costs. Allergic diseases include food allergies, eczema (atopic dermatitis), asthma or wheeze and hay fever (allergic rhinitis). Many childhood allergies continue into adulthood.

Pregnant women, especially those from Western countries, are not eating as much fish and allergic diseases have been increasing over the time that pregnant women have been eating less fish. The unborn baby gets nutrition from his or her mother and so the mother's diet is important. Supplementing women with omega-3 fatty acids from marine origin may be important in preventing their children from developing allergies.

In this review of randomised controlled studies, we evaluated the effects of adding marine omega-3 fatty acids to women's diets during pregnancy or lactation on allergic diseases in their children. We analysed eight trials that involved 3366 women and 3175 children. The women were randomly assigned to receive a marine omega-3 supplement (as fish oil capsules, or added to foods) or no treatment during pregnancy (five trials), during breast feeding (two trials) or both pregnancy and breast feeding (one trial). Overall, the methodological quality of the trials varied, with only two trials being at low risk of bias.

Overall, the results showed little effect of maternal marine omega-3 supplementation during pregnancy and/or breast feeding for the reduction of allergic disease in the children. However there were reductions in some outcomes such as food allergy during the baby's first year and eczema with marine omega-3 supplementation in women with a baby at high risk of allergy. Currently, there is not enough evidence to say that omega-3 supplements from marine origin during pregnancy and/or breast feeding for mothers will reduce allergies in their children.

In terms of safety for the mother and child, omega-3 fatty acids supplementation from marine origin during pregnancy did not show increased risk of excessive bleeding after the baby was born (postpartum haemorrhage) or early childhood infections.

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