

# Two ADHD Drugs Affect Sleep Differently

BY NICHOLAS MULCAHY  
Contributing Writer

PHILADELPHIA — Children who had attention-deficit hyperactivity disorder had a shorter time to sleep onset and more actual sleep time when they were treated with atomoxetine than with methylphenidate, according to a study comparing the two ADHD treatments that was presented at the annual meeting of the Associated Professional Sleep Societies.

Children were able to get to sleep more quickly and slept longer during a drug-free baseline period.

Methylphenidate caused fewer awakenings and produced less awake time during the night than did atomoxetine.

"The results of the study may not be a big surprise to clinicians familiar with these drugs, as methylphenidate is a stimulant and atomoxetine is not.

"However, the half-life of methylphenidate is so short that, by bedtime, it is gone. So there is some question about its effects," said Bart Sangal, M.D., director of the Sleep Disorders Institute, Troy, Mich.

The current study was a randomized, double-blind, crossover trial of 85 children with ADHD. The average age of the children was 10.1 years. After a treatment-free baseline period of up to 12 days, patients underwent treatment for up to 7 weeks on one drug. After another drug-free period (10-20 days), patients in the study then crossed over to the other drug for treatment up to 7 weeks.

When compared with the initial treatment-free baseline period, ADHD children who were treated with atomoxetine fell asleep within 12.1 minutes of their baseline,

compared with 39.2 minutes for the methylphenidate group. Researchers measured the time to sleep onset by actigraphy, which is a monitor worn like a watch on the wrist at home by the child.

"Both atomoxetine and methylphenidate caused an increase in time to fall asleep, but it was significantly more so with methylphenidate," Dr. Sangal said.

Actual sleep time also was negatively affected by both drugs. Children who were on atomoxetine slept 15.3 minutes less than at baseline and children who were on methylphenidate slept 29.6 minutes less than at baseline. The difference in sleep times was statistically significant, Dr. Sangal said.

On a positive note, the numbers of wake bouts or awakenings experienced by the participants were decreased, compared with baseline, by the two drugs. But that decrease was more significant with methylphenidate, according to Dr. Sangal.

Children who were on atomoxetine had 1.3 fewer awakenings than at baseline and children on methylphenidate had 4.4 fewer awakenings.

The total awake time was significantly decreased from baseline by 6.3 minutes with methylphenidate, while atomoxetine decreased awake time by only 0.3 minutes, Dr. Sangal said.

"It is possible that the subjects in the study had a worse sleep initiation with methylphenidate and then a compensatory improvement in sleep maintenance," he said.

The mean final dosages were 1.56 mg/kg per day for

atomoxetine and 1.12 mg/kg per day for methylphenidate. Dosage was based on weight and started at 0.5 mg/kg per day for atomoxetine and 0.45 mg/kg per day for methylphenidate. Each subject was titrated upwards to a maximum of 1.8 mg/kg per day for each drug.

There were 21 (25%) female and 64 (75%) male subjects. The ADHD subtypes were: 2 (2%) hyperactive/impulsive; 25 (29%) inattentive; and 57 (68%) combined. In terms of race, 21 (25%) of the participants were of African descent; 62 (73%) were of European descent; and 2 (2%) were categorized as other. Thirty-seven (43.5%) of the participants had previous stimulant exposure and 48 (56.5%) did not.

Only a subset of patients in the study underwent polysomnography in a sleep lab, which Dr. Sangal said was a "limitation of the study." With polysomnography, atomoxetine compared favorably again with methylphenidate with regard to time to persistent sleep, a polysomnography measure that is akin to sleep onset.

ADHD children treated with atomoxetine fell asleep 0.2 minutes ahead of their baseline, compared with 16.8 minutes after their baseline for the methylphenidate group; the difference was statistically significant. Both atomoxetine and methylphenidate were well-tolerated, he said.

Dr. Sangal is a paid consultant to Lilly Pharmaceuticals. Lilly Pharmaceuticals sponsored the study and manufactures atomoxetine. ■

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# Sleep Found Surprisingly Inadequate in Children of All Ages

BY MARY ANN MOON  
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BETHESDA, MD. — American children aren't getting enough sleep.

Children in every age group "don't even meet the low end of the range recommended by experts" for sleep in a 24-hour period, according to a national survey, Mary A. Carskadon, Ph.D., said at a conference on sleep disorders sponsored

by the National Institutes of Health.

Dr. Carskadon was referring to the results of the National Sleep Foundation's annual Sleep in America poll, which included data on children's sleep for the first time this year. The NSF found that televisions and computers in children's bedrooms are the main contributors to sleep loss. In the phone survey of a random sample of 1,473 parents and caregivers, respondents reported that nearly half (43%) of school-

aged children, one-third of preschool children, and "an astounding 20% of infants and toddlers" had TVs in their bedrooms, Dr. Carskadon said.

These children go to sleep an average of 20 minutes later and sleep 40 minutes less per night than children with no TV in their rooms, for a loss of more than 2 hours of sleep every week. Many never "catch up" on their sleep on the weekends, as approximately one-fourth of children 3-10 years old actually sleep less on weekends than on weekdays, said Dr. Carskadon, professor of psychiatry and human behavior at Brown University, Providence, R.I.

For these children, bedtimes are delayed, overall sleep time is decreased, and daytime sleepiness is common. "A paper coming out soon in the Archives of Pediatrics and Adolescent Medicine shows that among young adolescents, watching TV in the bedroom at night predicts major sleep disturbances such as insomnia in young adulthood," she added.

Most of the parents polled reported that their children get "the right amount" of sleep, apparently unaware that the actual number of hours they say their children sleep falls far short of the experts' recommendations.

The other major culprit in children's sleep loss is caffeine consumption. The NSF poll showed that 26% of children 3-10 years old drink at least one caffeinated beverage every day. Those who have caffeinated drinks sleep less than children who don't ingest caffeine (an average of 9.1 versus 9.7 hours per night), for a loss of about 3.5 hours every week.

Dr. Carskadon noted that myriad caf-

feinated drinks are specifically targeted to children and adolescents, and coffee shops offer chocolate drinks, teas, and coffee concoctions with flavors calculated to appeal to children and teenagers.

Early school start times are another contributor to children's sleep loss.

With the delay in circadian phase and the delay in the melatonin secretory phase that accompany puberty, preadolescents and adolescents in particular "are under enormous physiological pressure to delay their sleep cycle"—to stay awake until late at night and to rise late in the morning.

"These kids' circadian cycles are already hammered by their biology. Add to that the ridiculously early school start times across much of the country, and sleep gets squeezed right out of their schedules," Dr. Carskadon said.

Extracurricular activities also affect sleep. Many high school athletes are required to practice every morning before school, at 4 a.m. and 5 a.m. sessions, or after school every day until 6 p.m. to 8 p.m. Games and competitions routinely extend until 10 p.m. or later, excluding travel time.

According to the NSF survey, parents also reported that a majority of children's physicians (52%) never ask about their children's sleep habits, even though most parents (69%) said their children have sleep problems such as difficulty falling asleep, nighttime awakening, and snoring, at least a few nights every week.

The survey also found that the older the child, the less likely a physician was to ask about sleep, even though older children and teens are more likely to have frequent sleep problems than younger children. ■

## Children's Sleep Can Be Improved

Dr. Carskadon discussed several recommendations aimed at improving the quantity and quality of children's sleep:

► **Make adequate sleep a priority for families.** Help parents determine the amount of sleep each family member needs, and urge them to ensure that those needs are met. To motivate parents to regulate their children's sleep, emphasize the strong links between poor sleep and bad behavior, poor school performance, depressed mood, high risk for accidents and injuries, and high risk for alcohol and drug use later in life.

► **Promote good sleep habits.** Advise parents to schedule leisure activities like television viewing, video games, and Internet surfing for specific times and places—and never in children's bedrooms. They also should promote regular bedtime routines, and create quiet and comfortable settings for sleep.

► **Limit sleep disrupters.** Tell parents that caffeine should not be part of a child's diet, and remind them that some unlikely drinks, such as citrus-flavored sodas, can have high caffeine contents. Lobby parents and schools to limit the hours of extracurricular activities and to change early school start times. It may help to cite research on a Minneapolis school district that found grades markedly improved, tardiness and absenteeism greatly declined, and the graduation rate rose when school start times were delayed.

► **Regularly ask patients and parents about sleep.** Children's sleep problems too often go undetected and untreated. Since depression in particular can be related to sleep disturbances, both as a consequence and as a cause of inadequate sleep, "all children and teenagers who appear to be depressed must be queried about sleep," Dr. Carskadon noted.