Proceedings of the Nutrition Society (2012), **71 (OCE2)**, E204 doi:10.1017/S0029665112002613

Summer Meeting hosted by the Irish Section, 16–19 July 2012, Translational nutrition: integrating research, practice and policy

Macronutrient intake and relations to cardiometabolic risk in 10 to 11 year old children: The CHANGE! Project

R. Gobbi[1], J. Abayomi[1], G. Warburton[1], K. Mackintosh[1], S. J. Fairclough[2], L. M. Boddy[2], K. George[2] and I. G. Davies[1]

[1]*Faculty of Education, Community and Leisure, Liverpool John Moores University, Barkhilll Rd, Liverpool, L17 6BD and* [2]*Research Institute for Sports and Exercise Sciences, Liverpool John Moores University, Liverpool, Byrom Street, L3 3AF, UK*

It is widely accepted that cardiometabolic risk has its origins in childhood, although clinical symptoms may not become apparent until later in life[(1)]. A growing body of evidence suggests that diet in childhood plays a key role in cardiometabolic risk profile in adulthood[(2)]. It is proposed that proportions of macronutrient intake may be more pivotal in the development of cardiometabolic risk than total energy intake[(2)]. The aims of this cross sectional study were to investigate the relationships between cardiometabolic risk and macronutrient intake in 10 to 11 year old children.

Participants ($n = 55$) were recruited from 11 primary schools from a North West English town, of those 27 provided complete data sets for all measures (mean age = 10.6, SD = 0.28 years). Children completed 7 day food dairies and Microdiet employed to estimate mean daily total energy intake (KCal) and the following macronutrients, as a percentage of total energy; protein, carbohydrate (CHO), starch and sugars, fructose, maltose, sucrose, and glucose, fat, mono unsaturated fatty acids (MUFA), poly unsaturated fatty acids (PUFA), and saturated fatty acids (SFA). Cardiometabolic risk markers measured included fasting capillary blood total cholesterol (TC), high density lipoprotein cholesterol (HDL-C), triglycerides (TRG), and glucose; body composition (DEXA); resting blood pressure (sBP and dBP) and resting heart rate (RHR), carotid intima media thickness (CIMT), left ventricular diastolic filling (E/A); septal myocardial tissue velocities (E'/A'), and left ventricular mass (LV mass). LV mass index was calculated to account for body size. A clustered risk score (CRS) was calculated using TC: HDL-C, glucose, systolic BP, LV Mass Index, and trunk fat mass (g). The following outcome measures were not normally distributed and were log10 transformed: TRG, fructose, dietary glucose, trunk fat mass and capillary glucose. Pearson's correlation coefficients, controlling for gender and somatic maturation, were completed to assess the relationships between total energy, CHO, sugars and starch and cardiometabolic risk markers.

Sucrose had a weak to moderate negative correlation with TRG (log) [$r = -0.42$, $p = 0.029$], TC: HDL-C [$r = -0.487$, $p = 0.001$] and CRS [$r = -0.625$, $p = 0.001$], and a moderate positive correlation with HDL-C [$r = 0.530$, $p = 0.004$]. Total CHO was also negatively correlated with CIMT [$r = -0.375$, $p = 0.029$]. PUFA had a weak positive correlation with BMI [$r = 0.343$, $p = 0.033$] and RHR [$r = 0.336$, $p = 0.039$]. There were no other correlations between macronutrients and cardiometabolic risk markers.

In conclusion, a higher intake of PUFA was associated with a higher RHR, and BMI. A higher intake of carbohydrates and sucrose was associated with a favourable cardiometabolic risk profile. This evidence is contradictory to conventional wisdom and further investigation into the contribution of foods to the nutritional values is required, to explain this finding.

1. Williams CL, WHayman LL, Daniels SR, Robinson TN, Steinberger J, Paridon S *et al*. (2002) Cardiovascular Health in Childhood: A Statement for Health Professionals From the Committee on Atherosclerosis, Hypertension, and Obesity in the Young (AHOY) of the Council on Cardiovascular Disease in the Young, American Heart Association. *Circulation* **106**, 143–60.
2. Sharma S, Roberts LS, Hudes ML, Lustig RH & Fleming SE (2009) Macronutrient intakes and cardio metabolic risk factors in high BMI African American children. *Nutrition & metabolism* **6**, 41.