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Sleep Strategies: Sleep in Women A Changing Perspective

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SLEEP STRATEGIES

Sleep in Women: A Changing Perspective

As with many other specialties, sleep medicine has been shifting toward helping clinicians obtain a better understanding of gender-specific issues in disorders and disturbances. It is easier today to appreciate the complex dynamics of biological, psychosocial, and cultural factors that define sleep patterns and problems in women. Sleep in women changes across their life spans, with three major shifts likely due to hormonal differences: at the onset of the menstrual cycle, during pregnancy, and during the perimenopausal period.

The National Sleep Foundation's 2007 Sleep in America Poll revealed that 46% of a sample of women aged 18 to 64 years in households across the continental United States had sleep problems almost every night, with only 39% reporting sleeping well most nights or every night. Nearly 3 in 10 women reported a good night's sleep only a few nights a month or less. The most common complaint, difficulty falling asleep or waking too early with an inability to return to sleep, occurred in more than one-third of those surveyed at least a few nights a week. According to the Sleep Heart Health Study, women are significantly more likely to report difficulty initiating and maintaining sleep than men (42.4% vs 32.5%), whereas men are twice as likely to have sleep-disordered breathing (Baldwin et al. *Sleep*. 2001;24[1]:96).

Insomnia occurs almost twice as often in women compared with men; women also have a significant increase in sleep-onset latency and a significant decrease in sleep efficiency and sleep quality, most often during the luteal phase of the menstrual cycle (Soares. *Arch Womens Ment Health*. 2005;8[4]:205). These symptoms are also pronounced during the onset of menses in those who experience premenstrual syndrome

and are of increased severity in those with premenstrual dysphoric disorder, with greater luteal increases in daytime sleepiness likely due to lower progesterone levels (Manber and Bootzin. *Health Psychol*. 1997;16[3]:209).

More data exist on female sleep during pregnancy than during any other phase of the female life cycle. The vast majority of women who were pregnant or in the postpartum period (84%) in the 2007 Sleep in America Poll reported sleep problems at least a few nights a week. During pregnancy, sleep is affected by both hormonal changes and physical discomfort. Significant changes in sleep patterns are evident by 11 to 12 weeks of gestation, with a notable increase in total sleep time but less deep sleep and more nocturnal awakenings. Pregnancy-induced changes in the physiology and anatomy of the upper airway make women more prone to snoring, paving the way for the development of obstructive sleep apnea and nocturnal desaturation, which may be particularly severe during the third trimester when oxygen stores in the lung are already reduced due to lung compression from the enlarging uterus. Pregnant women who snore are at increased risk for preeclampsia, pregnancy-induced hypertension, and fetal growth retardation, even after adjustment for weight, age, and tobacco use (Franklin et al. *Chest*. 2000;117[1]:137). This has important implications for the unborn child as well because severe sleep deprivation during the pregnancy period is associated with increased sleep disturbance for the offspring during childhood (Armstrong et al. *J Paediatr Child Health*. 1998;34[3]:263). Sleep impairment is not limited to the period of pregnancy; sleep disturbance is even more severe during the first postpartum month, an effect that is most pronounced

in first-time mothers (Lee et al. *Obstet Gynecol*. 2000;95[1]:14).

Up to one-half of women complain of sleep problems during the menopausal transition, some of which can be attributed to hot flashes and night sweats. Short-term hormone replacement therapy, antidepressants, and nonpharmacologic therapy have been shown to have a beneficial effect on sleep quality during this time. Studies have also shown that the delicate interplay of hormones during the reproductive years influences sleep architecture, with progesterone increasing the latency to REM sleep and decreasing the overall percentage of REM sleep, and estrogen possibly doing the opposite (Manber et al. *Sleep*. 1999;22[5]:540). The Study of Women's Health Across the Nation (SWAN) demonstrated that an adjusted odds ratio of reported trouble sleeping was 29% higher in perimenopausal women compared with those who were premenopausal. Different hormones predicted trouble sleeping in the two groups, with low follicle-stimulating hormone levels associated with increased trouble sleeping in premenopausal women. Levels of pregnanediol glucuronide, a progesterone metabolite, was a better marker for predicting trouble sleeping during the perimenopausal period (Kravitz et al. *Arch Intern Med*. 2005;165[20]:2370).

While work-related sleep restriction has classically affected men, times are changing. Eighty percent of working women report fatigue, and 60% has difficulty sleeping. Shift-working women, like their male counterparts, are prone to altered sleep and circadian rhythms and also report higher rates of sleeping pill, tranquilizer, and alcohol use (Gordon et al. *Am J Public Health*. 1986;76[10]:1225). Women are physiologically less capable of metabolizing similar amounts of alcohol compared with men (Frezza et al. *N Engl J Med*. 1990;322[2]:95); whether this translates

into an increased risk for alcohol-induced sleep disturbances is unknown at this time.

It is not all bad news for the fairer sex, though. Women have a longer total sleep time albeit a longer sleep latency, less stage 2 sleep, and more slow-wave sleep than age-matched men (Ohayon et al. *Sleep*. 2004;27[7]:1255). Also, women with sleep-disordered breathing do not have an increased risk of motor vehicle accidents when compared with their well-rested female counterparts, even when controlled for age, alcohol use, and miles driven. This is in stark contrast with men who snore and those with an apnea-hypopnea index >5/h, who are at three times the risk of a motor vehicle accident compared with similar healthy control subjects (Young et al. *Sleep*. 1997;20[8]:608). It is unknown whether this is due to a predominantly male instinct to ignore potentially dangerous sleepiness and get behind the wheel or an actual difference between the sexes in resistance to impairment of concentration and motor skills consequent to sleep-disordered breathing.

Given that we are now more cognizant of the differences in sleep physiology and architecture between the sexes, and indeed within the life cycle of women, the onus is on present and future researchers in sleep medicine to study large samples of women to better identify clinically relevant causes and outcomes of sleep disruption. ■

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In Remembrance

Brian J. Whipp, PhD, DSc, died on October 20, 2011, at the University of Wales Hospital in Cardiff, Wales, United Kingdom.

Dr. Whipp received his PhD in physiology from Stanford University, and he then set out on what was to become an illustrious career in physiology, both as a research investigator and a teacher. He taught at the Harbor-UCLA Medical Center in Torrance, California, proceeding through the academic ranks to become Professor of Physiology and Medicine and Vice-Chairman of UCLA's Department of



BRIAN J. WHIPP,
PHD, DSC

Physiology. During this period, he was awarded an Established Investigatorship of the American Heart Association and was a Visiting Research Scientist at Oxford University. In 1992, he returned to the United Kingdom to become Professor and Chairman of the Physiology Department at the University of London's St. George's Hospital Medical School.

Dr. Whipp was a recipient of the ACCP Distinguished Scientist Honor Lecture Award in 2007. Dr. Whipp was a well-respected and

recognized researcher with interests centered on the control of ventilation and pulmonary gas exchange during exercise in health and disease, with special reference to the nonsteady state. In addition to more than 300 publications on these topics, he was author or coauthor of nine books and monographs. He was also an accomplished teacher, combining scientific rigor with humor, wit, and enthusiasm.

Dr. Whipp retired from the University of London's St. George's Hospital Medical School in 2001. He remained active since that time, working from his home in the Welsh village of Crickhowell and presenting many invited lectures worldwide. ■

Lessons for January

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- ▶ **Imaging and Differential Diagnosis of Cystic Lung Disease.** By Dr. Isabel B. Oliva; Dr. Danielle Antin-Ozerkis; and Dr. Ami N. Rubinowitz