A Wake-Up Call on Sleep and Health

Scientists sound the alarm about the connections between sleep problems, disease and even your weight. Here's what you need to know before your head hits the pillow.

If the number of sleep-medication advertisements is any indication, a good night's sleep seems to be as elusive as a dream for a growing number of Americans. Although tossing and turning and wakefulness through the night are common, sleeplessness should not be taken lightly, experts say. Mounting evidence from numerous studies shows that sleep deprivation—whether due to medical disorders or counterproductive dietary and lifestyle habits—increases your risk for serious illness.

And if that weren't enough to motivate you to grab more zzz's, new research shows that getting a proper night's rest may actually help women fight middle-aged spread. "Sleep Disorders and Sleep Deprivation: An Unmet Public Health Problem," a report issued last year by a special panel of the Institute of Medicine (IOM), says that otherwise health-conscious Americans consider sleep an "expendable luxury." (See the July 2006 Healthletter.) The researchers say this is alarming given the connections being shown between sleeplessness and health.

For example, a study published in Hypertension, a journal of the American Heart Association, reported an association between short sleep duration and high blood pressure. Of the nearly 5,000 subjects who were studied over 10 years, those who got five hours or less of sleep per night were more than twice as likely to develop hypertension than those who got the norm of seven to eight hours of shut eye a night.

Another study has shown that elderly people with severe sleep apnea, a disorder that disrupts sleep repeatedly throughout the night, have more than twice the risk of ischemic stroke. Researchers used data from 394 people, age 70-plus, who participated in the Vitoria Sleep Project in a small town in northern Spain; the study tracked medical events for six years, registering 20 ischemic strokes, which are caused by a blood clot that blocks blood flow to a part of the brain. Patients with severe sleep apnea had a 2-1/2 times greater risk of suffering a stroke during the study than those who got the norm of seven to eight hours of shut eye a night.

Still another study concluded that women who got only five hours of sleep per night were one-third more likely to have substantial weight gain—a whopping 30-plus pounds over the course of the study period—than those who got seven hours of sleep.

One possible reason, the researchers suggested, is that sleep deprivation alters hormones involved in appetite control and metabolism. Because the women who slept less also ate less, extra calorie consumption could not be blamed for the weight gain, the investigators said. And even though the less-rested women might exercise somewhat less regularly due to fatigue, the differences between the women's levels of physical activity did not appear to be a factor.
Lead researcher Sanjay Patel, MD, assistant professor of medicine at Case Western Reserve University, and his colleagues based their findings on data from the long-running Nurses’ Health Study, which has followed the health of thousands of female nurses for the past 30 years.

On average, women who in 1986 said they usually slept five hours or less per night gained more weight over the next 16 years than those who slept for seven hours per night or longer. Although the effect was modest, Dr. Patel’s team noted, even a relatively small weight gain can make a health difference; putting on an extra 10 pounds has been shown to double a person’s risk of diabetes, for example.

“These findings,” the researchers concluded, “have the important implication that increasing sleep time among those sleeping less than seven hours per night may represent a novel approach to obesity prevention.”

**The role of hormones**

While doctors have long known that many hormones are affected by sleep, this new research into the impact of sleep on weight gain has thrown a spotlight on two

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**The Mechanics of Sleep and Sleeplessness**

Our bodies go through five stages of sleep. First are two stages of getting into sleep, where we spend a large portion of our sleep time, followed by two stages of deeper sleep, also called slow-wave or delta sleep. After achieving deep sleep, we actually go back through the phases of lighter sleep and then begin REM sleep, so named for the Rapid Eye Movements that accompany dreaming.

These sleep cycles repeat throughout the night and get longer as sleep continues. A person may complete up to five cycles in a typical night’s sleep. Disruptions anywhere along the line—whether temporary or chronic—can add up to ill health.

Three main sleep disorders that interrupt the dreaming (REM) and restorative sleep phases are insomnia, sleep apnea and parasomnia, all of which have subcategories within them. It is not uncommon for a person to have a combination of disorders.

**Insomnia** is the sleep disorder with which most laypersons are familiar. Tossing and turning, perhaps counting sheep by the hundreds, an insomniac can’t get to sleep, can’t stay asleep, or wakes too early. Simple lifestyle changes (see last page, “10 Tips for a Better Night’s Sleep”) or today’s new generation of prescribed sleep-enhancing medications are often all that’s needed to help the insomniac get a good night’s rest.

**Obstructive sleep apnea** is a sleep disorder that causes the sleeper to stop breathing, literally choking, awakening the sleeper repeatedly—sometimes up to hundreds of times throughout the night. Loud snoring often is a sign of sleep apnea. The CPAP (Continuous Positive Airway Pressure) mask has become increasingly popular to treat apnea. The device delivers a constant low-pressure stream of air in the nose and throat during sleep to maintain an open airway.

In **parasomnia**, which literally means “around sleep,” the sleeper engages in activities that should not occur during sleep, such as sleepwalking and eating. Narcolepsy (falling asleep suddenly and without warning at inappropriate times) and disruptive night terrors (stronger and different from nightmares) are other types of parasomnia.

It’s possible for parasomniacs to drive a car while asleep, or to get up and eat in the middle of the night, sound asleep—not eating just food, but substances that can be harmful, like dirt from their houseplants and other foreign objects. Parasomnias often are precipitated or perpetuated by stress. Because of the possibility of danger or injury to oneself or others, parasomniacs should be evaluated and treated by a medical professional.

Although you’d naturally connect daytime sleepiness to problems with getting enough rest at night, there are other symptoms that you might be surprised to learn are a sign of a sleep disorder. These include concentration difficulties, morning headaches, depression and memory problems. Research shows that some conditions such as migraines and fibromyalgia may actually stem from an undiagnosed sleep disorder.

J. Wright, PhD, an insomnia clinician at the Sleep Lab of Las Cruces, NM, one of only a handful of US sleep centers accredited to evaluate and treat patients as well as perform sleep research, says sleep aids and treatments have improved rapidly and dramatically in recent years. She recommends simple lifestyle and dietary adjustments to see if sleep improves, and evaluation at a qualified sleep lab for elusive symptoms or if a serious condition might be suspected.

Wright warns against self-diagnosis and over-the-counter treatments. Though the CPAP mask has gained such wide acceptance and use that over-the-counter models are now available, she points out that the devices require fine-tuning adjustments for air level. She adds that Benadryl, an over-the-counter allergy medicine often taken for its ability to promote general drowsiness, actually robs the user of the restorative phase of sleep and can dehydrate the body, leading to serious health problems with long-term use. Moreover, the effects of drugs like Benadryl can extend into the next day, meaning that people who take it improperly can put themselves at risk when they operate a car, for example, still under the influence of the medication. (See box, “Hit the Brakes!”)

“People should try the simple things first,” Wright says, “cutting out caffeine, turning off the computer early. . . . They may get relief from those naturally health-enhancing measures.”

And if the sandman remains elusive, she adds, the patient will now be armed with more information—about what works for him or her and what doesn’t—to assist sleep lab practitioners in finding the route to a good night’s rest.
Those two factors combined, he says.

tract, stimulates appetite, while leptin, more food,” Breus told WebMD.

Lack of sleep also causes ghrelin levels to rise, which means your you eat. When you don’t get enough sleep, it drives leptin levels down, which means you don’t feel as satisfied after you eat. Lack of sleep also causes ghrelin levels to rise, which means your appetite is stimulated, so you want more food,” Breus told WebMD. Those two factors combined, he says, set the stage for overeating, leading in turn to weight gain.

The impact of leptin and ghrelin in this scenario recently was explored in two studies conducted at the University of Chicago and at Stanford University. In the Chicago study, doctors measured levels of leptin and ghrelin in 12 healthy men. They also noted their hunger and appetite levels. Soon after, the men were subjected to two days of sleep deprivation followed by two days of extended sleep. During this time doctors continued to monitor hormone levels, appetite and activity.

When sleep was restricted, the researchers found, leptin levels went down and ghrelin levels went up. The men’s appetites also increased accordingly, and they became nearly insatiable; their desire for high-carbohydrate, calorie-dense foods in particular increased by 45%.

In the Stanford study, the leptin-ghrelin effect was shown to have far-reaching impact. In this research, a joint project between Stanford and the University of Wisconsin, about 1,000 volunteers reported the number of hours they slept each night. Doctors then measured the subjects’ levels of ghrelin and leptin, and charted their weight.

Those who slept less than eight hours a night were found not only to have lower levels of leptin and higher levels of ghrelin, but also a higher level of body fat. In fact, levels of body fat seemed to correlate with sleep patterns, with those who slept the fewest hours per night weighing the most.

Although the exact mechanics are still being debated as to why well-rested individuals have an easier time losing unwanted pounds, most experts agree that if you are dieting, logging in a few extra hours of sleep a week is not a bad idea, particularly if you currently only get six hours of sleep or less a night. In addition to lessening your risk of serious illness, you'll likely feel better and may just discover that you aren’t as hungry, or that you have lessened your craving for sugary, calorie-dense foods.

Far from being “an expendable luxury,” it turns out that a good night’s sleep may be as essential to disease prevention and maintenance of a healthy weight as is a nutritious diet.

Hit the Brakes!

Of course it’s common sense to follow your doctor’s instructions to the letter, particularly dosage information on your medicine bottle’s label. But with people increasingly buying medicines over the Internet, or maybe falling into the misconception that “if this is good, more may be better,” doctors are reporting an increase of prescriptive medicines being used improperly.

This led to an alarming report last year by Laura Liddicoat, supervisor of the toxicology section of the Wisconsin State Laboratory of Hygiene. Liddicoat’s report detailed the cases of six people who drove their cars while under the influence of Ambien (zolpidem), crashing their vehicles but later having no memory of the accidents. Liddicoat presented her report at a meeting of the American Academy of Forensic Sciences.

Liddicoat said the pattern involved taking the best-selling prescription sleeping pill drug and not going to bed, or taking more than the recommended dose. Some patients got up and drove in the middle of the night. Others took the drug with the intention of driving home to go to bed. One patient had an out-of-date Ambien prescription, but was buying her drugs online.

A standard 10-milligram dose of Ambien, she said, produces average blood levels of 121 ng/mL. If a patient goes to sleep, the level of the drug in the blood after eight hours would be zero, or very close to that, she said in her report. But in these six cases, patients’ drug levels were as high as 1,000 ng/mL, and in one case 4,400 ng/mL.

Drivers under the influence of high doses of Ambien drove on the wrong side of the road, ran into stationary objects and suffered confusion, loss of balance and loss of memory. They later reported having no idea of why they were in the hospital or why they were being arrested.

Cases of drugged drivers have been increasing steadily over the past five years. In some state toxicology laboratories, Ambien shows up in the top 10 list of drugs found in impaired drivers. In Wisconsin, Ambien was detected in the bloodstreams of 187 arrested drivers from 1999 to 2004, reaching a peak of 45 cases per year in 2003 and 2004.

As more insomniacs turn to the drug—there were 26.5 million Ambien prescriptions filled in the US last year—Ambien-related arrests and accidents are expected to rise.

Liddicoat’s report concluded that patients taking Ambien for sleeplessness must follow dosage instructions to the letter: Do not exceed the 10-milligram dose, don’t drink alcohol with the drug in your system, take the drug immediately before bedtime, and don’t drive or operate heavy machinery until sleeping a full eight hours.
10 tips for a better night's sleep

According to sleep researchers, there are simple first steps you can take to ensure you get enough good, restful sleep. Of course, if you suspect you may have a serious impediment to sleep—like apnea, for example—you should be evaluated and treated by a medical doctor. But otherwise you can improve the quality of your sleep, and thus your health, by making a few simple adjustments to diet, habits, routine and even bedroom furnishings. Try out these suggestions and see if the quality of your slumber improves:

1. Maintain a regular bed and wake time schedule, including weekends. "Sleeping in" on weekends throws off your rhythm. Consistency is best.

2. Establish a regular, relaxing bedtime routine such as soaking in a hot bath or hot tub and then reading a book or listening to soothing music. Avoid lively conversations, action-filled television programs and achievement-oriented tasks just before bedtime.

3. Create a sleep-conducive environment that is dark, quiet, comfortable—not too cool or too warm. If you sleep with a bed partner whose comfort levels are different from your own, the two of you can compromise and dress accordingly to accommodate.

4. Sleep on a comfortable mattress and pillows. There are many new materials on the market. If your bedding is more than seven or eight years old, shop around for something comfortable, trying out actual bed models in furniture showrooms.

5. Use your bedroom only for sleep and sex. It is best to take work materials, computers and televisions out of the sleeping environment. Reading in bed to relax is OK, but avoid doing challenging crossword puzzles or games.

6. Finish eating at least two to three hours before your regular bedtime. A body focused on digestion is not fully relaxed and consequently, sleep may not reach deep, restorative levels. Eat a healthful, balanced diet with a minimum of refined sugars, which are stimulating.

7. Exercise regularly. It is best to complete your workout at least a few hours before bedtime so you have time to wind down and the adrenaline can leave your system.

8. Avoid nicotine (cigarettes, tobacco products). Besides other detrimental health effects, tobacco products can lead to poor quality sleep when used close to bedtime.

9. Avoid caffeine (coffee, tea, soft drinks, chocolate) close to bedtime. Stimulants can keep you awake or make it hard to go back to sleep if you awaken during the night.

10. Avoid alcohol close to bedtime. It can lead to disrupted sleep later in the night.


Hypertension, April 3, 2006; abstract at <hyper.ahajournals.org/cgi/content/abstract/47/5/833> (sleep and hypertension).

Stroke, September 2006, abstract at <stroke.ahajournals.org/cgi/content/abstract/37/9/2377> (sleep apnea and stroke).

Archives of Internal Medicine, Sept. 18, 2006; abstract at <archinte.ama-assn.org/cgi/content/abstract/166/16/1768> (sleep and diabetes).

American Journal of Epidemiology, Nov. 15, 2006; abstract at <aje.oxfordjournals.org/cgi/content/abstract/164/10/847> (sleep and weight).


Sleep Apnea: Thief in the Night

You go to bed early and think you are getting a good night's rest. But in the morning you're groggy and have a headache. Perhaps you experience memory or concentration problems. You may have obstructive sleep apnea, a nocturnal ailment that stops the sufferer's breathing for up to a minute at a time, dozens or even hundreds of times throughout the course of a night.

Dominic Roca, MD, PhD, director of the Connecticut Center for Sleep Medicine at Stamford Hospital, believes that physical abnormalities inside the neck and mouth may cause the soft tissue in the rear of the throat to collapse. This briefly closes off air passages, causing disruption in breathing and a tendency to snore. In fact, the loud snoring that brings people into sleep centers for evaluation often is the first sign that sleep apnea is the culprit.

The end result is that even though you've slept eight hours, the constant disruptions in breathing—which prevent the body from restorative sleep—"leave you feeling like you've only had four hours," says Dr. Roca. Sleep apnea sufferers often report feeling tired all day. And it may be years before some find out they have a serious problem that can increase the risk of heart attacks and strokes.

"People adjust to having less energy, less alertness," Dr. Roca says. "They think, 'Everybody is tired all day' or 'Everybody gets headaches.' They don't realize how they are being robbed of their health over time."

In a classic chicken-or-egg conundrum, research shows that patients who suffer from sleep apnea are more likely to be obese and that apnea sufferers gain more weight. It is clear that obesity can cause sleep apnea and that, in turn, sleep apnea can contribute to weight gain. What is being debated is how sleep apnea causes weight gain, Dr. Roca says.

In any case, getting proper sleep is crucial to good health. As Dr. Roca puts it, "There's more than enough data now that people who are sleep deprived don't feel as well, don't eat as well and don't function as well. They get into more motor vehicle accidents. The case for getting adequate sleep has been made."

He notes that there are a number of treatments available for sleep apnea sufferers, and adds, "Those who may have problems achieving proper sleep should speak to their doctors. It's that important."
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