

The Association between Longitudinal BMI Patterns in Children and their Parents

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Objectives: Parental (maternal and paternal) weight before and after pregnancy has been associated with an increased risk of obesity in the offspring. However, less is known on the longitudinal association between parental and child growth trajectories across early childhood. This work aims to describe parental and child body mass index (BMI) trajectory patterns from birth until adolescence and assess their association.

Methods: We analyzed 1537 single-child families participating in the Applied Research Group for Kids (TARGet Kids!) cohort (ON, Canada). Children and their parents had repeated measurements of weight and length or height from child's birth to 13 years during scheduled visits with their primary care physician. These measurements were used to calculate BMI for parents and age and sex adjusted BMI z-scores (zBMI) for children based on the World Health Organization.

Latent class mixed modeling was used to identify children and parental growth patterns. A loglinear analysis was conducted to study the tri-party interaction between child, maternal, paternal longitudinal patterns. Jaccard distance was used to assess cluster similarity.

Results: We identified two distinct patterns in children (normal, increasing obesity), mothers (normal, increasing obesity), and fathers (overweight, obesity). The three-way loglinear analysis indicated that the tri-party interaction between children, maternal and paternal growth patterns interaction was significant ($\chi^2(1) = 15.1, p < .001$). 92.1% of children in the normal pattern had mothers in the normal pattern and fathers in the overweight pattern. Cluster similarity was 63% for mothers and children, but 12.5% between fathers and children, with most children from the increasing obesity group with a father in the overweight group.

Conclusions: There is a significant tri-party association between children, maternal and paternal BMI patterns from birth to adolescence. Future studies should aim in studying eating and other health behaviors associated with these relationships at the family level.

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