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Relationships between BMI, aerobic fitness and several ‘lifestyle variables’ in 9–10-year-old children living in Liverpool

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In Liverpool over the past 10 years prevalence of paediatric obesity has increased substantially, whilst levels of physical fitness have declined⁽¹⁾. The aim of the present study was to investigate relationships between measures of body fatness, physical fitness and a number of ‘lifestyle’-related variables in children living in Liverpool. Data were collected over two academic years (2004–6) and were available for 6057 (2820 boys and 3237 girls) 9–10-year-old participants. Stature and body mass recorded at SportsLinX⁽²⁾ fitness sessions were used to calculate BMI. Participants were assigned to an overweight plus obese group or a non-overweight/obese group using age and gender-specific cut-off points⁽³⁾. Performance on the 20 m multistage-shuttle runs (20 mMST) test was used as a marker of aerobic fitness. Food intake, sporting participation, sedentary activity and parental participation in sport were assessed using the SportsLinX Survey. The food intake section of the survey has been previously investigated for validity and reliability⁽⁴⁾. Positive, negative and overall food scores were calculated, these calculations have been used previously in Liverpool schoolchildren⁽⁵⁾. Weekday and weekend-day sedentary scores were also calculated, by taking the mean of aggregated time spent in various sedentary activities. Correlations, multiple logistic regression and multiple regression were used to assess the relationship between lifestyle variables and BMI and 20 mMST performance. Pearson’s correlation data are shown in the Table.

Table. Correlations between lifestyle variables, BMI and 20 mMST

Variable	BMI		20 mMST	
	Boys	Girls	Boys	Girls
Positive food score	0.04	0.11**	0.07*	0.02
Negative food score	–0.11**	–0.11**	0.04	0.03
Overall food score	0.16**	0.17**	–0.01	–0.01
Weekday sport	–0.04	–0.03	0.22**	0.17**
Weekend sport	0.00	0.01	0.19**	0.14**
Weekday sedentary score	–0.01	0.01	–0.05	–0.03
Weekend-day sedentary score	–0.01	0.01	–0.05	–0.04
Transport to school	0.03	–0.01	–0.05	–0.01
Parental participation	0.03	–0.00	0.13**	0.03

* $P \leq 0.05$, ** $P \leq 0.01$.

For logistic regression food score was the only predictor variable for BMI in boys and girls ($P \leq 0.01$), describing a positive relationship between food score and BMI. No activity measures were significant predictors of BMI and no food variables were significant predictors of 20 mMST performance. For boys multiple regression results found weekday sport participation ($P \leq 0.01$), weekend-day sport participation and parental activity (both $P \leq 0.05$) were positive predictors and weekend-day sedentary score ($P \leq 0.01$) was a negative predictor of 20 mMST performance. The model accounted for 7.5% of variance (R^2 0.075). For girls weekday sport participation ($P \leq 0.01$) was a positive predictor and weekday sedentary score ($P \leq 0.05$) was a negative predictor of 20 mMST performance, with the model explaining 2.5% of variance (R^2 0.025).

Results describe weak relationships between ‘lifestyle’ variables, BMI and fitness in 9–10-year-old children. These findings are in contrast to many theories surrounding the causes of the obesity ‘epidemic’ and declining levels of fitness in children, and may relate to methods used.

1. Stratton G, Canoy D, Boddy LM, Taylor SR, Hackett AF & Buchan IE (2007) *Int J Obes (Lond)* **31**, 1172–1178.
2. Taylor S, Hackett A, Stratton G & Lamb L (2004) *Educ Health* **22**, 3–7.
3. Chinn S & Rona RJ (2004) *Ann Hum Biol* **31**, 695–696.
4. Johnson B, Hackett A, Bibby A & Cross J (1999) *J Hum Nutr Diet* **12**, 307–316.
5. Hackett AF, Boddy LM, Boothby J, Dummer T, Johnson B & Stratton G (2008) *J Hum Nutr Diet* (In the Press).