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## Influence of socio-economic status on upper-body fatness and abdominal obesity in children

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The prevalence of overweight and obesity is greater in individuals from lower income groups, although it is unclear whether there are socio-economic differences in abdominal obesity. Excess body fat in the abdominal region is associated with raised CVD risk, including an atherogenic lipoprotein profile and raised fasting insulin levels<sup>(1)</sup>, both in children and adults. The present cross-sectional study compared upper-body fatness in children from different income groups.

A total of 2218 children from inner city London and from more affluent surrounding counties aged between 4 and 14 years participated in the study. Income status was defined at the school level from the percentage of children eligible for free school meals<sup>(2)</sup>. Height, weight, waist circumference (WC) and total and regional body fatness (using segmental bioelectrical impedance analysis (BIA)) were measured. Standard deviation scores (SDS) for height and WC were calculated separately for boys and girls in each income group using the current UK reference data<sup>(3,4)</sup>. The percentage of children >91st for WC was calculated. Waist:height ratio (WHtR) was calculated and the percentage of children >0.50 boundary value was determined<sup>(5)</sup>. Overweight and obese (determined by the International Obesity Task-force classification<sup>(6)</sup>) children were analysed further.

	<i>n</i>		Height (m)		SDS height		WC (cm)		SDS WC	
	M	F	M	F	M	F	M	F	M	F
Low	553	562	1.33**	1.32*	0.28	0.14	61.5**	59.7**	0.76	0.66***
High	651	452	1.34	1.34	0.36	0.20	62.9	63.2**	0.79	0.99

  

	% above 91st centile for WC		WHtR		% above 0.50 boundary value		Trunk fat (kg)		Trunk:total fat	
	M	F	M	F	M	F	M	F	M	F
Low	28.8	26.4	0.46**	0.45	18.6	17.4	2.9***	3.2*	41.7***	40.5***
High	26.9	36.9	0.45	0.45	10.6	16.1	2.4	2.9	38.1	37.8

M, male; F, female. Mean values were significantly different from those for the higher income group: \* $P < 0.05$ , \*\* $P < 0.01$ , \*\*\* $P < 0.001$ .

The percentage of children >91st centile for WC was greater in those from the higher income group. However, the proportion of children exceeding the 0.50 WHtR boundary value was greater in the lower income group compared with the higher income group. Using BIA, overweight and obese children from the lower income group stored a larger proportion of fat on the trunk compared with those from the higher income group ( $P < 0.05$ ).

These findings indicate that children from a lower income group are shorter for their age than those from the higher income group, and tend to have a lower age-specific WC. When height was taken into account, the effect of income on WC was reversed in boys and removed in girls. However, predicted trunk fat from BIA was greater for children in the lower income group, suggesting that for a given WC, trunk fat is greater in children in the lower income group. Furthermore, as children become overweight or obese there is a greater tendency for this excess fat to be stored on the trunk in those from a lower income group. In conclusion, caution should be exercised when interpreting WC measures in children across different income groups, and height should be taken into account when these comparisons are made.

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