

Does birth weight predict childhood obesity?

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Evidence-based answer

Yes. A birth weight greater than 4,000 g is associated with an increased risk of obesity in both childhood and adolescence

(strength of recommendation [SOR]: **B**, systematic review and multiple cohort studies).

Clinical commentary

Lifestyle matters, too

Few people have more questions than brand-new parents. Physicians often answer these inquiries from their pool of clinical experience or pearls handed down by mentors. It's refreshing to be able to address a parental query on the basis of good evidence rather than empiricism.

The data compel us to inform parents that a new baby who weighs more than

4 kg is at increased risk of childhood obesity. However, all parents should be counseled that the lifestyle choices they make for their child are far more likely than birth weight to influence future obesity. Education about appropriate diet and physical activity is the bedrock from which to attack the childhood obesity epidemic.

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A birth weight >4,000 g heightens the risk of obesity in childhood and adolescence

Evidence summary

The number of children 2 years and older who are overweight has tripled in the past 2 decades; the current prevalence of overweight children and adolescents in the US is 15%.¹ By contrast with adults—in whom overweight and obesity are defined separately as a body mass index (BMI) above 25 kg/m² and 30 kg/m², respectively—overweight and obesity are synonymous in children and are defined as a BMI above the 95th percentile for age and sex.² Children and adolescents with a BMI between the 85th and 95th percentiles are considered at risk for overweight.²

Overweight children are vulnerable to adverse health outcomes, including insulin resistance, hyperlipidemia, hypertension, depression, sleep apnea, asthma,

steatohepatitis, genu varum, and slipped capital femoral epiphysis.² The many variables that have been suggested to influence childhood obesity include birth weight, gestational age, parental obesity, socioeconomic status, single parent household, and birth order.³⁻⁵

Birth weight and later BMI: Consistently linked

A systematic review of 19 longitudinal, observational studies comparing birth weight with later BMI indicates that the association between the 2 is positive and consistent in multiple cohorts.³ Eleven studies focused on outcomes in childhood; another 8 measured outcomes into adulthood.

Fifteen of the 19 studies (79%), ranging in size from 1028 to 92,940 subjects,

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found a positive association between birth weight and later BMI. However, the data were too heterogeneous to combine into a single summary measure. One representative study quantified the relative risk (RR) for severe obesity (>95th percentile BMI) at 5 years of age as 1.7 (95% confidence interval [CI], 1.2-2.9) for birth weights between the 85th and 94th percentiles and 1.8 (95% CI, 1.1-2.9) for birth weights greater than the 95th percentile.³ Studies that didn't find such an association had smaller sample sizes (137 to 432 subjects) and, therefore, may have lacked the power to detect an association.

Gestational diabetes. A subsequent retrospective cohort survey of 14,881 children born to mothers with gestational diabetes—and controlled for age, sex, and Tanner stage—found that the odds ratio (OR) for adolescent overweight was 1.4 (95% CI, 1.2-1.6) for each 1-kg increment in birth weight.⁴ The correlation persisted (OR=1.3; 95% CI, 1.1-1.5) when other covariates were controlled (television viewing, physical activity, energy intake, breastfeeding duration, birth order, household income, mother's smoking, dietary restraint, and mother's current BMI).

Large for gestational age. A US national cohort study of 3192 children adjusted for gestational age, found that large-for-gestational-age (LGA) infants with birth weights above the 90th percentile remained longer and heavier through 83 months of life.⁵ The triceps and subscapular skinfold measurements at 3 years of age for children born LGA were virtually identical to those of children born appropriate for gestational age, but by 6 years of age, skinfold measurements had diverged considerably, to more than 0.60 standard deviations. The researchers concluded that intrauterine growth is associated with obesity in early childhood.

Finally, a large Chinese population-based, case-control study (N=1322), found birth weight above 4.0 kg to be a risk factor for obesity in preschool-age children (OR=3.77; 95% CI, 2.06-6.29).⁶

The absolute rate of overweight increased from 8% to 26% among LGA infants.

In adolescence, parental weight may be a factor

A prospective cohort study of 1993 white LGA infants found a greater propensity to become obese in adolescence, but only if their mothers or fathers were also obese (RR=5.7).⁷ Children with lean parents did not have an increased risk of being overweight in adolescence.

Recommendations

Although major organizations don't focus on infant birth weight as a predictor of overweight, they do address childhood obesity. The American Academy of Pediatrics states that genetic, environmental, or combinations of risk factors predisposing children to obesity can and should be identified.² The US Preventive Services Task Force concludes that the evidence is insufficient to recommend for or against routine screening for overweight in children and adolescents as a means of preventing adverse health outcomes (Grade I recommendation).¹ ■

Acknowledgements

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