COMMENTARY

If You Weigh Too Much, Maybe You Should Try Sleeping More


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ANY VISIT TO A LOCAL SHOPPING CENTRE (OR SCHOOL) WILL SHOW YOU THAT OBESITY IS A MAJOR PUBLIC HEALTH PROBLEM IN NORTH AMERICA. Two major contributors to the high prevalence of obesity are inadequate exercise and excessive nutritional intake. However, many other factors have also been implicated including: increased maternal age, prenatal environment, viral infections, side effects of pharmaceuticals, assortative mating, endocrine disruptive chemicals, and the ambient thermal environment.¹

One potentially important factor of substantial interest to sleep physicians and researchers concerns the potential impact of sleep duration. Specifically, accumulating mechanistic and epidemiologic data suggest that reduced sleep duration may contribute to the development of obesity.

Mechanistic Studies: In humans, short-term reduction in sleep length results in changes in the hormonal milieu that can predispose to increased appetite and weight gain. Ghrelin is a hormone secreted by the gastrointestinal tract that stimulates hunger; leptin is a hormone secreted by adipose cells and attenuates hunger. In a study by Spiegel and colleagues, when sleep in young males was restricted to 4 hours for two nights, plasma levels of ghrelin were increased and leptin was decreased.² Furthermore, these men experienced significantly increased ratings of hunger for various categories of food, and especially for high carbohydrate foods. This research group has also demonstrated blunting of thyroid hormone secretion³ and impaired glucose tolerance⁴ with sleep restriction, which may also predispose to weight gain. Epidemiologic studies have also demonstrated greater serum levels of ghrelin and lower levels of leptin in short sleepers compared to individuals reporting 8 hours of sleep per night.⁵ More studies are required to confirm and extend these important findings.

Epidemiologic Studies: Numerous studies in many countries have reported a cross-sectional association between curtailed sleep and obesity.⁶ Furthermore, prospective studies have suggested short sleep duration predicts future obesity.⁷ Patel and colleagues followed 68,183 women for up to 16 years in the Nurses’ Health Study, and found women sleeping 5 or fewer hours gained 1.14 kg more and those sleeping 6 hours gained 0.71 kg more than women sleeping 7 hours after adjusting for important covariates.⁸ The potential impact of reduced sleep may be even greater in children and adolescents.⁹ For instance, in a British birth cohort of 8234 children, sleeping less than 10.5 hours at age 3 increased the risk of obesity at age 7 by 45%.¹⁰

The prospective study by Watanabe and colleagues in this issue of SLEEP provides even further support of the relationship between sleep duration and weight gain.¹¹ In this large epidemiologic study of over 35,000 workers, self-reported short sleep duration in men was significantly associated with the development of obesity over a one year time period. Specifically, the adjusted odds ratios for the development of obesity were 1.91 (95%CI 1.36, 2.67) and 1.50 (95%CI 1.24, 1.80) in men who slept less than 5 and 5-6 hours, respectively. Interestingly, no significant association between sleep duration and weight gain or obesity was found for women, perhaps due to the relatively small numbers in the sample (approximately 10% of workers were women). Strengths of this study included the prospective design, direct measurements of weight (as opposed to self-reported weight), and the large sample size. As with all observational studies, only an association can be demonstrated, and causation can only be inferred.

There are many potential explanations for why short sleep duration may be associated with weight gain. As described earlier, changes in the hormonal milieu due to sleep restriction may directly contribute to weight gain. Also, tiredness may result in reduced daytime activity. Alternatively, the association may be partially secondary to unrecognized or inadequately controlled confounders. For instance, perhaps individuals who do not sleep adequately also have other unhealthy habits (such as inadequate exercise or poor diet) that can contribute to weight gain. Similarly, patients with obstructive sleep apnea may suffer from short sleep, abnormalities in glucose control, and reduced activity levels.¹² Future studies to investigate the potential mechanisms accounting for this association would be valuable to design effective interventions.

Randomized controlled trials of interventions designed to increase sleep duration will ultimately be required to determine whether increasing sleep will reduce the propensity to gain weight; at least one such clinical trial is in progress.¹³ Nevertheless, I believe the data are currently compelling enough to recommend good diet, adequate exercise, and adequate sleep in people trying to lose weight.

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