Children who take ADHD medicines have trouble sleeping, new study shows

November 23 2015

UNL researchers have conducted a meta-analysis study that shows ADHD medications can cause children to develop sleep problems. Psychology doctoral student and lead author Katie Kidwell (right), doctoral student Alyssa Lundahl and Professor Tim Nelson authored the paper along with doctoral student Tori Van Dyk, who is away from UNL on an internship. Credit: Craig Chandler/University Communications

Stimulant medications for attention-deficit/hyperactivity disorder (ADHD) cause sleep problems among the children who take them, a new study from the University of Nebraska-Lincoln concludes.

The study addresses decades of conflicting opinions and evidence about the medications' effect on sleep. In what's known as a "meta-analysis," researchers from the UNL Department of Psychology combined and analyzed the results from past studies of how ADHD medications affect sleep.

In a study published online Nov. 23 by the journal *Pediatrics*, the Nebraska researchers found children given the medicines take significantly longer to fall asleep, have poorer quality sleep and sleep for shorter periods.

"We would recommend that pediatricians frequently monitor children with ADHD who are prescribed stimulants for potential adverse effects on sleep," said Katie Kidwell, a psychology doctoral student and the study's lead author.

About one in 14 children and adolescents in the U.S. are diagnosed with ADHD, a chronic condition that includes attention difficulty, hyperactivity and impulsiveness. About 3.5 million are prescribed stimulant medications such as Ritalin and Adderall, the most common form of ADHD treatment.

Many research articles have been written in the past 30 years on whether ADHD medications harm the ability to sleep. Some researchers have found that the drugs do interfere with sleep, particularly if taken later in the day. Others maintain the medications improve ADHD patients' ability to sleep, by relieving symptoms and reducing resistance to bedtime. Indeed, some suggest that sleep problems are caused by the medication wearing off near bedtime, creating withdrawal symptoms.

"One reason we did the study is that researchers have hypothesized different effects, and there are some conflicting findings in the literature," said Timothy Nelson, an associate professor of psychology involved in the study. "This is when a meta-analysis is most useful. By aggregating and summarizing previous research in a rigorous and statistical way, we can identify the main findings that we see across all these studies. It's essentially a study of studies."

After screening nearly 10,000 articles, Kidwell and her colleagues reviewed 167 full texts before selecting nine studies of sufficient rigor for their analysis. Tori Van Dyk and Alyssa Lundahl, also psychology doctoral students, assisted in the effort.

Studies included in the analysis were peer-reviewed, randomized experiments. The studies did not rely on parental reports of their children's sleeping patterns, instead requiring objective measures obtained through clinical sleep studies or wristband monitors used at home.

The researchers found that both methylphenidate medications like Ritalin and amphetamines like Adderall cause sleep problems, without identifying differences between the two.

Although they were unable to determine whether varying dosage amounts changed the effect on sleep, they found that more frequent dosages made it harder for children to fall asleep.

They found that drugs tend to cause more sleep problems for boys. The problems dissipate, but never completely go away, the longer children continue to take the medication.

"Sleep impairment is related to many cognitive, emotional and behavioral consequences, such as inattention, irritability and defiance,"

Kidwell said. "Sleep adverse effects could undermine the benefits of stimulant medications in some cases. Pediatricians should carefully consider dosage amounts, standard versus extended release, and dosage frequencies to minimize sleep problems while effectively treating ADHD symptoms."

She also recommended considering behavioral treatments, such as parental training and changes to classroom procedures and homework assignments, to reduce ADHD's negative consequences.

"We're not saying don't use stimulant medications to treat ADHD," Nelson said. "They are well tolerated in general and there is evidence for their effectiveness. But physicians need to weigh the pros and cons in any medication decision, and considering the potential for disrupted sleep should be part of that cost-benefit analysis with stimulants."

Provided by University of Nebraska-Lincoln