

## **Infants who sleep less may have lower cognitive and language skills by age two**

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Does your child sleep less than 12 hours over a 24-hour period? Does he or she breathe through the mouth, snore or have pauses in breathing while asleep?

New research has examined the impact of an infant's sleep duration and sleep disruption due to sleep-disordered breathing (SDB) on cognitive and language development at two years of age. A separate study has identified four distinct types of SDB that occur in infants, along with unique risk factors associated with each.

Both studies are part of the larger CHILD Study—a national birth cohort study involving nearly 3,500 Canadian children and their families.

The findings, published in two papers in the June 2018 issue of *Sleep Medicine*, will help doctors better predict which children are at risk for sleep disorders and intervene early with treatment.

Dr. Piush Mandhane, an associate professor of pediatrics in the University of Alberta's (U of A) Faculty of Medicine & Dentistry, and leader of the CHILD Study's Edmonton site, led both studies.

"Short sleep duration and symptoms of SDB ranging from snoring to sleep apnea have been associated with multiple health, learning and behavioural problems in children," says Dr. Mandhane. "In the CHILD Study, we were interested to find out if limited sleep time and sleep disruption affected cognitive and language development in preschool children."

### *Importance of total and nighttime sleep*

In the [first study](#), CHILD researchers found that infants who regularly sleep less than 12 hours total over any given 24-hour period have poorer cognitive and language development at two years of age than infants who get more sleep. They also found that nighttime sleep had a greater impact on cognitive and language development compared to daytime sleep, and a short nighttime sleep was associated with a 10.1-point decrease in cognitive development using a standardized test of mental and motor development.

"A drop of 10 points represents nearly a full standard deviation on the cognitive scale," Dr. Mandhane explains. "It's quite a substantial difference."

The researchers further found that children with persistent SDB had lower language scores, but no differences in cognitive development compared to children with no SDB. There are a few possible explanations for this finding, according to AllerGen trainee and study first-author Dr. Lisa Smithson, a postdoctoral researcher at the U of A.

"One theory is that language acquisition is more sensitive to sleep disruption than cognitive development. Alternatively, the link between SDB and language delay may be the result of kids having multiple nose and ear infections, which tend to impair hearing and speech," says Dr. Smithson.

### *Patterns of sleep-disordered breathing associated with unique risk factors*

In the [second study](#), Dr. Mandhane's team analyzed data from a subset of 770 children involved in the CHILD Study.

Parents completed questionnaires regarding their child's sleep patterns and SDB symptoms, and answered questions about daycare/location away from home; cold (rhinitis) symptoms and treatment; acid reflux symptoms and treatment; and inhaled corticosteroid use. At one year of age, the children underwent a specialized sleep test, as well as a skin-prick test to determine allergic sensitization.

The researchers identified four patterns of SDB from infancy to two years of age: i) no SDB; ii) early-onset SDB with peak symptoms at nine months of age; iii) late-onset SDB with peak symptoms at 18 months of age; and iv) persistent SDB with symptoms from three to 24 months.

Viral infections and daycare attendance were associated with all three of the SDB symptom categories. Unique genetic and environmental risk factors were identified for each of the four subtypes.

"We found that infants who received medication for acid reflux were more likely to have early-onset SDB, while children who were exposed to smoke or dogs in the home were more likely to develop late-onset SDB. Children at risk for allergies or with divorced parents were more likely to present with persistent SDB," explains Dr. Mandhane.

"Together, these findings highlight the importance of total and nighttime sleep, and demonstrate the cognitive and language problems that can occur in preschool children when sleep is disrupted. Our results suggest that early intervention to reduce specific SDB risk factors may help to avoid more serious behavioural, cognitive and emotional problems down the road."

### **About the CHILD Study and AllerGen NCE**

Funded by AllerGen and CIHR, the [CHILD Study](#) is collecting a vast range of health, lifestyle and environmental exposure information from more than 3,500 mothers and children from pregnancy to age five. The study spans four provinces (BC, AB, MB and ON), involving over 140 multidisciplinary researchers, students and research staff. St. Joseph's Healthcare Hamilton hosts the CHILD Study's National Coordinating Centre.

[AllerGen NCE Inc.](#) is a national research network dedicated to improving the quality of life of people suffering from allergic and related immune diseases. Funded by Innovation, Science and Economic Development Canada through the federal Networks of Centres of Excellence (NCE) Program, the Network is hosted at McMaster University in Hamilton, ON.

### **About the U of A Faculty of Medicine & Dentistry**

The [Faculty of Medicine & Dentistry](#) at the University of Alberta is a leader in educating and training exceptional practitioners and researchers of the highest international standards. The faculty's mission is to advance health through excellence in teaching, research and patient care. It is home to one of the top 100 ranked medical schools in the world.

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