Zzz’s to A’s:
The Role of Social Workers in Promoting Healthy Sleep

Insufficient Sleep: 91.8%
Sufficient Sleep: 9.2%
U. S. Adolescents

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‘Healthy People 2020’
(US Dept HHS: www.healthypeople.gov)

“The public health burden of chronic sleep loss and sleep disorders, coupled with low awareness of poor sleep health among the general population, health care professionals, and policymakers, necessitates a well-coordinated strategy to improve sleep-related health.”

Ohio Adolescent Health Partnership:
A collaboration of stakeholders with committees on:

- Behavioral Health
- Injury, Violence & Safety
- Reproductive Health
- Nutrition & Physical Activity
- Sleep
Objectives:

- Understand the sleep needs of children and adolescents and the most common barriers to healthy sleep for American children.
- Recognize the negative effects of chronic sleep deprivation.
- Identify ways in which social workers can intervene at both the micro and macro levels to support healthy sleep for our youth.

Sleep and Mental Health

- Johnson, Chilcoat, and Breslau, 2000:
  - Increased risk of future depression and anxiety among children with deficient sleep

Sleep and Mental Health

- Chorney et al, 2008 Literature Review - ‘The Interplay of Sleep Disturbance, Anxiety, and Depression in Children’:
  
  “As our empirical base expands, we should seek to disseminate the knowledge gained in effort to arm parents and frontline practitioners with tools to screen for potential problems and strategies to optimize sleep. Such efforts may go a long way toward minimizing long term dysfunction and improving the quality of lives of countless children and their families.” (pg 355)
Sleep and Risk-Taking Behavior

• O'Brien and Mindell, 2005: Adolescents with less than 8.5 hours of sleep engaged in more
  – violence
  – unsafe behaviors
  – drug use
  – sexual activities

• Kahn et al, 2006 – similar results: “[Our] findings suggest that sleep deprivation significantly
  weakens the inhibition of aggression… through reduced metabolic activity in prefrontal regions of the brain….” (pg 214)

Sleep and Dietary Choices

• 13,284 teens surveyed. Teens who slept less than 7 hours per night (compared to teens who slept more) were:
  – More likely to consume fast food two or more times per week
  – Less likely to consume fruits and vegetables
  – Despite race, gender, SES, physical activity and family structure

  “...we need to start thinking about how to
  more actively incorporate sleep hygiene education into
  obesity prevention and health promotion interventions.”

  -Lead researcher Dr. Lauren Hale,
  Stony Brook Medicine Press Release, June 20, 2013

Sleep and Insulin Resistance

Matthews et al, 2012:

245 healthy white and black adolescents:
• Elevated insulin resistance [HOMA-IR] associated with
  shorter sleep duration
• Findings were independent of age, race, gender and
  adiposity [obesity]

  “…interventions designed to extend sleep in short sleepers
  may be beneficial for metabolic health in adolescence and
  beyond.” (pg 1357)
Sleep and Obesity

- Extensive research had been disproving the assumed link between TV and obesity.
- Instead, researchers are finding a link between chronic insufficient sleep and obesity.
- This link occurs along all ages, but the link is strongest among children.

(Must and Parisi, 2009; Nolan et al, 2009; Taheria et al, 2004)

Sleep and Sports Injuries

Research presented by Dr. Matthew Milewski at the American Academy of Pediatrics Conference, Oct 2012:

68% fewer sports injuries among teens who slept at least 8 hours compared to teens who slept less

Sleep and Grades

Study of 6,165 US Air Force Academy cadets over 4 years. (Carrell et al, 2011)

- Cadets with 7:50 am classes courses performed better in all their courses for that day compared to cadets with 7:00 am classes
- 50 minute later start improved teacher quality by one standard deviation

“...later start times may be a cost-effective way to improve student outcomes for adolescents” (pg.80)
In 1998 the 5 public high schools in Fayette County, KY changed start times from 7:30 am to 8:30 am. In the two years afterwards:

Auto accidents involving teens from Fayette Co. decreased 16.5%.

while auto accidents involving teens in the state increased 7.8%... 

...a comparable decrease of 24.3%. (Danner and Phillips, 2008)

**Sleep and Pedestrian Safety**

Pedestrian fatalities are 6th leading cause of death for 14 and 15 year olds.

Over 8,000 injuries annually among 14 and 15 year old pedestrians.

(Centers for Disease Control, WISQARS)

Study by Davis et al (2013) of 14 and 15 yr olds:

- 50% increase in ‘hits’ or ‘close calls’ in virtual reality cross-walks when sleep-restricted (4hrs)

**Recommendations:**

1. Explore policies regarding school start times
2. Better sleep hygiene education
3. Better parent education
‘Healthy People 2020’
(US Dept HHS: www.healthypeople.gov)

Sleep Health Objectives:
• Reduce the rate of drowsy driving vehicular crashes
• Reduce the proportion of children who have poor quality sleep
• Increase the proportion of students in grades 9 – 12 who get sufficient sleep

Elementary Sleep Needs: Age 5-11
10-11 hours per night

Most 5 yr olds get 30 min less sleep.
Most 11 yr olds get an hour less sleep.

(Carskadon et al., 1980; National Sleep Foundation, 2009)

Adolescent Sleep Needs: Age 12-24
8.5 – 9.25 hours per night

Only 9.2% of adolescents get at least 8 ½ hours of sleep each night.
On average, most teens sleep 6.75 hours on school nights.

(Carskadon et al., 1980; National Sleep Foundation, 2009)
Weekend Catch-Up?

- Adolescents who sleep more on the weekend experience a ‘jet-lag’ effect, with negative effect on school performance. (Bergin and Bergin, 2009)

- High school students with a greater discrepancy (2 hours and more) between school-night and weekend bedtimes earn lower grades than students with less discrepancy. (Wolfson and Carskadon, 1998)

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Sleep: Ohio Snapshot

| Percentage of Ohio Students Who Report More than 8 Hours per School Night: |
|-----------------------------|-----------------------------|
| 9th Graders 29.1%            |
| 10th Graders 25.6%           |
| 11th Graders 24.6%           |
| 12th Graders 18.4%           |

Source: 2011 Ohio High School YRBS

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Sleep: Ohio Snapshot

<table>
<thead>
<tr>
<th>Comparison by Race: Percentage of Ohio High School Students Who Report More than 8 Hours of Sleep Per School Night</th>
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<tbody>
<tr>
<td>White, Non-Hispanic 24.7%</td>
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<td>Black 21.9%</td>
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Note: Statistics for other racial and ethnic groups un-reportable due to small sample sizes.

Source: 2011 Ohio YRBS
Non-REM Stage 1
Falling Asleep
Light Sleep

REM
Every 90 min.
Brain is Active, Dreams
25% Adults, 50% Infants
Each course gets longer

Non-REM Stage 2
Fully Asleep
Body Temp Drops

Non-REM Stage 3
Deep Sleep
Restorative
Tissue Repair/Growth
Hormone Release

Barriers to Sleep

• Ignorance of Sleep Needs
• Over-Scheduling
• Evening Stimulation
• Obesity
• Medical Disorders
• Psychological Disorders
• Biological Clock Interference

Household-type is NOT a barrier to childhood sleep
(Wolfson and Carskadon, 1998)
Survey of 3,120 students age 13-19, mean total sleep:
7 hrs and 4 minutes

"Over 80% of youngsters in this survey come from two-parent households...and we saw no differences between this cohort and those from single-parent homes on the major sleep variables..."

"...We propose that the biological and psychosocial processes favoring sleep delay in teens collides with early rising times mandated by schools and that even in the most well-regulated families the capacity for adequate adjustments may be limited."
Ignorance of Sleep Needs

- Underestimating sleep needs
- Erroneously assuming that weekend catch-up compensates for missed sleep
- Underestimating the negative consequences of chronic sleep deprivation

Over-scheduling

- Planning activities until late in the evening
- Pushing dinner-time late due to activities
- Pushing ‘unwinding’ time into bedtime

‘Nurture Shock’ refers to the ‘Slush Hour’ before bed – a fund that parents frequently borrow from. (pg 43)

Evening Stimulation

- TV
- Video Games
- Studying/Heavy Reading
- Bright or Flickering Light
- Exercise, sports practices (should not occur within 3 hrs of bedtime)
- Caffeine, nicotine, ADHD meds given too late
**TVs in Bedrooms**

68% of 8-18 yr-olds have a TV in their bedroom

*Children who have a TV in their bedroom have been shown to get less sleep and to go to bed later compared with those who have no bedroom TV.*

(Must and Parisi, pg 84)

**Sleep and Weight Cycle**

(Nolan et al, 2009)

**Medical Disorders**

- Sleep Apnea
- Narcolepsy
- Sleep Walking
- REM Motor Behavior Disorder
- Restless Leg Syndrome
- Chronic Pain
**Psychological Disorders**

- **Post-Traumatic Stress Disorder**
  - Difficulty falling asleep
  - Difficulty staying asleep
  - Nightmares
- **Depression**
  - Increased or decreased sleep
- **Generalized Anxiety**
  - Difficulty falling asleep
- **ADHD**
  - Difficulty falling asleep if hyperactive
  - Higher rates of sleep disordered breathing

**Biological Clock Interference**

- Our circadian rhythm controls the sleep/wake cycle
- The circadian rhythm among humans averages 24.27 hours, but it 'entrains' to a 24-hour day based primarily on light exposure.

  [Crowley, Acebo and Carskadon, 2007]

**Melatonin**

Melatonin is a hormone secreted by the pineal gland in response to the circadian rhythm:

- Rising in the evening near the person's usual bedtime
- Remaining constant through sleep
- Decreasing during the person's usual wake time

  [Wahlstrom, 2003]
Melatonin Shift in Adolescence

- Measuring of melatonin levels in saliva:
  - later onset of higher levels of melatonin among adolescents – as compared to younger children and older adults

- Observed in other countries around the world:
  - a developmental condition of adolescence – not a cultural or scheduling phenomenon

(Carskadon et al., 1979; National Sleep Foundation, 2009; Wahlstrom, 2003)

Impacts of Chronic Sleep Deprivation

- Academic
- Cognitive
- Mood
- Behavior
- Health
- Obesity
- Safety

Ohio Adolescent Health Partnership

Goal: Ohio adolescents will obtain a minimum of 8.5 to 9.5 hours of sleep per night.

- Objective 1: Increase the percentage of adolescents who engage in good sleep hygiene and habits
- Objective 2: Increase the percentage of health care providers who are screening, diagnosing, and providing interventions for adolescents with insufficient and disordered sleep
- Objective 3: Increase the percentage of middle and high schools participating in later school day start times
Minnesota Medical Association

1993 resolution to educate the public on:
– the need for more sleep during adolescence than during childhood
– the biological shift to a later sleep pattern in adolescence
– the impact of inadequate sleep on driving safety and school performance
– the recommendation for schools to eliminate early starting times for adolescents

(Minnesota Medical Association, mmmed.org)

House Resolution 4131: The Z’s to A’s Act

• Introduced June 24, 1998 by Representative Zoe Lofgren of California
• Would have allowed for $25,000 grants to schools to implement start times of later than 9am

So what do the experts say?

School start times after 8:30 am for 6th - 12th grades.

Many experts recommend after 9:00am.

(Bergin and Bergin, 2009; Carskadon, et al 1998; National Sleep Foundation, 2009; Noland et al, 2009; Wahlstrom, 2003; Wolfson et al, 2007; and more...)
In 1997...
Minneapolis Public School District’s 7 high schools changed from:

7:15 am - 1:45 pm school days
to
8:40 am - 3:20 pm school days
(Affecting 18,000 students)

In a study 4 year after changes:

“Contrary to the fears and expectations that a later start would result in students staying awake an hour later on school nights…

Minneapolis high school students get five more hours of sleep per week than their peers [with early school start times].”

(Wahlstrom, 2003)

Benefits of Later Start Times
In Minneapolis (statistically measured):
– Increased total sleep
– Increased attendance
– Reduced tardiness
– Increased enrollment
– Slight improvement in grades (“difficult to measure”)

(Wahlstrom, 2003)
Benefits of Later Start Times

Anecdotal and Survey Reports from Minneapolis:
- According to the faculty and staff:
  - Less students falling asleep in class
  - Students more alert during first two periods
  - Improved student behavior
  - Quieter hallways
- According to the students:
  - Learning was ‘easier’

(Wahlstrom, 2003)

Rhode Island Comparison:
Late Starting (8:37 am) compared to Early Starting (7:25 am) Middle Schools:

- Increased total sleep times
- Less daytime sleepiness
- Improved grades among females in 7th grade
  (no statistical difference among males)
- Improved grades among both genders in 8th grade

(Wolfson et al, 2007)
Wilton, Connecticut

Changed start times in 2003

• A local sleep disorders center survey, one year later, showed that Wilton high-school students were obtaining an hour more sleep per night.

“Six years later, no one is even looking back... Our students are happier, performing at the highest levels academically, and our sports teams continue to be the among the best in the state.”  

(CT LWV, 2009 Statement)

The Brookings Institute’s Hamilton Project Policy Brief 2011-08: ‘Organizing Schools to Improve Student Achievement’

9 to 1 benefit-to-cost ratio
in moving middle and high schools one hour later

(Available online at the Brookings Institute’s site)

In Wilton, Connecticut ‘a self-described sports town’:

After changes in school start times in 2003:

• Participation in high school athletic programs ‘continued to rise’
• Upper elementary extracurricular involvement increased
• Other schools in the conference accommodated late arrivals to events – with some of those schools ‘looking at making the change themselves’

(CT LWV, 2009 Statement)
St. George’s School, RI

“We have found it (switching to 8:30 start) one of the best things our school has ever done. The impact on athletics is minimal. Coaches have given up 5 minutes per day of practice time, willingly…”

John R. Mackay  
Director of Athletics  
Head Football Coach  
(2/8/2011 email)

St George’s School maintains 48 teams in 22 sports.  
Students are required to play at least 2 sports per season.

Fayette County, Kentucky

“The time issue has never been a problem for us. Our schools start time is 8:25 and practice after usually starts around 3:30 or 3:45.”

- Donald Adkins, Athletics Director  
Fayette County Schools, Kentucky  
1/12/12 email

Hudson, OH

“It has actually worked out better than we anticipated.”

~

“We have not really had any problems getting everything done before dark.”

-Ray Ebersole, Athletic Director  
Hudson Public High Schools  
12/8/2011 and 5/13/2012 emails
One solution in Minnesota:

“Make connections.”
- Al Frost, Athletics Director
Roosevelt High School, Minnesota
(12/9/11 phone conversation)

Mr. Frost made a deal with the park system, on which the school relied for baseball and softball fields, to push the adult softball leagues a little later in exchange for the use of the school’s football field by the park system’s pee-wee football league.

Short-Term Recommendations
– Give standardized testing after 10am, when adolescents are more alert
– Decrease nightly homework hours
– Give plenty of notice for large assignments
– Educate schools, physicians, mental health providers on the impact of sleep deprivation
– Educate parents that weekend ‘catch-up’ is normal, however sleeping beyond 2-3 hours past normal wake time is not recommended
(Hansen, et al 2005; Wolfson and Carskadon, 2005)

Resources:
- Ohio Adolescent Health Partnership: www.odh.ohio.gov/programs/chisp/ad_hlth (join the OAHP!)
- National Center on Sleep Disorders Research: www.nhlbi.nih.gov/about/sleepdis (free education materials)
- The National Sleep Foundation: www.sleepfoundation.org
- US Department of Health and Human Services: www.hhs.gov
- The Lloyd Society: www.thelloydsociety.org (criminal justice advocacy, sleep and delinquency research)
- School Start Time: www.schoolstarttime.org (excellent compilation of the clinical research)
- Start School Later: www.startschoollater.net (nonprofit national advocacy group)
- Northeast Ohio Petition: www.signon.org, search ‘Northeast Ohio’ (for schools to form committees)
Books/Publications

- Adolescent Sleep Needs, available via the National Sleep Foundation website (above)
- Nurture Shock: New Thinking About Children, P.Bronson and Ashley Merryman
- Ready…Set…R.E.L.A.X (Audio and Workbook for children through middle school), Jeffrey Allen & Roger Klein
- Plain Language About Shiftwork, National Institute for Occupational Safety and Health [800-35-NIOSH, also available online via the US Department of HHS – website is above]

References


