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Re-evaluation of a food frequency questionnaire to estimate total n-3 fatty acid intake in primary school children

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Long-chain omega-3 polyunsaturated fatty acids (LC n-3 PUFA), including docosahexanoic acid (DHA) and eicosapentanoic acid (EPA), contribute significantly to neurological and cognitive development in children¹. Dietary sources of intake of LC n-3 PUFA, however, are limited only to relatively few and less commonly eaten foods and there are currently no data available on LC n-3 PUFA intakes in primary aged school children. Recent studies have shown that endogenous synthesis of LC n-3 PUFA from α -linolenic acid (ALA), which is abundant in the diet, is not as efficient as previously thought². This casts doubt on the adequacy of the supply of LC n-3 PUFA based on the conversion of ALA. In response to this evidence, food manufacturers have developed several foods fortified with 'omega-3 fats' marketed at parents by suggesting benefits to children's learning and behaviour. There is currently no validated method of collecting intake data. A Food Frequency Questionnaire² was previously design to measure the n-3 PUFA intake in children with the breakdown of each single n-3 PUFA. However, the FFQ was found to underestimate ALA intake.

The aim of this study was to re-design the previous FFQ to overcome the main limitation of ALA underestimation and then re-evaluate it. 39 primary school children (16 males, 23 female), aged 5-8 participated in the study.

Comparison to the National Diet and Nutrition Survey³ showed that intakes of total n-3 PUFA for 5-6 yr old males ($p=0.77$), 5-7yr old females ($p=0.66$), and 7-8 yr old males ($p=0.79$) were in line with the expected frequencies whereas intakes in 7-8 yr old females were significantly lower ($p<0.001$). Data for total n-3 PUFA ($p<0.001$) ALA ($p<0.001$), DHA ($p<0.001$), were significantly greater when compared to data from the previous study⁴, whereas intakes for and total n-3 LC PUFA ($p=0.5$) and EPA ($p= 0.22$) were not significantly different. The mean intakes of total LC n-3 PUFA in both male (0.18 ± 0.005 g/day) and female (0.18 ± 0.04 g/day) groups, were significantly lower ($p<0.001$) than recommendations⁵. 'Omega-3' fortified foods did not account for any of the total n-3 LC PUFA intake; however 3 children (1 male, 2 female) took omega-3 supplements which accounted for 21% of the total n-3 LC PUFA intake from all children.

The study indicates that the FFQ was successful in overriding the main limitation of the original design, which involved underestimation of ALA intake Furthermore, it illustrated that intakes of LC n-3 PUFA were far below of recommendations. Validation of the FFQ, against a more comprehensive method of assessing dietary intake, is now fundamental to assess its accuracy.

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