

Sleep apnea in children linked to increased risk of high blood pressure in teens

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Children with obstructive sleep apnea are nearly three times more likely to develop high blood pressure when they become teenagers than children who never experience sleep apnea, according to a new study

funded by the National Heart, Lung, and Blood Institute (NHLBI), part of the National Institutes of Health. However, children whose sleep apnea improves as they grow into adolescence do not show an increased chance of having high blood pressure, which is a major risk factor for heart disease.

The long-term study, one of the largest of its kind in the pediatric population, underscores the seriousness of [sleep apnea](#) in [children](#) and the importance of early treatment, the researchers said. Their findings appear online in the journal *JAMA Cardiology*.

Obstructive sleep [apnea](#), a common sleep disorder that affects millions worldwide, causes people to briefly and repeatedly stop breathing during sleep. While it occurs mostly in adults, an estimated 10% of [school-aged children](#) can also suffer from it. Although almost half of them outgrow the disorder by the time they reach adolescence, another half remain with a chronic and persistent problem. As physicians cannot accurately predict who will outgrow sleep apnea, early treatment may be beneficial to the long-term cardiovascular health of children, the researchers suggest.

While past studies have linked sleep apnea to high [blood](#) pressure and an increased risk of heart disease in adults, few have examined the long-term health impact of the disorder in children as they transition to adolescence, said lead study author Julio Fernandez-Mendoza, Ph.D., an associate professor at the Sleep Research and Treatment Center at Penn State College of Medicine in Hershey, Pennsylvania.

"Our study showed that pediatric sleep apnea can act as a gateway to future hypertension," Fernandez-Mendoza said. "Because most cases of sleep apnea go undiagnosed in adults and children alike the problem needs more attention. Sleep apnea and its risk factors should be screened for, monitored, and targeted early in life to prevent future cardiovascular

disease."

Marishka Brown, Ph.D., director of the NHLBI's National Center on Sleep Disorders Research, noted that most of the sleep apnea findings in pediatric patients focus on the disorder's behavioral effects, such as sleepiness, hyperactivity, and cognition.

"There is limited data on either the short- or long-term impact on cardiovascular risk in this population," she said. "The new findings address this knowledge gap and raise awareness of sleep-disordered breathing in children as a public health problem."

In the study, the researchers enrolled 421 children ages 5 to 12 years and monitored them overnight in a sleep lab. They found that about 12% had [obstructive sleep apnea](#) according to pediatric diagnostic criteria. The researchers also measured blood pressure levels in this group.

After eight years, the researchers evaluated these children again for sleep apnea and high blood pressure. At this point, the participants were on average 16 years old (ages 12 to 23 years).

The researchers found that children whose sleep apnea continued into adolescence were nearly three times more likely to develop high blood pressure compared to those who never had sleep apnea. Those whose sleep apnea began as teenagers and met adult diagnostic criteria were nearly twice as likely to develop high blood pressure than those without sleep apnea. In addition, these teens were also more likely to have a specific form of high blood pressure called orthostatic hypertension, which occurs when standing up rapidly from a prone position and is considered a strong risk factor for heart disease in adulthood.

The exact biological mechanisms underlying the link between childhood sleep apnea and elevated blood [pressure](#) in adolescence are unclear.

Obesity is a driving factor of sleep apnea even in the young, the researchers said. Growing evidence also suggests that increased inflammation, oxidative stress, and impaired heart function caused by changes in the sympathetic nervous system may be at play, given the independent contribution of sleep apnea to [high blood pressure](#) and orthostatic hypertension observed, they added.

Like adult sleep apnea, pediatric sleep apnea can be treated. For some specific cases, surgical removal of the tonsils and adenoids can help. Other cases may require the use of a CPAP machine ([continuous positive airway pressure](#)), a device that delivers air through a mask to keep the airway open when worn during sleep. For children with obesity, adopting a healthy eating and exercise plan that leads to weight loss can also help. Fernandez-Mendoza encourages parents to talk to their child's pediatrician if they suspect sleep apnea and encourages clinicians to integrate behavioral weight loss in their management of overweight youth with sleep apnea.

Fernandez-Mendoza is currently conducting another follow-up study of these youth, now aged 20 to 31 years old, to better understand the long-term impact of childhood sleep apnea on cardiovascular health in adulthood.

More information: Julio Fernandez-Mendoza et al, Association of Pediatric Obstructive Sleep Apnea With Elevated Blood Pressure and Orthostatic Hypertension in Adolescence, *JAMA Cardiology* (2021). [DOI: 10.1001/jamacardio.2021.2003](https://doi.org/10.1001/jamacardio.2021.2003)

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