Reference:

n-3 Fatty Acid Supplementation in Mothers, Preterm Infants, and Term Infants and Childhood Psychomotor and Visual Development: A Systematic Review and Meta-Analysis


Tufts Friedman School of Nutrition and Science Policy, Boston, MA, USA

Summary:

The accumulation of DHA (docosahexaenoic acid omega-3) in the brain and retina of the eye during early growth and development has been positively related to optimal cognitive and visual functioning, respectively. Population-based studies have related a higher maternal intake of fish/seafood containing the long chain omega-3 fatty acids as DHA plus EPA (eicosapentaenoic acid) to better cognitive performance in their infants and young children. The present publication is a review of the various reported research trials which evaluated the effect of omega-3 fatty acid supplementation in mothers and in both preterm and term infants on childhood psychomotor and visual development. The cumulative data was derived from 38 research trials on mothers (13 trials), preterm infants (7 trials), and term infants (18 trials) involving 5,541 participants. Supplementation with DHA and/or EPA via supplements, fortified foods, infant formula, or diet in pregnant or lactating women or in infants aged less than 2 years of age was included in the analyses. For the maternal studies, supplementation duration averaged 22 weeks with the doses of DHA and EPA averaging 673 and 297 mg/day, respectively. For preterm infants (average age of 30.7 weeks), the supplementation trials averaged 45 weeks with average intakes of DHA, EPA, and AA (arachidonic acid, omega-6) being 0.28, 0.12, and 0.34% of total fatty acids, respectively. Among term infants, the supplementation duration averaged 37 weeks with average levels for DHA, EPA, and AA being 0.38%, 0.05%, and 0.40% of the total fatty acids.

This systematic review and meta-analysis of 38 clinical trials across critical periods of infant brain development (from pregnancy through infancy) demonstrated a statistically-significant
benefit of DHA/EPA omega-3 fatty acid supplementation on infant cognitive development and visual acuity. Visual acuity showed the strongest benefit. The authors indicated that the greater effect on visual acuity with supplementation after birth was consistent with the timing of retinal and visual cortex neurodevelopment – much of which occurs postnatally. No significant relationship to overall childhood IQ was found although the number of IQ studies were limited.

Dr. Holub’s Comments:

While the intervention groups in the present review (mothers, preterm infants, term infants) have various differences, the different time periods of supplementation targeted neuro/visual development. The findings indicate a somewhat greater effect for DHA/EPA omega-3 fatty acid supplementation in both preterm and term infants relative to maternal supplementation for visual acuity and in preterm infants for cognitive performance (mental development index). It is apparent, from global estimates of current intakes DHA/EPA in mothers and infants, that these frequently fall well below the intakes via supplementation in many clinical trials which supported an improvement in childhood psychomotor and visual development as reviewed herein.