The Impact of Sleep on Mental Health and Well-Being in Children and Adolescents

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There Are No Disclosures
Objectives

- Identify sleep recommendations for the various pediatric age groups.
- Recognize the signs and symptoms of inadequate sleep and/or sleep disorders in your pediatric patients.
- Define the relationship between mental/behavioral health and development and sleep.
- Understand the AAP policy statement on School Start Times for children and adolescents.
- Provide recommendations for fostering good bedtime habits and improving sleep among pediatric patients.
How Much Sleep is Needed at Different Ages?
Recommended Range of Hours of Sleep for Age – AASM, AAP

- Infants 4 to 12 months – 12 to 16 hours (including naps)
- Toddlers 1 to 2 years – 11 to 14 hours (including naps)
- 3 to 5 year old children – 10 to 13 hours (including naps)
- 6 to 12 year old children – 9 to 12 hours
- Teens 13 to 18 years – 8 to 10 hours

Wise, Glaze 2017
Recommended Hours of Sleep for Age

- Families may need specific advice on recommended hours of sleep for age.
- 2 years of age – About 12 hours (with one nap included)
- 5 years of age – About 11 hours
- 10 years of age – About 10 hours
- Adolescence – About 9 hours

Picchietti, 2017
Sleep duration recommendations by age from the National Sleep Foundation*

These recommendations are very similar, but not identical to those from the American Academy of Sleep Medicine (AASM).[1,2]


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Sleep History: “BEARS”

- **B**edtime
- **E**xcessive daytime sleepiness
- **A**wakenings: night waking, early morning waking
- **R**egularity and duration of sleep
- **S**noring
### BEARS screening tool for assessment of sleep in children

<table>
<thead>
<tr>
<th></th>
<th>Preschool (2-5 years)</th>
<th>School-aged (6-12 years)</th>
<th>Adolescent (13-18 years)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bedtime problems</td>
<td>Does your child have any problems going to bed?</td>
<td>Does your child have any problems at bedtime? (P)</td>
<td>Do you have any problems falling asleep at bedtime? (C)</td>
</tr>
<tr>
<td></td>
<td>Falling asleep?</td>
<td>Do you have any problems going to bed? (C)</td>
<td></td>
</tr>
<tr>
<td>Excessive daytime sleepiness</td>
<td>Does your child seem over tired or sleepy a lot during the day?</td>
<td>Does your child have difficulty waking in the morning, seem sleepy during the day or take naps? (P)</td>
<td>Do you feel sleepy a lot during the day? In school? While driving? (C)</td>
</tr>
<tr>
<td></td>
<td>Does she still take naps?</td>
<td>Do you feel tired a lot? (C)</td>
<td></td>
</tr>
<tr>
<td>Awakenings during the night</td>
<td>Does your child wake up a lot at night?</td>
<td>Does your child seem to wake up a lot at night? Any sleepwalking or nightmares? (P)</td>
<td>Do you wake up a lot at night? Have trouble getting back to sleep? (C)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Do you wake up a lot at night? Have trouble getting back to sleep? (C)</td>
<td></td>
</tr>
<tr>
<td>Regularity and duration of sleep</td>
<td>Does your child have a regular bedtime and wake time? What are they?</td>
<td>What time does your child go to bed and get up on school days? Weekends? Do you think he/she is getting enough sleep? (P)</td>
<td>What time do you usually go to bed on school nights? Weekends? How much sleep do you usually get? (C)</td>
</tr>
<tr>
<td>Sleep-disordered breathing</td>
<td>Does your child snore a lot or have difficulty breathing at night?</td>
<td>Does your child have loud or nightly snoring or any breathing difficulties at night? (P)</td>
<td>Does your teenager snore loudly or nightly? (P)</td>
</tr>
</tbody>
</table>

The BEARS instrument prompts screening questions in five major sleep domains, represented by the acronym B-E-A-R-S: Bedtime problems, Excessive daytime sleepiness, Awakenings during the night, Regularity and duration of sleep, and Sleep-disordered breathing. The table above shows examples of trigger questions for each age group.

P: questions addressed to parent; C: questions addressed to child.

HOW WELL I SLEEP

AT WORK

WATCHING A MOVIE

DRIVING

LAYING IN MY OWN BED AT NIGHT
Overall Sleep Assessment

- **Quantity** – number of hours

- **Quality** - interruptions, need to use the bathroom, restful or restless sleeper

- **Results** – wide awake or sleepy during the day, difficulty getting up in the morning
What can go wrong with sleep?

- Trouble Falling Asleep
  - Insomnia
  - Obstructive Sleep Apnea
  - Restless Legs Syndrome
  - Caffeine
  - Medications
  - Delayed sleep phase syndrome

- Trouble Staying Asleep
  - Insomnia
  - Obstructive Sleep Apnea
  - Periodic Limb Movement Disorder
  - Caffeine
  - Alcohol
  - Advanced Sleep phase syndrome
  - Short sleepers
  - Depression
What can go wrong with sleep?

- Non-refreshing sleep
- Narcolepsy
- Periodic Limb Movement Disorder
- Undiagnosed Obstructive Sleep Apnea
- Depression
OSA: General Definition

“Obstructive sleep apnea (OSA) is characterized by episodes of complete or partial upper airway obstruction during sleep, often resulting in gas exchange abnormalities and disrupted sleep”

S. Paruthi, 2017.
No combination of symptoms / physical findings reliably differentiates OSAS from primary snoring
I’M SLEEPY Screen for OSA

<table>
<thead>
<tr>
<th>Question</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>I: Is your child often Irritated or angry during the day?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>M: To be filled in by the healthcare provider: Body Mass index above 85%?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>S: Does your child usually Snore?</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>L: Does your child sometimes have Labored breathing at night?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>E: Ever noticed a stop in your child’s breathing at night?</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>E: Does your child have Enlarged tonsils and/or adenoids?</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>P: Does your child have Problems with concentration?</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Y: Does your child often Yawn or is he or she often tired/sleepy during the day?</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Scoring: $\geq 3 = \text{high risk of OSA}$

G. Kadmon, et al.
ICSD-3, 2014 definition

- Periodic limb movement disorder (PLMD) is characterized by clinical sleep disturbance and by repetitive limb jerking in sleep (known as periodic limb movements of sleep, PLMS), that is not better explained by another condition, medication use, or substance use.
PLMs on Polysomnogram
### Restless Legs Syndrome Screen

<table>
<thead>
<tr>
<th>Question</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>U:</strong> Does your child report an Urge to move the legs, usually associated with unpleasant leg sensations?</td>
<td>☑️</td>
<td></td>
</tr>
<tr>
<td><strong>R:</strong> Do the symptoms get worse with Rest (lying down or sitting)?</td>
<td>☑️</td>
<td></td>
</tr>
<tr>
<td><strong>G:</strong> Does Getting active(moving) bring relief?</td>
<td>☑️</td>
<td></td>
</tr>
<tr>
<td><strong>E:</strong> Do the symptoms get worse in the Evening and night?</td>
<td>☑️</td>
<td></td>
</tr>
</tbody>
</table>
Restless Legs Syndrome
Prevalence

- RLS prevalence in children and adolescents is 2 to 4 percent in population-based studies.
- RLS prevalence of moderate-to-severe restless legs syndrome is 0.5 to 1 percent. This approaches the prevalence of obstructive sleep apnea in children but exceeds the prevalence of both pediatric epilepsy and diabetes.

Picchietti, DL 2017
Classification of RLS

- Primary (no other disease present)
- Secondary
  - Iron deficiency
  - Renal failure
  - Pregnancy
  - Drugs (caffeine, TCAs, SSRIs, dopamine blockers)
DSWPD: Comorbidities

- DSWPD further increases the susceptibility to chronic sleep restriction and associated adverse outcomes.

- In a series of 22 adolescents with DSWPD, 59 percent demonstrated poor scholastic performance, and 45 percent had >1 behavioral problems.

- A cohort of adults with DSWPD scored significantly worse on measures of social functioning and role disability compared with both healthy controls and patients suffering from other chronic disorders such as sleep apnea and depression.
When to Suspect DSWPD

- When individuals endorse a consistent pattern of bedtimes and wake times that are significantly later than conventional or desired clock times.
- Although normative data on adolescent sleep-wake times are sparse, a typical weekday bedtime of midnight or later for those >14 years of age and 11 PM or later for those ≤14 years of age is considered a significant delay.
Prevalence of Mental Health Disorders in Childhood

Childhood:  ADHD 8.6%
           Mood Disorders 3.7%
           ASD 0.7%

Adolescents: Anxiety 31.9%
             Behavior Disorders 19.1%
             Mood Disorders 14.3%
             Substance Abuse 11.4%
I have so much to do tomorrow. I need to go to sleep. What time is it? Oh man, why can't I go to sleep?!

The next day:

ZZZZZ...
Sleep Disturbances in Child and Adolescent Mental Health Disorders: A Review of the Variability of Objective Sleep Markers

- Sleep problems are known to have complex bidirectional relationships with childhood psychiatric disorders
- Paucity of evidence on reliable objective markers of sleep in pediatric mental health disorders
- For children with anxiety and ADHD, sleep study results differ if done at home or in sleep lab.

Baddam et al. Med. Sci. 2018, 6, 46
Community Teenager Studies

- Less sleep is associated with more depressive symptoms, hopelessness, anxiety.

- A 2014 study of 15,364 teens sleeping less than 7 hours per school night found increased relative risk of drunk driving, weapon carrying, fighting, contemplated suicide, attempted suicide, smoking, alcohol use, binge drinking, marijuana use, sexual risk taking, texting while driving, obesity.

Meldrum and Restivo. Preventive Medicine 63:24-28
Even Larger Non-Clinical Teen Study

- A 2016 study of 50,000 US teenagers found that 5 injury-related risk behaviors were associated with school night sleep length of 7 or fewer hours: infrequent bicycle helmet and seatbelt use; riding with a drinking driver, drinking and driving, and texting while driving.

The Adolescent Brain: Sleep and Quantitative MRI Scans

290 healthy subjects between the ages of 5 and 18 years were studied.

Self-reported school night sleep duration positively correlates with bilateral hippocampal gray matter volume.

Gov. Chris Christie signed a law in August 2015 ordering the study of the benefits of later start times in middle and high schools amid growing concern from health professionals that teens are getting too little sleep, affecting their health and their grades.

A state-appointed study group concluded that school start times should continue to be set by local districts and not by any state authority. Approximately 14% had middle schools or high schools with start times of 8:30 a.m. or later.

**S3160** (2018) *An Act Establishing a Pilot Program ... on Later School Start Times for High School Students*, introduced by New Jersey Senator (and former Governor) Richard J. Codey (D), would implement a pilot program to study, educate and inform the public about the benefits of later school start times, involving five school districts that push back their start times to 8:30 a.m. or later. [11/2018] Passed by Senate Education Committee (3/6/19)
### Average Start Times of Schools in USA and NJ

<table>
<thead>
<tr>
<th></th>
<th>Average Start Time</th>
<th>Percent Starting Before 7:30 am</th>
<th>Percent Starting 7:30-7:59 am</th>
<th>Percent Starting 8:00-8:29 am</th>
<th>Percent Starting 8:30 am or later</th>
</tr>
</thead>
<tbody>
<tr>
<td>U.S.</td>
<td>8:03 am</td>
<td>6.7%</td>
<td>31.9%</td>
<td>43.7%</td>
<td>17.7%</td>
</tr>
<tr>
<td>N.J.</td>
<td>8:00 am</td>
<td>6.7%</td>
<td>37.2%</td>
<td>41.2%</td>
<td>14.9%</td>
</tr>
</tbody>
</table>

How much caffeine is safe for kids?

<table>
<thead>
<tr>
<th>Age</th>
<th>Maximum amount of caffeine per day</th>
</tr>
</thead>
<tbody>
<tr>
<td>4-6 years</td>
<td>45 mg (about one can of cola)</td>
</tr>
<tr>
<td>7-9 years</td>
<td>62.5 mg (about one and a half cans of cola)</td>
</tr>
<tr>
<td>10-12 years</td>
<td>85 mg (about two cans of cola)</td>
</tr>
<tr>
<td>13 years and up</td>
<td>weight in kg X 2.5, not to exceed 400 mg per day</td>
</tr>
</tbody>
</table>

Source: Government of Canada website accessed on 10/8/2017
Typical, moderate caffeine consumption in children and adolescents is relatively safe, but that higher doses of caffeine consumption (>400 mg) can cause physiological, psychological, and behavioral harm, in particular in subgroups of children, such as those with psychiatric or cardiac conditions.

High doses of caffeine (3-9 mg/kg/d) increase the incidence of headache, stomachache, and nausea in children.

Some studies suggest an association between caffeine consumption and longer-term behavioral problems in youth, such as anger, violence, and alcohol and drug use.

Greater caffeine use from energy drinks is associated with conduct disorders, and greater coffee consumption is associated with greater likelihood of panic and anxiety disorders.

Caffeine use is positively associated with depression among children, especially girls. Caffeine can also impair sleep, and lack of sleep can be detrimental to many aspects of psychological well-being, such as depression, anxiety, and emotion regulation.
Healthy sleep practices for children

1. Have a set bedtime and bedtime routine for your child.

2. Bedtime and wake-up time should be about the same time on school nights and non-school nights. There should not be more than about an hour difference from one day to another.

3. Make the hour before bed shared quiet time. Avoid high-energy activities, such as rough play, and stimulating activities, such as watching television or playing computer games, just before bed.

4. Don’t send your child to bed hungry. A light snack (such as milk and cookies) before bed is a good idea. Heavy meals within an hour or two of bedtime, however, may interfere with sleep.

5. Avoid products containing caffeine for at least several hours before bedtime. These include caffeinated sodas, coffee, tea, and chocolate.

6. Make sure your child spends time outside every day whenever possible and is involved in regular exercise.


8. Keep your child’s bedroom at a comfortable temperature during the night (about 75°F).

9. Don’t use your child’s bedroom for time-out or punishment.

10. Keep the television set out of your child’s bedroom. Children can easily develop the bad habit of “needing” the television to fall asleep. It’s also much more difficult to control your child’s viewing if the set is in the bedroom.

JEREMY! GET UP!

IT'S SATURDAY, MOM!

OH, BUT YOU'RE WASTING THE BEST PART OF THE MORNING!

YANK!

THE BEST PART OF SATURDAY MORNING IS SATURDAY AFTERNOON.
Tips for Teens to Improve Sleep

- Make a plan for sleep: set a bedtime for yourself that will allow enough time to sleep – and keep as close to it as you can
- Get bright light every morning when you wake up to help move your internal clock to an earlier time that can help you fall asleep earlier
- Avoid light at night before bedtime to keep your internal clock from moving later
- Avoid ‘arousing’ activities in the evening and give yourself a wind-down time to relax for about 30 min before bedtime
- Don’t sleep with your cell phone on, nor the computer, TV, or any other technology (including lights) in your bedroom
- Stick as closely as you can to your sleep schedule on weekends
- Avoid caffeine after school
- Do not nap after 4 p.m.
- Have some fun every day and enjoy your life!

Tarokh et al, Sleep in Adolescence, 2016
Summary

- Adolescence is a transitional period from childhood to adulthood and sleep disturbances from both groups can manifest.
- Transitions affect sleep behaviors and sleep disorders.
- In adolescence, common sleep disorders include insomnia, delayed sleep phase syndrome, hypersomnia, narcolepsy and OSA.
- Policy measures and sleep education can benefit adolescent sleep health.
Conclusions

- Children and adolescents act how they sleep.
- If you don’t ask, parents and children won’t tell!
- Screening for pediatric sleep disorders is very important.
- There is a bidirectional relationship between sleep and mental health
Pediatric Psychiatry Collaborative

Regional Hubs

- Atlantic Health Hub @ Newton Medical Center
- Atlantic Health Hub @ Goryeb Children’s Hospital
- Hackensack Meridian Hub @ Hackensack University Medical Center
- Hackensack Meridian Hub @ Palisades Medical Center
- Hackensack Meridian Hub @ Saint Peter’s Family Health Center
- Hackensack Meridian Hub @ Jersey Shore University Medical Center
- Cooper Hub @ Cooper University Medical Center
- Cooper Hub @ Pennsville

Essex County served by Rutgers University Behavioral Health Care. More information on the Essex Hub can be found here: http://ubhc.rutgers.edu/services/children_family/EssexHUB.html
Collaborative Hub Procedure

- Referring to the Hub: After required routine screening and/or based on clinical judgement following the exam, providers can fax the PPC Hub. Providers should send a complete consult form, screening tools, and any other clinically relevant information.

- What Does the Hub Staff Need? All of the information the PPC Hub staff needs is on the consult form, including relevant background information, current clinical picture, demographic information, and reason for referral.

- Communicating with the Family: Please be sure you have discussed the PPC Hub with the patient and family prior to faxing a referral to the PPC Hub, so that the family is aware that a Hub staff psychologist/LCSW/other mental health specialist will be contacting them to discuss current concerns and suggestions for support/treatment.
What will the PPC Hub Staff Do?

- PPC Hub staff will call the patient’s family and complete a clinical intake. The family will discuss their main concerns. Case managers will evaluate for severity and level of care. Depending on the patient’s needs, PPC Hub staff will:
  
  - **Recommend** an appropriate level of care (inpatient, PHP, IOP, or outpatient) - family is sent list of referrals for therapy services to address current MH concerns.
  
  - **Match** the patient with therapist based on insurance and geographic location - referrals are researched by staff psychologists/LCSWs, and most often accept patient insurance.

- “Closing” the Loop: PPC Hub staff will communicate with the you, sending you notes on what occurred with the family. They will also encourage the family to call them back if they need another resource. PPC Hub staff will also follow-up with referred families 3 and 9 months after initial referral.
Questions?

Please contact:
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Mental Health Collaborative
609-842-0014
mhc@njaap.org