Sleep Debt Takes Toll on Health, Relationships

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ANALYSIS FROM THE ANNUAL MEETING OF THE ASSOCIATED PROFESSIONAL SLEEP SOCIETIES

MINNEAPOLIS – Sleep is in short supply, thanks to our "24-hour society" in which trading sleep for work or play is commonplace and sleep deprivation is worn as a badge of honor, according to Dr. Michel Cramer Bornemann, codirector of the Minnesota Regional Sleep Disorders Center at Hennepin County Medical Center in Minneapolis.

Not only have we become accustomed to trading sleep for work, Dr. Cramer Bornemann said at the meeting, "lack of sleep is synonymous with hard work or achievement, when really it can impede both." In fact, the effects of insufficient shut-eye extend across multiple domains, according to a collection of independent studies presented at this year's meeting. For example, sleep loss was linked to the development or exacerbation of symptoms of ADHD in early childhood, an individual's genetic risk of obesity, inhibitory response to images of high-calorie foods, and even marital discontent.

ADHD and Sleep Loss

In a study designed to tease out the complex relationship between sleep problems – particularly falling asleep and staying asleep – and the development or worsening of inattention and hyperactivity and impulsivity in children and adolescents diagnosed with ADHD, Erika Gaylor, Ph.D., of SRI International in Menlo Park, Calif., and her colleagues analyzed data from the preschool and kindergarten waves of the Early Childhood Longitudinal Study–Birth Cohort. The cohort comprises a representative sample of approximately 6,860 children and their families living the United States.

The investigators calculated total nighttime sleep duration based on parent-reported bedtime and wake time. "We performed two sets of regression analyses to identify whether sleep duration in preschool-age children predicts attention and hyperactivity at kindergarten entry and [whether] attention and hyperactivity symptoms at preschool predict sleep duration at kindergarten," she explained.

Controlling for the outcome of interest at the preschool time point, sex, ethnicity, and family income, researchers found that less sleep at preschool significantly predicted worse scores on parent-reported hyperactivity and attention at kindergarten, whereas parent-reported hyperactivity and attention at preschool did not predict sleep duration at kindergarten, Dr. Gaylor stated.

The results extend those of a previous study in which she and her colleagues determined that having a consistent bedtime was the most reliable predictor of positive developmental outcomes by age 4 years, she noted.

The Obesity Link

In a twin study designed to look more closely at the previously reported link between short sleep duration and elevated body mass index, Dr. Nathaniel Watson of the University of Washington in Seattle and his colleagues determined that short sleep may potentiate an underlying genetic mechanism for obesity.

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In our "24-hour society:" trading sleep for work is commonplace and is worn as a badge of honor.

The investigators examined whether sleep duration modified genetic and environmental influences on BMI in 1,811 pairs of twins drawn from the population-based University of Washington Twin Registry. The mean age of the study participants was 36.6 years. The participants provided self-reported information on height and weight, which was used to calculate BMI, as well as on habitual sleep duration, Dr. Watson said. The mean BMI of the group was 25.4 kg/m^2, and the mean sleep duration was 7.18 hours, he said.

Using behavioral genetic interaction models, the investigators found significant relationships between habitual sleep duration and genetic and shared environmental influences on BMI. Specifically, longer sleep duration was associated with decreased BMI, Dr. Watson reported. "When sleep duration was 7 hours, the heritability of BMI was more than double [70%] that observed when sleep duration was 9 hours [33%]," he said, noting that "there appears to be something about short sleep that creates a permissive environment for expression of obesity-related genes."

The findings are an important addition to the existing body of research on the relationship between sleep duration and BMI, Dr. Watson said.

A connection between sleepiness and lack of self-control with respect to dietary choices may also contribute to the sleep loss/obesity equation, according to a study presented by William Killgore, Ph.D., of Harvard Medical School in Boston.

To test their hypothesis that greater daytime sleepiness correlates with reduced prefrontal cortex response during passive viewing of images of high-calorie foods, Dr. Killgore and his colleagues analyzed the functional MRI scans of 12 healthy adults obtained while they were shown pictures of high-calorie foods, low-calorie foods, and control images of plants and rocks. The researchers correlated the fMRI findings with subjects' self-reported daytime sleepiness, assessed via the Epworth Sleepiness Scale (ESS).

"Greater ESS scores correlated with reduced activation in the dorsolateral prefrontal cortex when high-calorie vs. low-calorie food images were perceived," Dr. Killgore said, noting that this region is typically implicated in attention and inhibitory processing. Greater daytime sleepiness was also associated with increased activation in the right parietal and inferior temporal cortex, he said.

The findings suggest the possibility that sleepiness may affect an individual's inhibitory control when he or she is exposed to highly appetizing, high-calorie foods, according to Dr. Killgore.

Marital Discord

Although most sleep research focuses on the individual, the fact that sleep problems and relationship trouble often co-occur led Wendy M. Troxel, Ph.D., of the University of Pittsburgh, and her colleagues to consider the dyadic nature of sleep in a recent study. The investigators examined the bidirectional links between nightly sleep and daily marital interactions among 35 healthy married couples (mean age, 32 years) by correlating the actigraph results for sleep latency, wakefulness after sleep onset, and total sleep time of each partner over 10 nights, with daily self-reported positive and negative marital interactions assessed via electronic diaries during the same period.

"We found stronger evidence linking sleep to the next day's marital interactions, rather than the reverse direction," Dr. Troxel reported. Specifically, wives' prolonged sleep latency significantly predicted their own and their husbands' reports of more negative and less positive interactions the next day, even after adjustment for depressive symptoms, whereas the quality of marital interactions did not appear to predict sleep measures in women, she said. The sleep quality of husbands did not appear to affect their own or their wives' reports of next-day marital interactions; however, for men, a higher level of positive marital interactions predicted shorter total sleep duration the next night.

The findings suggest, perhaps, that "men are more likely to repress their feelings or not be as aware" of mood changes, whereas women are more likely to express their emotional concerns and to "drive the emotional climate of the relationship," Dr. Troxel said. The results highlight the potential interpersonal consequences of sleep disorders, and as such may have important clinical implications, she said.

The presenters reported no financial conflicts of interest relevant to their respective presentations. ■

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increase of 8-12 points, depending on score severity at baseline (J. Clin. Epidemiol. 2004;57:1153-60).

In EQUIP, the proportions of patients achieving a meaningful change in weight-related quality of life were 30% with placebo, 37% with the lower phentermine/topiramate dose, and 49% with the higher dose.

In CONQUER, meaningful improvement on IWQOL-Lite occurred in 36% of the placebo patients, compared with 52% of each of the two doses of phentermine/topiramate. Similar results in CONQUER were seen with the SF-36, for which meaningful improvement was defined as an increase of 2.5 or more points. Those percentages were 36% for placebo, 55% for the lower dose, and 53% for the higher dose, she reported.

Not surprisingly, improvement in quality of life was directly related to amount of weight lost. In EQUIP, those losing less than 5% of their body weight had a mean change of 5 points on the IWQOL-Lite at 56 weeks, compared with 17 points for those who lost 10% or more of their body weight. Similar results were seen on the IWQOL-Lite (from 6 vs. 18 points, respectively) and the SF-36 (2 vs. 6 points) in CONQUER.

"Quality of life is an important health outcome in its own right, representing the ultimate goal of all health interventions," Dr. Kolotkin said, quoting Dr. Richard Rubin (Diabetes Metab. Res. Rev. 1999;15:205-18).

Separately, Miriam M. Rueger, R.N., a certified diabetes educator at the University of Alabama at Birmingham, and her associates presented data showing sustained weight loss among the CONQUER patients in a 52-week extension trial (SEQUEL).

In the double-blind, placebo-controlled extension study of subjects who completed 56 weeks of treatment in CONQUER and enrolled in SEQUEL, the original randomization was maintained in a total of 675 patients for an additional 52 weeks, with 227 continuing to receive placebo, 153 the lower phentermine/topiramate dose, and 295 the higher dose. In the ITT-LOCF analysis at 108 weeks, significantly greater weight loss was achieved with both the lower and higher drug doses, compared with placebo (9% and 11%, respectively, compared with 2%). The proportions of those achieving a body weight loss of 10% or more were 54% and 50% for the higher and lower doses, respectively, vs. just 12% with placebo, said Ms. Rueger.

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