

Rapid growth and body size in infancy predict overweight/obesity at 2 years

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The global prevalence of obesity is increasing, even among children as young as preschool age⁽¹⁾. Rapid infant growth and a larger body size in infancy have been implicated as risk factors for subsequent obesity in both childhood and adulthood⁽²⁾. The aim of this study was to determine the association between body size and rapid growth in the first 12 months of life and overweight or obesity at 2 years of age.

We defined weight status at 2 years using the UK-WHO 0–4 year age-and-gender specific BMI charts⁽³⁾ in 1346 children who participated in the Cork BASELINE Birth Cohort Study.

Weight was measured at birth, 2, 6, and 12 months and age-and-gender specific standard deviation scores (SDSs) were generated using the UK-WHO growth reference data⁽³⁾. We identified infants who displayed rapid growth, defined as an increase >0.67 in weight SDS⁽⁴⁾, between 0–2, 0–6, 2–6, 6–12, or 0–12 months. Children with a BMI >91st percentile at 2 years were defined as overweight/obese. Separate multivariate logistic regression models were developed to identify independent predictors of overweight/obesity at 2 years. Candidate predictors were: a weight SDS in the highest quartile at birth, 2, 6, or 12 months and rapid growth during each of the age intervals. All models were adjusted for birth weight SDS, parity, gestational age, maternal third level education status and smoking during pregnancy.

Overall, 58% of children displayed rapid growth during at least one age interval. There was a significantly higher ($P < 0.001$) prevalence of overweight/obesity at 2 years among these children than their counterparts who did not display rapid growth during any age interval in the first 12 months (29.7 vs. 12.9%). Rapid growth over any individual age interval or having a weight SDS in the highest quartile at birth or at 2, 6, or 12 months was associated with an increased risk of overweight/obesity at 2 years (see table).

	Prevalence (%)	Odds ratio (OR)	95% CI	P-value
Rapid growth ($\uparrow >0.67$ in weight SDS)				
0–2 months	10.2	2.92	1.92, 4.44	<0.001
2–6 months	29.7	2.71	1.99, 3.68	<0.001
0–6 months	25.7	4.58	3.29, 6.39	<0.001
0–12 months	35.7	1.93	1.35, 2.75	<0.001
6–12 months	16.0	5.02	3.52, 7.18	<0.001
Any age interval in 0–12 months	58.0	4.38	3.09, 3.21	<0.001
Weight SDS in the highest quartile				
Birth	–	1.99	1.47, 2.67	<0.001
2 months	–	3.20	2.30, 4.45	<0.001
6 months	–	5.52	4.05, 7.53	<0.001
12 months	–	7.90	5.76, 10.83	<0.001

We have found that a rapid increase in weight SDS or a body weight at the higher end of the distribution during infancy is associated with a greater risk of overweight/obesity in early childhood. The risk associated with having a weight SDS in the highest quartile increased with age, suggesting that intervention should begin as early as possible in infancy. Rapid growth between 0–2, 0–6 and 6–12 months was associated with a greater risk of overweight/obesity than rapid growth between 0–12 months suggesting that growth should be monitored at regular intervals during infancy to identify those at risk. Infancy may be a critical period for the development of obesity and identifying modifiable determinants of rapid weight gain during this period may be critical for the prevention of subsequent obesity.

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