Diet-induced changes in iron and n-3 fatty acid status and associations with cognitive performance in 8-11-year-old Danish children: secondary analyses of the Optimal Well-Being, Development and Health for Danish Children through a Healthy New Nordic Diet School Meal Study

Fe and n-3 long-chain PUFA (n-3 LCPUFA) have both been associated with cognition, but evidence remains inconclusive in well-nourished school-aged children. In the Optimal Well-Being, Development and Health for Danish Children through a Healthy New Nordic Diet (OPUS) School Meal Study, the 3-month intervention increased reading performance, inattention, impulsivity and dietary intake of fish and Fe. This study investigated whether the intervention influenced n-3 LCPUFA and Fe status and, if so, explored how these changes correlated with the changes in cognitive performance. The study was a cluster-randomised cross-over trial comparing school meals with packed lunch (control). At baseline and after each treatment, we measured serum ferritin, whole-blood n-3 LCPUFA and Hb, and performance in reading, mathematics and d2-test of attention. Data were analysed using mixed models (n 726) and principal component analysis of test performances (n 644), which showed two main patterns: 'school performance' and 'reading comprehension'. The latter indicated that children with good reading comprehension were also more inattentive and impulsive (i.e. higher d2-test error%). The intervention improved 'school performance' (P=0·015), 'reading comprehension' (P=0·043) and EPA+DHA status 0·21 (95 % CI 0·15, 0·27) w/w % (P
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