

# Sleep-Disordered Breathing Tied to Risk for Behavioral, Emotional Problems

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Young children with sleep-disordered breathing (SDB) are more likely to develop behavioral problems including hyperactivity and aggressiveness, as well as emotional and friendship difficulties, according to researchers at Albert Einstein College of Medicine of Yeshiva University.

The study, the largest and most comprehensive of its kind, evaluated and followed more than 11,000 children for over six years.

“This is the strongest evidence to date that snoring, mouth breathing, and apnea (abnormally long pauses in breathing during sleep) can have serious behavioral and social-emotional consequences for children,” said study leader Karen Bonuck, Ph.D., professor of family and social medicine and of obstetrics and gynecology and women’s health at Einstein.

“Parents and pediatricians alike should be paying closer attention to sleep-disordered breathing in young children, perhaps as early as the first year of life.”

Sleep-disordered breathing is a broad term for breathing abnormalities that occur during sleep. Its main symptoms include snoring (usually accompanied by mouth breathing) and sleep apnea. The primary causes of SDB are enlarged tonsils or adenoids.

The disorder tends to peak in children between two to six years old, but can occur in younger children. Approximately 10 percent of children snore regularly and 2 to 4 percent have sleep apnea, according to the American Academy of Otolaryngology-Health and Neck Surgery (AAO-HNS).

“Until now, we really didn’t have strong evidence that SDB actually preceded problematic behavior such as hyperactivity,” said Ronald D. Chervin, M.D., M.S., a co-author of the study and professor of sleep medicine and of neurology at the University of Michigan.

“Previous studies suggesting a possible connection between SDB symptoms and subsequent behavioral problems weren’t definitive, since they included only small numbers of patients, short follow-ups of a single SDB symptom, or limited control of variables such as low birth weight that could skew the results. But this study shows clearly that SDB symptoms do precede behavioral problems and strongly suggests that SDB symptoms are causing those problems.”

For the study, researchers evaluated the combined effects of snoring, apnea and mouth-breathing on the behavior of children enrolled in the Avon Longitudinal Study of Parents and Children in the United Kingdom. Parents completed questionnaires about their children’s SDB symptoms at several intervals, from 6 to 69 months of age.

When the children were approximately four and seven years old, parents filled out the Strengths and Difficulties Questionnaire (SDQ)—a form widely used to assess behavior. The SDQ rates for inattention/hyperactivity, emotional symptoms (anxiety and depression), peer difficulties, behavior problems (aggressiveness and rule-breaking), and pro-social behavior (sharing, helpfulness, etc.).



The study controlled for 15 possible confounding factors, such as socioeconomic status, maternal smoking during the first trimester of pregnancy, and low birthweight.

“We found that children with sleep-disordered breathing were from 40 to 100 percent more likely to develop neurobehavioral problems by age 7, compared with children without breathing problems,” said Bonuck. “The biggest increase was in hyperactivity, but we saw significant increases across all five behavioral measures.”

Children whose SDB symptoms peaked early — at 6 or 18 months — were 40 percent and 50 percent more likely, respectively, to have behavioral problems at 7 years of age compared with children who had normal breathing. Children with the worst behavioral problems had SDB symptoms that continued throughout the evaluation period and became most severe at 30 months.

Researchers hypothesize that SDB could trigger behavioral problems by harming the brain in a variety of ways: decreasing oxygen levels and increasing carbon dioxide levels in the prefrontal cortex; interrupting the restorative processes of sleep; and disrupting the balance of various cellular and chemical functions.

Behavioral difficulties caused by these negative effects on the brain include executive functioning problems (being able to pay attention, plan ahead, and organize), an inability to suppress behavior, and the inability to self-regulate emotion and arousal.

“Although snoring and apnea are relatively common in children, pediatricians and family physicians do not routinely check for sleep-disordered breathing,” said Bonuck. “In many cases, the doctor will simply ask parents, ‘How is your child sleeping?’ Instead, physicians need to specifically ask parents whether their children are experiencing one or more of the symptoms—snoring, mouth breathing or apnea—of SDB.”

“As for parents,” said Bonuck, “if they suspect that their child is showing symptoms of SDB, they should ask their pediatrician or family physician if their child needs to be evaluated by an otolaryngologist (ear, nose and throat physician) or sleep specialist.”

The study is published in the journal *Pediatrics*.

Source: [Albert Einstein College of Medicine](#)

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