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IMPACT FACTOR 2017: 1.558

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Prenatal and early postnatal fatty acid status and neurodevelopmental outcome

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Published Online: 2007-02-16 | **DOI:** <https://doi.org/10.1515/JPM.2007.034>

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Abstract

The present review addresses the effect of pre- and postnatal supplementation of nutrition with long-chain polyunsaturated fatty acids (LCPUFA) on neurodevelopmental outcome. The few studies which addressed the effect of prenatal LCPUFA status or prenatal LCPUFA supplementation suggest that a better prenatal arachidonic acid (AA) and docosahexaenoic acid (DHA) status might be related to a better neurodevelopmental outcome until at least 18 months of age. A review of the few randomized controlled trials on formula supplementation with LCPUFA in preterm infants did not provide evidence for a significant beneficial effect of LCPUFA on developmental outcome. A review of the trials on formula supplementation with LCPUFA in term infants revealed that supplementation with LCPUFA, in particularly supplementation with $\geq 0.30\%$ DHA, has a beneficial effect on neurodevelopmental outcome until 4 months. The studies could not demonstrate a consistent positive effect beyond that age. It was concluded that the relatively subtle effects of LCPUFA supplementation on neurodevelopmental outcome do not only depend on dosage but also on the gestational period during which the nutritional components are supplied: supplementation prior to term seems to have more effect than that after term.

Keywords: Arachidonic acid; brain development; docosahexaenoic acid; full term infants; LCPUFA; neurodevelopmental outcome; prenatal nutrition; preterm infants; review; trans-fatty acids

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Published Online: 2007-02-16

Published in Print: 2007-02-01

Citation Information: Journal of Perinatal Medicine, Volume 35, Issue S1, Pages
S28–S34, ISSN (Online) 1619-3997, ISSN (Print) 0300-5577,
DOI: <https://doi.org/10.1515/JPM.2007.034>.

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