Arch Public Health
2009, 67 (Supplement 1), 52

Erythrocyte n-3 fatty acid status is adversely associated with metabolic health in Danish adolescence

by

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Marine long-chain n-3 polyunsaturated fatty acids may have a beneficial effect on several aspects of the metabolic syndrome (dyslipidemia, insulin resistance, hypertension and abdominal obesity), which is increasing in prevalence during adolescence. Only few studies have investigated the effects of n-3 fatty acids in adolescence. The present study examine associations between fish intake (assessed by a 7 d pre-coded food diary), erythrocyte (RBC) docosahexaenoic acid (DHA)-status (analyzed by gas-chromatography) and metabolic syndrome measures (anthropometry, blood pressure and plasma lipids, insulin and glucose) in 109 17y-old children in the Copenhagen Birth Cohort Study. Only 8% of the children were overweight/obese and few showed signs of the metabolic syndrome, but all of the metabolic syndrome variables were correlated. The median fish intake was 10.7 [inter quartile range 3.6-21.2] g/d. Boys tended to have a higher fish intake ($p=0.052$), but girls had significantly higher RBC levels of DHA ($p=0.001$). Sex and fish intake explained 37% of the variance in RBC-DHA ($p<0.001$). After adjustment for sex, breast-feeding, body fat% and dietary factors, DHA-status was significantly positively correlated with systolic blood pressure ($p=0.032$), fasting insulin ($p=0.013$), HOMA ($p=0.020$) and there was a similar but non-significant trend for plasma cholesterol ($p=0.058$). Overall, this study showed the expected association between fish intake and RBC-DHA, which in contrast to our expectations was found to be associated with a poorer metabolic profile. Whether these results reflect the physiological function of n-3 LCPUFA, lifestyle factors associated with fish intake in Denmark, or mere chance remains to be investigated.

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