

Sleep and School

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Katherine M. Kidwell, Maren Hankey, Donna M. Flores, Tori R. Van Dyk, Alyssa Lundahl, and Timothy D. Nelson, University of Nebraska-Lincoln

Sleep problems, including insufficient or poor quality sleep, are alarmingly prevalent among school-age children and can compromise a child's cognitive, emotional, behavioral, and physical functioning. These issues, in turn, may pose a serious threat to educational success. While sleep problems are often overlooked, educators and school personnel are in an ideal position to intervene by identifying and addressing critical sleep issues, which can have a meaningful impact on learning outcomes.



Consequences of Poor Sleep

The consequences of sub-optimal sleep are numerous and diverse, affecting a child's brain, behavior, and body. The cognitive effects of poor sleep are particularly well-documented, including problems with attention, working memory, and problem-solving (Beebe, 2011; Gruber et al., 2011). In fact, the effects of sleep loss in children can mimic the symptoms of Attention-Deficit/Hyperactivity Disorder (ADHD; Owens, 2005) and substantially interfere with essential learning processes. Almost three quarters of youth identified with ADHD have significant sleep problems (Sung, Hiscock, Sciberras, & Efron, 2008).

Research also indicates significant links between poor sleep and emotional and behavioral problems. Studies have found that sleep loss contributes to child mood problems, anxiety, and disruptive/non-compliant behavior (Alfano et al., 2007; Chervin et al., 2003; Chorney, Detweiler et al., 2008; Cortese et al., 2009). Poor sleep can also disrupt children's ability to regulate their emotions and negatively impact their daytime functioning (Molfese, Rudasill, & Molfese, 2013). These behavioral and emotional issues, in turn, threaten classroom success for the student, even in the context of excellent instruction.

Finally, recent research has documented that chronic sleep problems may also undermine children's physical health. Poor sleep has been linked to increased risk for obesity, type 2 diabetes, and a variety of other chronic health conditions (Bell & Zimmerman, 2010; Bixler et al., 2005). Sleep problems may also weaken an individual's immune system (Irwin, 2014), increasing the likelihood of acute illnesses that may result in school absences. Simply put, when children do not get adequate sleep, they do not function optimally – cognitively, behaviorally, physically and, ultimately, academically.

What Amount of Sleep is Needed?

Figure 1 provides information about how much sleep a child should get depending on his or her age. Recently, researchers have found that even low levels of sleep loss appear to have detrimental effects, with the loss of as little as 30 minutes to 1 hour of sleep per night often being enough to produce observable and meaningful impairments in child functioning (Molfese et al., 2013). Although such seemingly minor sleep deficits may be easy to overlook, especially in the context of other more obvious issues (e.g., ADHD symptoms), this “minimal sleep loss” is a major threat to academic success. Even the more subtle impairments of

sub-optimal sleep can have significant effects on children’s academic functioning, effects that may be particularly harmful for children who already face academic challenges. For example, some research suggests that children with ADHD may be especially vulnerable to the negative effects of sleep loss (Gruber, 2009), resulting in compounding impairments that undermine school functioning.

What is the Prevalence of Sleep Problems?

Considering the negative consequences of poor sleep, the high prevalence rates of sleep

Figure 1. Sleep Duration Recommendations. Reprinted with permission, National Sleep Foundation at: <https://sleepfoundation.org/how-sleep-works/how-much-sleep-do-we-really-need>.



problems in children is alarming, with estimates for inadequate sleep and/or sleep problems ranging from 10 to 40 percent in normally developing, nonclinical youth (Byars et al., 2012; Owens & Mindell, 2011). Further, sleep problems are highly prevalent in youth with poor emotional, behavioral, and psychological functioning (Reigstad, Jorgensen, Sund, & Wichstrom, 2010). This includes youth with emotional and behavioral difficulties such as anxiety, depression, ADHD, and disruptive behavior (Van Dyk, 2015). According to Sung et al. (2008) 73% of youth with ADHD have significant sleep problems. Inadequate sleep in these already at-risk populations is particularly concerning considering the multitude of negative consequences associated with poor sleep quality and/or sleep duration.

Identifying Sleep Problems

From a school perspective, good sleep should be seen as a prerequisite for good learning and appropriate school behavior. However, too many school-age children are not getting the amount of sleep they need to be successful, and educators may overlook this critical issue. Fortunately, educators can play an important role in the identification and treatment of sleep problems.

How Do Educators Determine When a Child Isn't Getting Enough Sleep?

The signs and symptoms of sub-optimal sleep in children and youth may be different from those in adults, and can include a range of both obvious and subtle symptoms. Poor sleep quality/quantity in children can result in both externalizing and internalizing behavioral symptoms. Some children, for example, may exhibit excessive movement and activity (perhaps in an unconscious effort to stay awake and focused), or may be irritable and angrily lash out against adults and other students. While some children may show the more obvious signs of lethargy, sluggishness, and falling asleep in class, other more subtle symptoms may include difficulty maintaining attention or remembering information.

Sluggish cognitive tempo, which is characterized by lethargy, daydreaming, and slow mental processing, is a common manifestation of ADHD (Langberg, Becker, Dvorsky, & Luebke, 2014). Children with sluggish tempo may appear to be “moving through molasses” in daily activities, and their thought processes may seem like they are “in slow motion.” These symptoms can greatly impair academic and social functioning, and they are common consequences of poor sleep, again highlighting how child sleep problems can compromise school success.

A compilation of some of the common symptoms includes:

- Falling asleep during the school day
- Grogginess or lethargy
- Excessive daydreaming
- Reluctance to get out of bed in the morning, possibly resulting in tardiness or absences
- Being late to classes during the school day
- Excessive activity and hyperactive behavior; fidgeting
- Inattentiveness
- Poor judgment and decision making
- Lack of motivation
- Moodiness and irritability
- Temper tantrums
- The tendency to emotionally ‘explode’ at the slightest provocation

Basic Sleep Assessment

Sleep deprivation is recognized as the number one cause of excessive daytime sleepiness among school-age children (Meltzer & Mindell, 2006), making it a highly relevant area for assessment in academic settings. The sleep assessment should focus on factors related to the quantity and quality of sleep. While some clinical sleep problems, such as obstructive sleep apnea (OSA) or narcolepsy, may require overnight sleep studies in a medical setting, basic sleep assessment can often be initiated with family interviews in a school or behavioral clinic setting. Assessments include questions regarding the family’s bedtime routine, the time the child gets into bed, the sleep environment (e.g.,

Figure 2. Sample Sleep Assessment Questions.

QUESTION	WHY IT'S IMPORTANT
What is the child doing 30–60 minutes before getting into bed?	A good bedtime routine supports good sleep and may be a target for an intervention.
When is the child in bed and ready for sleep?	Establishing sleep duration and consistent sleep schedule.
What is the child's sleep environment like?	Poor sleep quantity and quality may be due to co-sleeping, chaotic sleep environment, or the presence of a TV in the bedroom.
When does the child wake up?	Establishing sleep duration and consistent sleep schedule.
Does the child fall asleep without meaning to (e.g., in class, while watching TV, during a car ride)?	Excessive sleepiness during the day may be a sign of insufficient sleep, obstructive sleep apnea (OSA) or, in very rare cases, narcolepsy.
Does the child snore or have "pauses" in breathing during sleep?	Snoring or disruptions in breathing during sleep may indicate OSA and referral for a follow-up medical sleep study may be needed. OSA interferes with the quality of sleep and often results in significant daytime fatigue even when the total hours of sleep is sufficient.
	<i>Table adapted from Laracy et al., 2015</i>

television in the bedroom, sleeping independently), the child's behavior at bedtime, and the amount of time it takes the child to fall asleep (Laracy, Ridgard, & DuPaul, 2015). Figure 2 presents sample questions aimed at understanding a child's sleep habits and patterns. The quantity and duration of awakenings in the middle of the night should be noted, as well as the time the child wakes up in the morning. Differences between sleep patterns on weekdays and weekends should also be explored. The total amount of time that a child sleeps in the average day can then be estimated from information obtained from the sleep assessment.

Sleep Treatment

Sleep researchers have identified key components to promoting healthy sleep in children, many of which can be delivered within a school setting.

Sleep Knowledge and Sleep Hygiene

Basic sleep treatment typically involves educating parents and children on the importance of sleep, the recommended amount of sleep for children based on their age, and how to improve sleep hygiene (i.e., the collection of habits and behaviors that support healthy sleep). Figure 3 provides a sample of basic sleep hygiene recommendations. Educators can teach parents strategies to improve sleep-related behaviors and support them in implementing these changes at home. These types of recommendations can be included in a school-wide health curriculum and are compatible with national and state science education standards (see below for resources and lesson plans available under Resources). Additionally, sleep recommendations can be communicated routinely to parents as part of school-hosted parent information activities such as school fairs

or conferences. Information can also be taught in students' health and biology classes. Providing education to parents and students about these sleep hygiene recommendations can be part of a universal Tier 1 prevention effort delivered within the school.

Behavioral Interventions

In addition to basic sleep hygiene recommendations, more intensive behavioral interventions (Tiers 2 and 3) can be helpful in improving child sleep, especially when sub-optimal sleep patterns are already well-established. Mental and behavioral health professionals, either in the school or in community clinics, can work with parents to implement these targeted interventions aimed at addressing sleep problems and reducing daytime impairment. Here are some common behavioral interventions:

- Bedtime warning. Set two specific times 30 minutes apart (e.g., 8:00 and 8:30). The first one is for the announcement, "Time to Get Ready for Bed" and the other is for "Lights-Out." Getting ready for bed means that the bedtime routine begins. A minute before the "Lights-Out" time, a transition warning is given. At "Lights-Out" time, the adult says goodnight, turns off the light, closes the door, and walks away.
- Bedtime pass. For children who get out of bed frequently, adults may give the child a "pass" that may be used for one chance to get out of bed. After the bedtime pass has been used, adults must ignore all requests to get out of bed. They must ignore yelling, crying, and pleading.
- Put backs. If the child gets up, the adult will return him or her to bed "like a robot." This means no talking and no eye contact with the child. Even if the adult must return the child to bed 100 times, acting like a robot will reduce the attention children receive and make getting out of bed less rewarding.
- Gradual adjustment of bedtime. For children who fall asleep hours after getting into bed, parents may put the child to bed closer to the time when the child naturally falls asleep and gradually move the bedtime earlier until the desired bedtime is reached.
- Improve sleep hygiene. For children and teenagers who have difficulty falling asleep at bedtime, parents can encourage their children to follow the sleep hygiene recommendations in Figure 3.

Figure 3. Basic Sleep Hygiene Recommendations for Children & Adolescents.

In many cases, problems with child sleep can be addressed by improving "sleep hygiene," which is the collection of habits and behaviors that support (or compromise) healthy sleep. Here are some common sleep hygiene recommendations for children and their parents:

- Create and maintain a regular bedtime schedule (e.g., in bed by 8 p.m. each night).
- Follow a consistent bedtime routine each night.
- Be physically active during the day.
- Do not consume caffeine in the afternoon or evening
- No heavy late night snacks.
- Spend time close to bedtime "winding down" with quiet activities like reading.
- Do not look at any screens for an hour before bed – no television, videogames, or smart phone – the blue light screens emit keep our brains awake by suppressing the release of melatonin.
- Implement a "media curfew" to discourage late night use of electronic devices and make staying up later less rewarding.
- Make sure the room is dark, cool and quiet. Remove the nightlight and close the curtains.
- Remove everything that distracts from sleep including pets.
- Use beds for sleeping only.

Figure 4. Continued-Basic Sleep Hygiene Recommendations for Children & Adolescents.



Medical Intervention for Sleep

While educational, sleep hygiene, and behavioral interventions are often sufficient to address child sleep problems, certain issues, such as obstructive sleep apnea, may require medical assessment and intervention. Continuous Positive Air Pressure (CPAP) devices can improve sleep for children with OSA by helping with breathing during sleep. Also, for children who tend to become tired much later than their target bedtime, melatonin supplements may be useful in combination with educational and behavioral interventions. Children who snore or have pauses in breathing during sleep, those who experience excessive fatigue despite sufficient sleep duration, and those with severely delayed sleep onset despite good sleep hygiene should be referred to a pediatric sleep specialist for more intensive evaluation.

Who is Responsible for Identifying Sleep Issues in School?

All educators should be provided with basic information about sleep-related issues and

basic sleep needs of the students they serve, thus increasing awareness of and vigilance for warning signs and symptoms of sub-optimal sleep. If a sleep deficit or disorder is suspected, teachers can communicate these concerns to both parents/guardians and Student Assistance Teams (SATs) or building administrators. If the administrator and/or SAT suspects a sleep deficit based on the basic sleep assessment questions discussed earlier (Figure 2), parents should be informed and provided with appropriate information and suggestions on how sleep concerns could be further addressed at home. Additionally, parents may be referred to a sleep specialist if necessary for further evaluation and treatment.

What are the Occasions for Raising Potential Sleep Concerns in Schools?

In addition to educator awareness of sleep issues and referral to SAT teams, there are other possible occasions for raising concerns with parents about sleep. When parents request Section 504 accommodations at school, the Section 504 administrator should explore the student's

symptoms and, if appropriate, suggest that the parent obtain a sleep evaluation by a medical or mental health professional. Suggestions for the parents to obtain a sleep evaluation and appropriate treatment from a medical professional can be included as a part of the Section 504 planning process for these students.

Similarly, when a student is referred for special education, the Multidisciplinary Team (MDT) ordinarily expects information about basic health, such as a physical examination, health issues, medications, etc. If student symptoms warrant it, the MDT evaluation plan should include a suggestion to the parent for assessment for basic sleep disorders by a medical professional. If this assessment supports the need for treatment for sleep disorders, the treatment should be suggested to the parent as part of the student's overall medical treatment.

Behavioral health professionals in schools, which might include school psychologists, social workers, counselors, and special education teachers, should take the lead to ensure that information and recommendations regarding sleep hygiene are provided to the student and the parents or guardians.

Structural and Policy Changes in Schools

In addition to assessment, education, and intervention strategies discussed above, there are also sleep-related policy issues for schools to consider. The American Academy of Pediatrics (AAP, 2014) released recommendations for later school start times for both middle schools and high schools, with classes starting no earlier than 8:30 a.m. This policy recommendation evolved out of a recognized need to adapt school schedules and activities to accommodate adolescents' sleep-wake cycles, which frequently enter a sleep onset delay making it difficult for many adolescents to fall asleep before 11:00 p.m. (National Sleep Foundation, 2015). A delayed school start time may allow students to get the recommended 8.5 to 9.5 hours of sleep



each night, which is linked to increased health, safety, academic performance, and quality of life in adolescents (Centers for Disease Control and Prevention, 2015).

Research on later school start times shows that when a high school start time shifted from 7:45 a.m. to 8:26 a.m., students reported getting more sleep, made it to class on time more frequently, skipped class less often, had fewer problem behaviors, and took fewer trips to the school nurse's office (Lamberg, 2009). Although delaying start times may not directly improve academic performance, it may positively impact factors related to academic performance, such as increased class participation. As one of the researchers noted, "Students who miss class or show up late may miss quizzes and homework assignments. When they get to class on time, their ability to participate improves. I think that will improve graduation rates, especially for the marginal students" (P. Thacher as quoted in Lamberg, 2013, p. 2).

However, given other problems associated with a later secondary school start time (e.g.,

supervision of students after parents leave for work but before school starts; potentially diminished time after school for activities and athletics), balancing sleep needs of students with other scheduling needs can be difficult. Some schools have experimented with later start times in light of these considerations. For example, some secondary schools have permitted students and parents a choice of start times, where they can choose to start school during either the first or the second period, with the school day ending one period later for those students who started later. It is beyond our scope here to fully examine these policy issues related to school schedules and student sleep needs, but this issue is receiving more and more attention from the educational and medical communities.

Conclusions and Recommendations

Educators need to take a more active role in identifying and addressing sleep related issues in students in order to maximize their learning potential and to minimize the numerous negative outcomes of sub-optimal sleep and sleep disorders. Specifically, school personnel can educate parents on the importance of sleep and advocate for later school start times for middle and high school students. In addition, when symptoms persist, educators can make recommendations to parents as a part of the SAT and MDT. See Figure 4 for recommendations for schools.



Figure 5. Brief Recommendations for Schools



Figure 4 Continued - Given the importance of child sleep for schools, here are some recommendations for how educators can address sleep issues to promote child health and achievement.



Be Aware of Warning Signs

Awareness of warning signs for sleep concerns in students is pivotal. Some signs, such as excessive sleepiness and dozing off at school, may be easily observable symptoms. However, it is equally important for educators to be attuned to the less obvious signs of sleep loss, including changes in student behavior such as irritability, hyperactivity (Laracy, Ridgard, & DuPaul, 2015), sluggish cognitive tempo, poor concentration, low energy, social withdrawal, nervousness, or a decline in school performance (Stores, 2009).



What I Can Do – Assess and Refer

If there are red flags in a student's behavior suggesting sub-optimal sleep, further assessment may be warranted. Training in how to gather a child's sleep history allows for a streamlined assessment of sleep concerns, including information on sleep quality/quantity, the bedtime routine, and the child's sleep environment. A working knowledge in how to identify certain sleep disorders, such as obstructive sleep apnea (OSA) and Delayed Sleep-Phase Syndrome, allows educators to know when referral for more intensive medical follow-up may be warranted.



Apply Behavioral Interventions

Sleep concerns related to lifestyle (e.g., demanding schedules, a high number of extracurricular activities) or poor sleep habits are treatable with behavioral interventions implemented by school psychologists (Gruber, 2013). With older children, psychoeducation on the relationship between sleep, health and school performance, as well as information on healthy sleep habits and patterns can be integrated into school curricula. With younger children, behavioral interventions are frequently aimed at caregiver involvement to improve sleep routines.



Keep the Family Involved

Given the substantial role caregivers play in children's sleep habits, it is essential to engage families in the treatment process. Assessment of the child's sleep patterns will allow educators to provide parents with personalized recommendations such as how much sleep their child should get each night and psychoeducation on sleep hygiene. With younger children, parent training on positive bedtime routines, consistent sleep schedules, and management of bedtime resistant behaviors (e.g., crying, tantrums) may be warranted (Buckhalt et al., 2009).



Education Policies and Recommendations

Increasing awareness of the importance of sleep in relation to cognitive and behavioral functioning in children and adolescents has led to policy recommendations aimed at improving academic functioning. The American Academy of Pediatrics (AAP, 2014) released recommendations for later school start times for both middle schools and high schools, with classes starting no earlier than 8:30 a.m. A delayed school start time may allow students to get the recommended 8.5 to 9.5 hours of sleep each night, which is linked to increased health, safety, academic performance, and quality of life in adolescents (Centers for Disease Control and Prevention, 2015).

Resources

Book:

Owens, J. A., & Mindell, J. A. (2005). *Take charge of your child's sleep: The all-in-one resource for solving sleep problems in kids and teens*. New York, NY: Marlowe & Company.

This book provides easy to understand information on healthy sleep in youth of all ages for parents. It suggests how to promote healthy sleep, and how to address sleep problems.

Websites:

Sleep Education for School. The American Academy of Sleep Medicine.

This website provides lesson plans and educational resources for K-12 teachers and administrators on healthy sleep. Resources provide evidenced-based, age-appropriate information on the importance of sleep, the structure of sleep, sleep disorders, how to promote healthy sleep, and special topics on drowsy driving and sleep careers.

<http://school.sleepeducation.com/>

Sleep, Sleep Disorders, and Biological Rhythms. (NIH Curriculum Supplement Series, Grades 9-12). National Institutes of Health: National Heart, Lung, and Blood Institute.

This website provides a complete curriculum supplement, consistent with National Science Education Standards, based on sleep science and research conducted by NIH. The purpose of the curriculum is to educate students on the importance of sleep, the consequences of poor sleep, and how to improve sleep while also engaging in important scientific skills (e.g., observation, critical thinking, and experimental design). All lesson plans and supporting materials are provided free of cost.

https://science.education.nih.gov/supplements/nih3/sleep/guide/nih_sleep_curr-supp.pdf

National Resource Center on ADHD. (n.d.). ADHD and Coexisting Conditions: ADHD, Sleep and Sleep Disorders (WWK5D).

This website provides information about the relationship of ADHD to sleep disorders.

www.chadd.org/understanding-ADHD/About-ADHD/Coexisting-Conditions/ADHD-Sleep-and-Sleep-Disorders.aspx

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