

# SleepSheet

News from the Sequoia Sleep Disorders Center

 Sequoia Hospital  
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## Sleep to Lose Weight?

A discussion of recent studies investigating the relationship between sleep and obesity

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Globally, more than one billion adults are classified as overweight (body mass index (BMI) of 25 to 29.9 kg/m), or obese (BMI > 30 kg/m). While some contributing factors to the obesity epidemic are well recognized—genetic background, physical inactivity, consumption of high-fat foods—the role of sleep is often overlooked. Over the last 30 years, sleep duration in the general adult population has decreased from 8.5 hours to 7.2 hours and sleep complaints are common.

Today, approximately 25% of the U.S. population is sleep deprived. As our sleep duration has decreased, rates of obesity have increased. Studies suggest that sleep deprivation alters metabolism in a manner that predisposes to weight gain. Leptin, the hormone that regulates body adiposity, and ghrelin, an orexigenic peptide hormone primarily secreted by the stomach, play a major role in appetite control, food intake and weight regulation. These hormones are central to the sleep duration/BMI relationship: sleep restriction decreases leptin and increases ghrelin, thus increasing appetite levels, which can lead to obesity.

### A Look at Recent Studies

A recent study by Theorell-Haglöw et al., was the first to use full-night polysomnography rather than self-reported sleep duration to demonstrate a significant inverse association between sleep duration and waist circumference, a marker of central obesity that is more strongly related to cardiovascular disease, type 2 diabetes mellitus and mortality than BMI.

### Theorell-Haglöw Study at a Glance

**Objective** Assess associations between sleep duration, sleep stages, and central obesity in women

**Setting** Uppsala, Sweden

**Participants** Population-based sample of 400 women (ages 20–70)

**Method** Full-night polysomnography and measurement of anthropometric variables

**Results** Sleep duration was inversely related to both waist circumference and sagittal abdominal diameter

Duration of slow wave sleep (SWS) and rapid eye movement (REM) were inversely related to waist circumference

Duration of REM sleep was inversely related to sagittal abdominal diameter

These associations were stronger in younger women (age <50)

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**Welcome** to the Summer issue of the SleepSheet, the new quarterly newsletter from the Sequoia Sleep Disorders Center for physicians and other healthcare providers. We look forward to bringing you summaries of current peer-reviewed articles in sleep medicine, as well as announcements about events at the Sleep Center, local news, and national policies that may affect your sleep patients. We will do our best to cull the medical literature for timely and clinically relevant articles.

We welcome your feedback and ideas for future issues of the SleepSheet.

Warm regards,



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Medical Director



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Founder

### Take Home Points

- ✦ Insufficient sleep is a rapidly growing health problem globally
- ✦ There are many causes of insufficient sleep (sleep apnea, insomnia, circadian rhythm disorders) that may warrant further evaluation
- ✦ Sleep deprivation causes hormonal changes that alter metabolism and increase appetite
- ✦ Studies suggest that insufficient sleep increases the risk of obesity

Watch Dr. Lim's 2-minute video clip on how sleep affects your health: [www.blueshieldca.com/bsc/video/goodtoknow/sleep.html](http://www.blueshieldca.com/bsc/video/goodtoknow/sleep.html)

## A Twin Study of Sleep Duration and Body Mass Index

In a recent twin study by N. Watson et al., short sleep was associated with elevated BMI following careful adjustment for genetics and shared environment. In particular, the presence of the within-pair association supports the environmental hypothesis that voluntary curtailment of sleep, not familial factors, drives the association.

**Objective** Determine the relative importance of genetic and environmental contributions to the association between sleep duration and body mass index (BMI)

**Setting** Seattle, Washington

**Participants** 1,224 twins from the University of Washington Twin Registry; mean age: 36.9 years

**Methods** Self-reported height and weight for BMI Calculation and habitual sleep duration

**Results All twins:** elevated mean BMI (26.0 kg/m<sup>2</sup>) in short sleeping twins (< 7 h/night) compared to twins sleeping 7–8.9 h/night (BMI 24.8 kg/m<sup>2</sup>;  $p < 0.01$ )

**Within-twin pair:** short sleeping twins mean BMI of 25.8 kg/m<sup>2</sup> compared to 24.9 kg/m<sup>2</sup> for the 7–8.9 h/night sleep duration group ( $p = 0.02$ )

**Monozygotic twins:** within-twin pair analysis elevated BMI in short sleeping twins (25.7 kg/m<sup>2</sup>) compared to the 7–8.9 h/night reference group (24.7 kg/m<sup>2</sup>;  $p = 0.02$ )

No differences in mean BMI observed between the 7–8.9 h/night reference group twins and longer sleeping twins ( $> \text{or} = 9 \text{ h/night}$ )

Bivariate genetic analysis revealed little evidence of shared genetics between sleep duration and BMI ( $p = 0.28$ )

## Association of Short Sleep Duration with Weight Gain and Obesity at 1-Year Follow-Up: A Large-Scale Prospective Study

In a recent Japanese study by Watanabe et al., short sleep duration was associated with weight gain and the development of obesity in men.

**Objective** Investigate the association between short sleep duration and elevated BMI and obesity in a large sample of Japanese adults over a 1-year period

**Setting** Workplaces of an electric power company in Japan

**Participants** 35,247 company employees (31,477 men; 3,770 women)

**Method** Measured weight and height and self-reported sleep duration were obtained at annual health checkup in 2006 and 2007

Weight change defined as difference in BMI between baseline and 1 year later

**Results** Short sleep duration (< 5 and 5–6 h) and long sleep duration  $\geq 9$  h were associated with an increased risk of weight gain among men after adjustment for covariates

Of the non-obese (BMI < 25) men at baseline, 5.8% became obese (BMI  $\geq 25$ ) 1 year later

Higher incidence of obesity was observed among groups with shorter sleep duration

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 < 5 and 5–6 h, respectively

## Sleep to Lose Weight?

Well, for those of us thinking we might trim down by simply adding an hour or so of sleep back into our daily routine, the solution is not quite that simple. More needs to be studied to determine the nature and direction of the association between sleep and obesity. It is clear though, that the obesity epidemic requires a multidisciplinary approach including stress management, reduction of risky behaviors, and increase in health lifestyle habits. And, one of those healthy habits, adequate sleep, is a key factor in the equation.

**Read the Articles:** Theorell-Haglöw J, Berne C, Janson C, Sahlin C, Lindberg E., **Associations between short sleep duration and central obesity in women**, *Sleep*. 2010 May 1;33(5):593–598.

Watson NF, Buchwald D, Vitiello MV, Noonan C, Goldberg J., **A Twin Study of Sleep Duration and Body Mass Index**, *Journal of Clinical Sleep Medicine*, 2010 Feb 15;6(1):11–17.

Watanabe M, Kikuchi H, Tanaka K, Takahashi M., **Association of short sleep duration with weight gain and obesity at 1-year follow-up: a large-scale prospective study**, *Sleep*, 2010 Feb 1;33(2):161–167.



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## SleepSheet

**IN THE NEXT ISSUE:**  
**Sleep Disorders in Children**  
**Not just for grown-ups! What you should know about the growing epidemic of sleep disorders affecting children**

## Calendar

**A.W.A.K.E. Meetings** For patients with obstructive sleep apnea. Please call Al Reichert at **650 367-5137** to confirm location and RSVP.

**The Second Wednesday of Each Month, 6:30–8pm**

This newsletter is a publication of this department. The information is intended solely for physicians and other healthcare providers. It is not intended for use as a replacement for medical advice. For individual situations or conditions, appropriate dental/medical consultation should be obtained.