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Macronutrient intake and relations to physical activity and sedentary behaviour in 10–11 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 and* [2]*Research Institute for Sports and Exercise Sciences, both Liverpool John Moores University, Liverpool, UK*

Prolonged sedentary (SED) behaviour, and low levels of physical activity (PA), are independently and positively associated with all-cause mortality and risk of chronic diseases such as obesity, cancer, cardiovascular disease (CVD) and type 2 diabetes mellitus[1,2]. Furthermore, a high energy intake and increased consumption of dietary fat, carbohydrates and sugars increases risk of obesity, and associated chronic disease, including CVD and cancer[3,4]. The combination of these unhealthy behaviours therefore increases overall risk for these diseases. The aims of this cross sectional study were to assess the relationships of PA, and SED, with total energy 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 40 provided complete data sets for all measures (mean age = 10.6, SD = 0.28 years). Habitual PA was measured using 7 day accelerometry, cut points were >2160 counts per minute for moderate to vigorous intensity PA (MVPA) and<100 CPM for sedentary time (SED). Children completed a 7 day food diary and food diaries were input into Microdiet to estimate mean daily total energy intake (KCal) and the following macronutrients, as a percentage of total energy; protein, carbohydrate (CHO), starch and sugars, fat, mono unsaturated fatty acids (MUFA), poly unsaturated fatty acids (PUFA), and saturated fatty acids (SFA). Pearson's correlation coefficients, controlling for gender and somatic maturation, were completed to assess the relationships between total energy, macronutrients and MVPA and SED and total PA (average CPM).

SED had moderate positive correlations with total energy intake (kcal) ($r = 0.610$, $p<0.001$) and %PUFA (% of total KCal) ($r = 0.582$, $p<0.001$). SED also had weak negative correlations with %CHO (% of total Kcal) ($r = -0.381$, $p = 0.018$) and %Starch (% of total Kcal) ($r = -0.429$, $p = 0.007$). Total PA (average CPM) had a moderate negative correlation with total energy (kcals) ($r = -0.455$, $p = 0.004$). MVPA was not significantly correlated with total energy intake or any of the macronutrients ($p>0.05$).

In conclusion, correlations exist between SED and total energy intake and PUFA. Furthermore total PA and total energy are correlated. The combination of these unhealthy behaviours needs addressing since it is known that clustering of unhealthy behaviours increase overall risk of chronic disease[1–4]. Furthermore behaviour established in childhood is likely to track into adulthood, further increasing risk later in life[5]. Further investigation is warranted.

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