

# Common Causes, Effects, and Solutions to Sleep Deprivation in Children

A pediatric sleep specialist reviews medical research on topics that are important to parents and children, including the impacts of sleep on sports participation and academic achievement.

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Childhood sleep deprivation is a common problem. Between 25% and 30% of normally developing children and adolescents are not getting enough sleep consistently, estimates the National Sleep Foundation.<sup>1</sup>

Lack of sleep is known to cause poor attention, worse grades, school absences, poor social interactions, irritability and crankiness, depression, increased car crashes, and increased risk taking behaviors.

Specifically, research studies have shown that shorter sleep durations are associated with inattention, poor decision-making, and decreased memory, all of which can affect academic achievement. Small decreases in the total amount of sleep, even by just an hour less per night, can cause negative cognitive performance. One study found that children who were making Cs, Ds, and Fs in classes were sleeping 25 to 30 minutes less on average than their peers who were making better grades.<sup>2</sup> Another study tried to better understand how much sleep was needed for optimal performance on different tasks in different age groups. For example, the study found that 12-year-olds needed at least 8 hours and 20 minutes of sleep to optimally perform letter-word and comprehension tasks, and 8 hours and 25 minutes of sleep for broad reading tasks.<sup>3</sup>

Another area of great importance to parents and children is sports participation. Multiple studies have found that sleep deprivation negatively affects performance in sports activities, and conversely that increased sleep (sleep extension) improves performance. Furthermore, sleep deprivation was found to actually increase a child's risk of injuries while playing sports. In a recent survey of middle and high school aged children, those who slept less than 8 hours per night on average had a nearly two times greater risk of being injured than those who slept more than 8 hours



per night. Children who slept 5 to 7 hours per night had the highest injury rates and those who slept at least 9 hours per night had the lowest injury rates.<sup>4</sup> More sleep at night may improve a child's performance on the field while promoting long-term safety and health.

Additionally, we now better understand that shorter sleep duration can result in hormonal changes associated with obesity, diabetes, and high blood pressure.<sup>5</sup> Several studies have shown that children who sleep less are more likely to be overweight or obese. Research studies are also investigating the effect of sleep deprivation on the body's immune system in children, such as the ability to overcome infection, based on research studies in adults and animals that have suggested shorter sleep durations blunt the ability to mount a response to infection or immunizations.

There are multiple ways to consider sleep deprivation. It can be thought of as not enough quantity of sleep and not enough quality of sleep. Some children will have a medical sleep problem that is causing sleep disruption, leading to overall sleep deprivation. Some common treatable medical sleep disorders in children include obstructive sleep apnea, insomnia, and restless legs syndrome. Children with obstructive sleep apnea may have snoring, pauses in breathing, bed-wetting, awak-



enings at night, daytime sleepiness, and morning headaches, among many other symptoms. Children also may experience insomnia or medical problems leading to insomnia, such as restless legs syndrome. Children with restless legs syndrome often complain of uncomfortable or painful sensations or urges to move their legs (or other limbs), the sensations being worse in the evening, movement improving the symptoms, and rest worsening the symptoms. In children who may find it hard to describe these symptoms, parents and clinicians may need to look for other clues (such as family history). For children suspected of having a medical problem that is causing sleep disruption and sleep deprivation, it is important for parents to discuss these signs and symptoms with their primary care provider or a sleep physician.

As more research becomes available to clarify the effects of sleep deprivation on children, it also becomes important to better understand how much sleep is optimal, or at least a minimum recommended amount, for children. As a great start, the National Sleep Foundation conducted a panel discussion and published an update of its sleep duration recommendations in 2015.<sup>6</sup> Additionally, as part of the National Healthy Sleep Awareness Project, at the urging of the National Institutes of Health and with the support of the Centers for Disease Control and Prevention, the American Academy of Sleep Medicine recently convened an expert panel to review all of the published research and literature on sleep duration in children to determine the amount of sleep recommended for optimal health in pediatric populations. These findings will be presented at the annual national sleep conference SLEEP 2016 in Denver. Together, these independent findings will help provide guidelines for recommendations for optimal sleep in children.

The feeling of sleepiness is a result of sleep deprivation and is highly correlated to daytime function and performance. As sleep duration is significantly influenced by habitual bedtime, wake-up time, and the usual daily schedule of activities, small changes can result in improved daytime function. This may be an important factor in consideration of how much sleep is right for each child. Every child responds to sleep deprivation differently, with some appearing to be less affected than others. While several definitions for optimal sleep have been proposed, it is important to find the right amount of sleep each individual child needs to be fully awake and to participate in normal daily activities at his or her highest ability.

Parents can also help their children realize the benefits of getting enough sleep. A study showed that an increase in sleep time by approximately 30 minutes every night for 5 nights had an immediate impact on emotional regulation and restless-impulsive behaviors of children in school.<sup>7</sup> Another study reported a 16.5% reduction in car crashes by teenagers when school start times were moved back by 1 hour and most of the students were able to

increase their nightly sleep time.<sup>8</sup> Additionally, it is important to think of consistency with regard to getting enough sleep. Studies show that sleep deprivation in children for 1 night showed less negative impact on attention than nightly sleep deprivation for a full week.<sup>9</sup> So while some days may be longer than others because of extracurricular activities, it is important for parents and children to not let it become a habit to sleep less every night.

Parents are often able to figure out how much sleep helps their child thrive; this can be determined when the child has an opportunity to catch up on sleep over approximately a week (such as a holiday break). Usually by the end of this week, it becomes apparent how much sleep each child “needs” to function at his or her best. Subtraction of this number of hours from the school day wake-up time helps to determine the ideal bedtime. Maintenance of a regular sleep-wake schedule daily, including on weekends, will help to ensure that children avoid sleep deprivation and its negative effects.

Furthermore, for areas with early school start times, parents may consider working with local school boards to move the start time later. The American Academy of Pediatrics recommends middle schools and high schools start at 8:30 AM or later so that more children can get the healthy sleep they need to function at their best.<sup>10</sup> Children experience a natural delay of approximately 1 hour in their internal sleep clocks near puberty, thus early start times require a child to be awake and alert when their biologic clock tells them to sleep.

In summary, sleep deprivation is common and has many effects on children, including daytime dysfunction with negative effects in school, sports, and overall health. A well-rested child is more likely to be healthy and energetic. Sleep deprivation is reversible and can be prevented with increased education on the importance of sleep and increased prioritization of sleep in our daily lives. **SR**

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