



Abstract

Vitamin D and Omega-3 Long Chain Polyunsaturated Fatty Acids Improve Behavioural Symptoms in Children with Autism Spectrum Disorder [†]

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Background: The efficacy of vitamin D and omega-3 long chain polyunsaturated fatty acid (omega-3 LCPUFA), each individually, in Autism Spectrum Disorder (ASD) has been tested in a few trials and the results are inconclusive. The objective was to evaluate the efficacy of vitamin D (VID), omega-3 LCPUFA (OM), or both (VIDOM) on symptoms of ASD in children.

Methods: New Zealand children with ASD (age 2.5–8.0 years) participated in a 12-month randomised, double-blind, placebo-controlled, 2 × 2 factorial trial of daily 2000IU vitamin D₃, 722 mg docosahexaenoic acid (DHA), both supplements, or placebo. Core symptoms were assessed using Social Responsiveness Scale (SRS), sensory issues using Sensory Processing Measure (SPM), problem behaviours including irritability and hyperactivity using Aberrant Behaviour Checklist (ABC), and biomarkers (serum 25-hydroxyvitamin D [25(OH)D] and omega-3 index) using venous blood samples. Outcome measures were analysed pre- and post-intervention. Pair-wise mixed effects longitudinal models were used for data analysis.

Results: Overall, 62% (73/117) of children completed the study (placebo 16, VID 19, OM 23, VIDOM 15). Compared to placebo, we observed greater improvement in multiple outcomes in the intervention groups: SRS-social awareness for OM (0.4 ± 2.9 vs. −1.4 ± 2.3, $p = 0.03$) and VIDOM (0.4 ± 2.9 vs. −1.7 ± 3.5, $p = 0.03$); SRS-social communicative functioning for VIDOM (−5.6 ± 10 vs. −16 ± 24, $p = 0.07$); SRS-total for OM (−5.8 ± 12 vs. −17 ± 18, $p = 0.08$); ABC-irritability for VID (0.8 ± 6.1 vs. −4.0 ± 4.9 vs., $p = 0.01$) and OM (0.8 ± 6.1 vs. −5.0 ± 5.0, $p = 0.001$); and ABC-hyperactivity for VID (−0.8 ± 5.6 vs. −5.2 ± 6.3, $p = 0.047$). The active treatments led to increases in mean serum 25(OH)D

concentrations (nmol/L) (VID: $+27 \pm 14$ and VIDOM: $+36 \pm 17$, both $p < 0.001$) and median omega-3 index (%) (OM: $+4.4$ (3.3, 5.9) and VIDOM: $+4.0$ (2.0, 6.0), both $p < 0.001$).

Conclusions: Vitamin D and omega-3 LCPUFA, each individually or together, improve some behavioural symptoms of ASD. However, large attrition rates and resultant loss of statistical power preclude definitive conclusion and warrant further trials.

Supplementary Material: The presentation is available online at www.mdpi.com/2504-3900/8/1/58/s1.



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