Childhood Sleep Deficits Linked to Weight Gain

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Children who lose sleep may have an increased risk of gaining weight, according to findings of a new study.

This points to the importance of sleep in the fight against obesity and further fuels the argument for later starts to the school day, reported Emily K. Snell and colleagues in Child Development.

"Encouraging parents to put their younger children to bed earlier at night and allowing both younger and older children to sleep longer in the morning, as well as urging school districts to avoid very early school start times for later elementary and middle school aged children, might represent an important and relatively low cost strategy to reduce childhood weight problems," wrote Ms. Snell of the Department of Human Development and Social Policy and the Institute for Policy Research at Northwestern University, Chicago (Child Development 2007;78:309-23).

In a study of 2,281 children from a nationally representative survey called the Child Development Supplement of the Panel Survey of Income Dynamics, the children were aged 3-12 years at baseline and 8-17 years at follow-up. Time diaries were used on a randomly selected weekday and weekend to record sleep behavior, and then a subsample of 1,441 children were examined to see whether sleep behavior at baseline influenced weight at follow-up.

The study found "a large decline in weekday sleep across middle childhood and adolescence, driven largely by later weekday bedtimes," a finding that the researchers described as "troubling." While they recommend a minimum of 10-11 hours of sleep per night for younger children, a goal which the study subjects usually achieved on weekends, children as young as 7 years old were already falling short on weeknight

sleep. "The fact that a substantial portion of American children achieve such small amounts of sleep should be of concern in light of findings from prior studies suggesting associations between poor sleep hygiene and decreased cognitive and social functioning," they wrote.

The investigators also noted that "the shift towards later weekday bedtimes might begin earlier than some researchers have suspected," occurring in preadolescence, as early as age 8 or 9 years. "There is clear evidence for the appropriateness of later bedtimes for adolescents, as these changes … may be biologically driven. … For younger children, however, the change to later bedtimes may be driven more by social factors rather than changes in biology," they suggested.

The study also found that lost sleep shows up on the scales 5 years later—with later bedtimes for younger children (aged 3-7.9 years) having the most impact on subsequent body mass index (BMI), while later wake times were more important for older children (aged 8-12.9 years) and subsequent BMI. "Even 1 additional hour of sleep may have a significant and meaningful effect on BMI and overweight status," they wrote, noting that at baseline, 1 extra hour of sleep above average lowered a child's risk of being overweight 5 years later—from 36% to 30%, even after controlling for baseline BMI, family socioeconomics, and race. The study found no evidence that gender or physical activity influenced the effect of sleep on BMI.

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The mediating pathway between inadequate sleep and weight gain may be the disruption of hormones that regulate appetite and metabolism, suggested the authors, "with insufficient sleep hours causing reduced levels of leptin and increased levels of ghrelin, a hormonal profile associated with increased hunger and appetite for carbohydrate-rich foods."

The investigators suggested that a combination of strategies geared toward earlier bedtimes and later wake times depending on a child's age "might well improve multiple aspects of children's health, emotional well-being, and academic performance." ■

Neonatal Weight Gain Linked to Adult Obesity

CHICAGO — Rapid weight gain in the first week of life in formula-fed infants is associated with increased risk of obesity 2-3 decades later, Dr. Nicolas Stettler said at the annual scientific sessions of the American Heart Association.

"The neonatal period may be a sensitive period for the programming of energy balance regulation," said Dr. Stettler of Children's Hospital of Philadelphia.

He presented an observational study conducted over several decades. It involved 653 formula-fed white infants born in the Iowa City area. At age 20-32 years, 32% of them were overweight or obese.

Using a relatively recent statistical analysis method called life-course modeling, Dr. Stettler and coworkers were able to identify the first 8 days of infancy as a critical period of weight gain associated with adult obesity.

The median weight gain during the first 8 days of life was about 200 g. After the researchers adjusted for birth weight, maternal overweight, and other potential confounders, early weight gain remained an independent predictor of adult overweight; for each 100-g increase in weight, the risk of adult overweight or obesity rose by about 28%. This was true even among babies with a low birth weight and rapid catch-up.

Thus, an individual who gained 200 g in the first week of life had a 32% chance of becoming an overweight adult, one who gained 300 g had a 41% risk, and a 400-g weight gain was associated with a 55% risk, Dr. Stettler said.

The importance of this large study of early weight gain isn't so much that it permits identification of individuals at risk for adult obesity; after all, obesity is now so common. Rather, the study is important mainly for its public health and research implications. The results, Dr. Stettler said, may eventually open the door to novel brief interventions in infancy to prevent later obesity. For example, the findings are consistent with animal studies that suggest overfeeding in the first few days of life may result in neurologic or endocrinologic imprinting leading to later obesity.

The first week of life is the first time an individual has to regulate energy intake, he noted. During the fetal period, nutrients are provided passively.

—Bruce Jancin