

Less is more: Study shows that teens who sleep less eat more fatty foods and snacks

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A study in the Sept. 1 issue of the journal *Sleep* shows that teens who slept less than eight hours per weeknight ate higher proportions of fatty foods and snacks than adolescents who slept eight hours or more. The results suggest that short sleep duration may increase obesity risk by causing small changes in eating patterns that cumulatively alter energy balance, especially in girls.

Results show that a shorter mean weekday sleep duration was significantly associated with an increase in the percentage of calories consumed from fats and a decrease in the percentage of calories from carbohydrates. After adjusting for potential confounders such as age, sex and race, teens who slept less than eight hours on weeknights consumed 2.2 percent more calories from fats and 3.0 percent fewer calories from carbs than teens who slept eight hours or more. Further adjustments for body mass index (BMI) had little effect on these associations. In secondary analyses stratified by sex, the results were significant among girls but not boys.

"The relative increase in fat consumption among shorter sleepers by 2.2 percent per day chronically may contribute to cumulative increases in <u>energy consumption</u> that would be expected to increase risk for obesity and cardiovascular disease," said senior author and principal investigator Susan Redline, MD, MPH, professor of medicine in the Division of Sleep Medicine at Brigham and Women's Hospital and Beth Israel Deaconess Medical Center, teaching affiliates of Harvard Medical School in Boston, Mass. "The demonstration of chronically altered



<u>dietary patterns</u> in adolescents with shorter sleep provides insight into why shorter sleep has been associated with obesity in prior experimental and observational studies."

The study also found a relationship between sleep duration and snacking. For each one-hour increase in sleep duration, the odds of consuming a high amount of calories from snacks decreased by an average of 21 percent. Analyses of sleep duration and timing of nutrient intake revealed that a significantly greater proportion of teens who slept less than eight hours per weeknight consumed food in the early morning between 5 a.m. and 7 a.m.

"Altered timing of eating in shorter sleepers also may be a metabolic stress that contributes to metabolic dysfunction," said Redline.

The study involved 240 teens between 16 and 19 years of age who are participating in the ongoing Cleveland Children's Sleep and Health Study at Case Western Reserve University School of Medicine and Rainbow Babies & Children's Hospital in Cleveland, Ohio. Eighteen percent of participants were obese, defined as being at or above the 95th percentile of BMI for age or having a BMI of 30 or higher.

Sleep was evaluated at home by wrist actigraphy, and average sleep duration was calculated using at least three weeknights of data. The mean weeknight sleep duration was 7.55 hours, and only 34 percent of participants slept for an average of eight hours or more. The American Academy of <u>Sleep Medicine</u> recommends that teens get at least nine hours of sleep each night to feel alert and well rested during the day.

Macronutrient intake was measured using two 24-hour, multipass recall interviews conducted by trained staff. Details were collected about food items and portion sizes, as well as the timing, location, type, and preparation of each meal or snack. Nutrition data were analyzed using



the Nutrition Data System for Research, a comprehensive nutrient database.

The authors noted that it is unclear why the association between shorter sleep durations and unhealthy dietary habits may be stronger in girls than boys. However, one explanation may be the increased propensity for female teens to engage in emotional eating.

"Further research is needed to understand how gender may modify the relationship between sleep, stress, metabolism and eating behaviors," Redline said.

The cross-sectional analysis did not allow for an examination of causality. However, Redline states that physiologic studies have identified numerous pathways by which sleep loss may promote weight gain. Reductions in sleep duration may alter metabolic rate and affect the production of leptin and ghrelin, two hormones that regulate appetite. Sleep restriction also may provide increased opportunities to eat, initiate stress responses that promote reward-seeking behaviors such as eating and reduce the physical and motivational drive to exercise.

A CDC study published last January in *JAMA* reports that the rate of obesity in U.S. adolescents between the ages of 12 and 19 years was 18.1 percent in 2007-2008. The authors concluded that the prevalence of high BMI in childhood has remained steady for 10 years and has not declined despite coordinated prevention efforts.

Redline believes that sleep may be the missing link in obesity interventions that focus only on diet and exercise. She suggests that improving <u>sleep duration</u> should be an essential component of obesity prevention and weight management programs.

More information: "The association of sleep duration with



adolescents' fat and carbohydrate consumption," Sleep.

Provided by American Academy of Sleep Medicine

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