Proceedings of the Nutrition Society (2010), **69 (OCE6)**, E423 doi:10.1017/S0029665110002867

Summer Meeting, 28 June–1 July 2010, Nutrition and health: cell to community

Early-for-age height attainment is associated with higher body fat levels and a more abdominal distribution of body fat in children

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There is accumulating evidence to suggest that rapid early childhood growth is associated with a greater risk of becoming overweight or obese in childhood and adulthood. Additionally, overweight and obese children tend to be taller for their age compared with normal weight children. These studies have relied upon the BMI as a proxy measure of overweight or obesity. However, nothing is known about this observation using other measures of body fatness in cross-sectional studies, or how children of similar height vary in their body fatness. Here, we report such findings in children grouped by similar height.

The original sample comprised a total of 2298 Caucasian children aged between 4 and 16 years for whom height (cm), weight (kg), BMI, percentage body fat (%BF), bio-impedance analysis (BIA) and waist circumference (WC, cm) had been measured. From this sample, 782 children spanning a 15 cm (0.5 SD) range in height around the sample mean were selected for further analysis and divided into three sub-groups each representing a (narrow) 5 cm range in height. Pearson correlation coefficients were calculated within each 5 cm grouping between height SD score (SDS) and weight, weight SDS, BMI, BMI SDS, %BF, %BF SDS, WC and WC SDS. SDS were calculated using the current UK reference data[1–4].

Significant correlations were observed within each 5 cm height range between height SDS and weight SDS, BMI SDS, %BF SDS and WC SDS ($P<0.001$ for all). In the highest height group, height SDS was also significantly associated with absolute weight, %BF and WC ($P<0.01$).

		Pearson correlation coefficient with height SDS							
Height range (cm)	Age range (years)	Wt (kg)	Wt SDS	BMI	BMI SDS	%BF	%BF SDS	WC	WC SDS
126–131 (*n* 252)	5.4–10.9	0.09	0.67**	0.09	0.21**	0.1	0.36**	0.20**	0.45**
131–136 (*n* 268)	6.6–11.6	0.06	0.69**	0.07	0.28**	0.09	0.35**	0.08	0.40**
136–141 (*n* 262)	7.3–12.7	0.12*	0.67**	0.12	0.30**	0.14*	0.28**	0.15*	0.45**

*$P<0.01$, **$P<0.001$.

This study indicates that the younger age a child attained a given height, this was associated with a greater weight for age, BMI for age, %BF for age and WC for age compared with children who attained this height at an older age. Although this cross-sectional data cannot describe growth patterns, it is able to show that attainment of a certain height at a younger age suggests a more rapid growth tempo and is associated with the child being heavier for age, with a greater BMI for age, a greater %BF for age and with a greater abdominal accumulation of body fat. Although these findings should be confirmed in longitudinal studies, they support the general hypothesis that a faster tempo of growth in childhood is associated with a risk of becoming overweight or obese.

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