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SLEEPLESSNESS TAKING A TOLL ON NATION'S WORKFORCE

One Out of Two Working Americans Say Sleepiness Affects Their Job Performance, National Sleep Foundation Poll Finds

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WASHINGTON, DC. March 28, 2000 - One-half of the American work force (51%) reports that sleepiness on-the-job interferes with the amount of work they get done, according to the results of a new poll released today by the National Sleep Foundation (NSF). Forty-percent of employees admit that the quality of their work suffers when they are sleepy, and nearly one out of five (19%) report making occasional or frequent work errors due to sleepiness, suggesting that the nation's productivity is not as high as it could be if Americans got more sleep.

NSF's 2000 Sleep in America omnibus poll of more than 1,154 adults age 18 and older confirms what most busy Americans know already, yet few seem prepared to correct. Sleep experts recommend at least 8 hours of sleep a night in order to function properly, yet one-third of American adults (33%) sleep only 6.5 hours or less nightly during the work week. Additionally, a full 45% of adults agree that they will sleep less in order to accomplish more.

Other poll findings on sleepiness and its impact on work:

- One out of four adults (24%) have difficulty getting up for work two or more days per week, and 27% of adults say they are sleepy

at work two or more days a week.

- At least two-thirds of adults report that sleepiness makes concentrating (68%) and handling stress (66%) on the job more difficult.
- Fifty-eight percent say that making decisions and solving problems are more difficult when they are sleepy.
- Listening to co-workers is more difficult when sleepy, according to 57% of respondents; similarly, thirty-nine percent report sleepiness makes relating to co-workers more difficult.
- Overall, employees estimate that the quality and quantity of their work is diminished by about 30% when they are sleepy.

Not surprisingly, NSF's poll shows that shift workers are hardest hit by problems associated with sleepiness. As shift workers struggle to turn night into day, trying to be alert when their brains are naturally inclined to sleep, they pay the price: nearly two-thirds report problems sleeping. Twenty-nine percent of shift workers (versus 17% of regular day workers) report being so sleepy a few days a week or more that it interferes with their daily activities.

"Workers are not the only ones suffering the consequences of sleepiness on the job," says Richard L. Gelula, Executive Director of the National Sleep Foundation. "Employers are hit with the costs associated with decreased productivity, work errors, and absenteeism." In 1997, NSF estimated the direct costs of sleepiness and lost productivity in the workplace at approximately $18 billion. "Today, we know that our country pays significantly more for sleepiness on the job than that conservative estimate," Gelula says. "In addition to the direct costs associated with lost productivity, there are countless untold costs associated with errors, damage, and health consequences."

"It's unfortunate that in our □24/7 □ society, sleep is viewed as expendable and something you can catch up on anytime," says Gelula. "The problem is, people aren't catching up on sleep □they're simply continuing to accrue a sleep debt that puts them further behind as they try to keep up with life's demands."

Overall, it is estimated that Americans are getting at least 20% less sleep now than they did 100 years ago. Today, TV and the Internet are prime contributors, causing 43% of adults to stay up later than they should. And regardless of the number of hours worked each week, Americans shortchange themselves by rising earlier, rather than going to bed earlier: 31% of adults who work more than 60 hours a week are up by 5:00 AM.

For exhausted employees, one solution may be as simple as napping on the job. If it were allowed, one-third of adults interviewed said they would nap at work. Studies that show naps can restore short-term

alertness and enhance both concentration and memory, yet only 16% of adults report that their employers currently endorse on-the-job naps.

The National Sleep Foundation's (NSF) 2000 Sleep in America omnibus poll was conducted by phone during October and November 1999, among a representative sampling of the civilian household population living in the continental United States. Results have an error range of plus or minus 3 percentage points.

National Sleep Awareness Week® 2000 (March 27-April 2, 2000) is a public education and awareness campaign of NSF and its Cooperative Co-sponsors, including the American Academy of Sleep Medicine, American Sleep Apnea Association, Association of Polysomnographic Technologists, Narcolepsy Network, NIH/NHLBI/NCSDR, Restless Legs Syndrome Foundation, Sleep Disorders Dental Society, Sleep Research Society. National Sleep Awareness Week always ends on the first day of Daylight Savings Time, when the clocks "spring" forward and Americans tend to lose an hour of sleep.

The National Sleep Foundation is a nonprofit organization dedicated to improving public health and safety by promoting public understanding of sleep and sleep disorders, and by supporting sleep and fatigue-related education, research and advocacy. For a copy of the poll and information on National Sleep Awareness Week 2000 activities, visit www.sleepfoundation.org or call (202) 347-3471.

For more information:

Executive summary of the 2000 Omnibus Sleep in America Poll.

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BACKGROUNDER: WHY SLEEP MATTERS

All living beings sleep, including humans, animals and plants. But why? Answering this very basic question has spurred extensive scientific study into what happens when we sleep and what happens to our bodies when we are sleep deprived. Through this research, a growing body of knowledge now shows that sleep is not only essential to mental and physical performance, but that not getting enough may weaken the immune system and may be a risk factor for type-II diabetes and obesity.

What Is Sleep?

After a century of scientific study on sleep – including four decades of modern intensive research – the function of sleep remains a biological enigma. However, the process of sleep has been widely studied and involves a natural rhythm that begins in the evening when the pineal gland in the brain releases melatonin, a hormone signaling time for sleep. As the person readies for sleep, breathing slows, muscles become limp, the heart rate slows, and body temperature decreases slightly. At this stage, brain waves change from the rapid beta waves of wakefulness to slower alpha waves. Following this period of calm, the alpha waves are replaced by theta waves that signal what researchers call stage one sleep.

From stage one sleep, sleepers go back and forth through various stages of sleep, all of which produce noticeable changes in brain activity and other physiological functions. Stage two sleep lasts for 10 to 15 minutes and produces bigger spikes in brain waves than stage one. At stage three, the sleeper enters a deep sleep with slow delta waves. Then comes stage four followed by REM (rapid eye movement) sleep when eyes move rapidly back and forth and people have visual dreams, an important part of the sleep process. Once REM sleep is over, the sleeper goes back to stage two to begin the cycle again. This happens four to six times throughout the night.

But changing brain activity is only the beginning of what happens during sleep. During sleep, the body secretes a number of necessary hormones that affect growth, regulate energy, and affect metabolic and endocrine functions. For example, near the end of the sleep period, the body secretes the stress

hormone, cortisol, which stimulates alertness. Sleep is also the time when growth hormone is secreted, which drives childhood growth and plays an important part in regulating muscle mass in adults. Further, the sleep cycle affects secretion of the hormone, leptin. This hormone tells the body when it should feel full and thus, has a direct influence on appetite and weight.

Because of the many biochemical and physiological processes that take place during the sleep cycle, there is a strong consensus among research scientists – from sleep experts to specialists in the fields of endocrinology, psychology and the neurosciences – that adequate sleep is essential to health and wellness. Although the function of sleep is not well understood, what is clear is that sleep is indispensable.

The Health Consequences of Inadequate Sleep

As scientists learn more about the function of sleep, a growing body of research is making the connection between inadequate sleep and the increased risk of a number of health conditions, such as type II diabetes and hypertension.

One pivotal study, conducted by researchers at the University of Chicago and published in 1999 in the journal *Lancet*[1], shows that even in young, healthy people, a sleep debt of three or four hours a night over the course of a week affects the body's ability to process carbohydrates, manage stress, and maintain a proper balance of hormones. The study involved monitoring the metabolic and endocrine functions of 11 health young men between the ages of 18 and 27 years who spent 16 consecutive nights in a clinical research center. During the first three nights, they spent eight hours in bed; for the next six nights, they stayed in bed for four hours; and during the last seven nights, they stayed in bed for 12 hours. The study found that during the second week, when the subjects were sleep restricted, their blood and saliva samples showed a significant loss in their ability to process glucose, prompting their bodies to produce more insulin. As a result, the men of the study had glucose levels that were associated with a pre-diabetic state.

Of equal significance, researchers have measured the impact of sleep deprivation on how the body regulates certain hormones, finding a link between deficiencies in these hormones and the propensity for overweight and obesity. One major study published in 2000 in the *Journal of the American Medical Association*[2] found that lack of sleep at a younger age in men can drive down the production of growth hormone (GH) later in life. Because GH plays an important role during adulthood in controlling the body's proportions of fat and muscle, having less of the hormone as men age increases the propensity for becoming overweight and having a middle age

paunch. Adding to these findings, other studies have found a correlation between inadequate sleep and inadequate levels of the hormone leptin, which regulates the metabolism of carbohydrates. When there are low levels of leptin, the body craves carbohydrates regardless of the amount of calories consumed.

How Sleep Affects Performance

Besides the connection between inadequate sleep and a number of major health problems, there is substantial scientific evidence that sleep deprivation affects cognition and motor performance. A recent study showed that people who were awake for up to 19 hours scored substantially worse on performance tests and alertness scales than those with a blood-alcohol level of .08 – the definition of being legally drunk[3]. Some other studies have found:

- After one night of total sleep deprivation, subjects scored significantly lower on tests of judgment, simple reaction time, explicit recall, and inverse words reading
- Free recall is sensitive to 24 hours of total sleep deprivation
- Daytime alertness and memory are impaired by the loss of eight hours of sleep, especially when there is a marked drop in sleep over a few nights
- Getting three, five or seven hours of sleep a night for seven consecutive nights can significantly impair alertness and motor performance

Complementing these findings in healthy adults are studies that look at reaction times in people with mild to moderate sleep apnea, a health condition characterized by pauses in breathing that prevent air from flowing into or out of a person's nose or mouth. Researchers at Stanford University found that people with mild to moderate sleep apnea did as poorly or worse on reaction times tests as those who were too legally drunk to drive in most states.

Sleep and Mood

The fact that extreme sleep deprivation makes people grumpier has long been apparent. But now there is a growing body of evidence linking inadequate

sleep with anger, anxiety and sadness. For example, researchers at the University of Pennsylvania conducted a study in which people were only allowed to sleep 4.5 hours a night for one week[4]. During this period, the subjects were given a number of performance tests and assessments of mood, feelings and emotion and were rated on scales of stress and calmness, happiness and unhappiness, mental exhaustion and sharpness. The subjects were also asked to list any significant problems or complaints they had.

After a week of monitoring, the study found conclusively that people who get less than a full night's sleep feel more stressed, angry, sad and more mentally exhausted. Overall scores for mood and vigor declined steadily over the test days. Further, when the subjects were allowed to get sufficient sleep, their mood scores improved significantly.

This finding was reinforced by a meta-analysis of 56 separate sleep studies[5]. Significantly, a meta-analysis provides insights and patterns that are more revealing than the information offered by an individual study. In this case, the meta-analysis revealed that mood is affected more by sleep deprivation than either cognitive skills or physical performance.

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For all these reasons, sleep experts recommend a range of seven to nine hours of sleep each night for adults of every age. While sleep patterns change as people age, the amount of sleep adults need remains constant. At the same time, sleep experts are united in their assessment that getting enough sleep is essential to health and well-being. In short, being healthy requires sleep that is healthy—it is as simple as that.

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