Infant Sleep Problems and their effects: A Public Health Issue

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Assessing the Physical Development and Well-Being of Children

8th Annual Assessment Workshop

Outline for Sleep Workshop for Assessing physical development and well-being of children

- Why is sleep necessary?
- How is sleep organized?
- What are sleep stages?
- What is normal sleep for infants?
- What is normal sleep for toddlers?
- Do infants and toddlers wake at night?
- What is a behavioral sleep problem?
- What are negative sleep associations?
- What are sleep-promoting strategies?
- What are effects of sleep problems?

Why is Sleep Necessary?

- Sleep is essential for our health and well being
- Sleep is not discretionary
- Children are growing up in a society that does not value sleep
- Children's emotional, behavioral, and obesity problems are linked to inadequate sleep
- Sleep serves as a window on parenting
- Persistent behavioral sleep problems have negative effects on parents' health

How is Sleep Organized?

- Based on circadian and homeostatic processes
- Circadian rhythm incorporates cues from the external environment to regulate timing
- Sleep pressure in the homeostatic process is relieved by naps and nighttime sleep
- Ultradian rhythm refers to organization of sleep cycles into alternating periods of NREM and REM sleep

What are Sleep Stages?

- Sleep cycles in infants are about 60 min. long and gradually increase to 90 min.
- NREM (4 stages)
- Stage 1
  - drowsy and less responsive
  - easily awakened
  - 3% of sleep mostly at the beginning of sleep

What are Sleep Stages?

- NREM (4 stages)
- Stage 2
  - Onset of true sleep
  - Decreased eye movements and muscle tone with movement in bed
  - 50% of total sleep time mostly in the middle of the night

What are Sleep Stages?

- NREM first 1/3 of night dominated by stages 3 and 4
- Stage 3 and 4
  - Slow-wave sleep
  - Relaxed body position with slow breathing and difficult arousal
  - 20% of total sleep time mostly in the early part of the night

What are Sleep Stages?

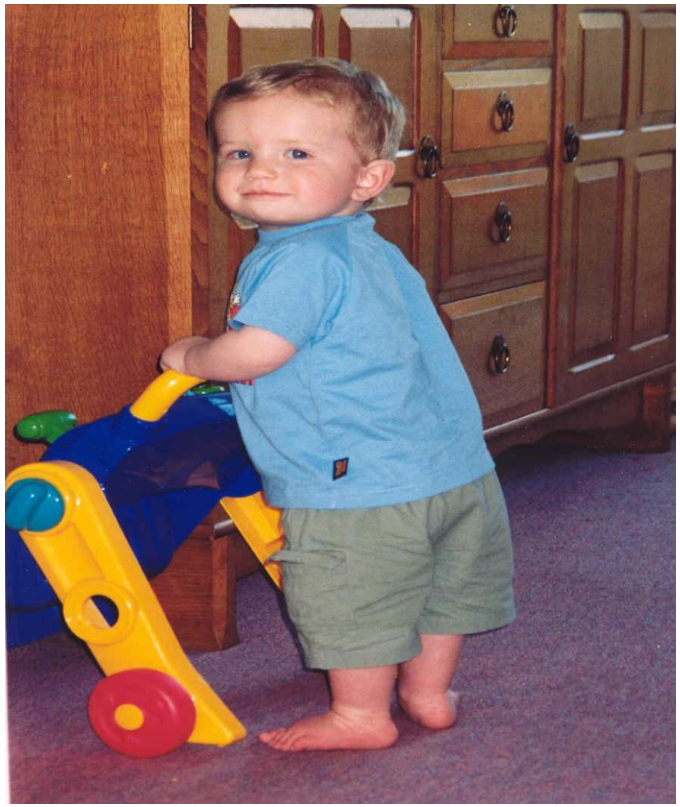
- REM
  - Bursts of rapid eye movement
  - Intense brain activity and dreaming
  - Muscle twitches and vocalizations can occur but the child is paralyzed
  - 25% of total sleep time by 5 years

What is Normal Sleep for Infants?

- Infants spend 50% of their sleep time in REM and 50% in NREM.
- In newborns, total sleep time (TST) averages 16 hrs each day (ranging from 11 to 23 hours)
- It decreases to an average of 14 hrs by 6 mths
- Sleep becomes consolidated during the night in the longest sleep period (LSP) and 2 -3 naps/day

What is Normal Sleep for Toddlers and Preschoolers?

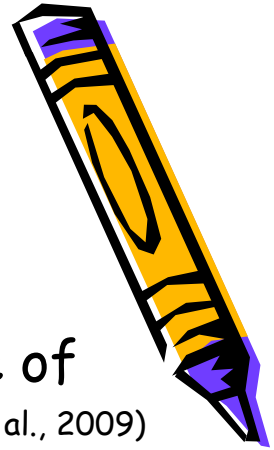
- Total sleep averages 13 hrs by 2, and 12 hrs by 3 to 4 (but large variability)
- Majority at night with average sleep of 10 to 12 hrs
- Average 1 to 2 year old has 1- 2 naps lasting 1.5-2 hrs.
- Average 3 to 4 year old has 1 nap lasting about 2 hours



Do Infants and Toddlers Wake at Night?

- Infants and young children have episodes of semi wakefulness that occur 5 to 7 times per night
- Typically last 1 to 5 minutes
- Infants and toddlers open eyes, look around and will fully wake if conditions are different than when they fell asleep

What is a Behavioral Sleep Problem?



- 20-30% of young children have some type of sleep disturbance and many persist (Sadeh et al., 2009)
- Usually parents decide whether child has a problem – insecure attachment is not linked to sleep problems (Sadeh et al., 2010)
- Difference between 'good sleepers' and 'poor sleepers' is the ability to self-soothe after waking (Goodlin-Jones et al., 2001)
- Children require parental intervention to fall asleep and return to sleep (Sadeh et al., 2009)
- Insufficient sleep occurs when sleep time is shorter than age-appropriate norms and the child shows evidence of sleep loss (Touchette et al., 2005)

Behavioral Sleep Problems are:

- Major causes of disturbed sleep and daytime sleepiness
- Caused by sleep-onset associations, limit-setting problems, inadequate sleep hygiene
- Defined as waking 2 or more times per night or more than 20 minutes per night for more than to 2 months or taking more than 20 minutes to settle (Richman, 1981)

Negative Sleep-onset Associations

- Children require parental presence to fall asleep (Mindell et al., 2009)
- Infants share a bedroom with parents (Mindell et al., 2009)
- Children breastfed to sleep or given a bottle to sleep during the night (Sadeh et al, 2008)
- Children brought into their parents' beds (Sadeh et al, 2008)
- Children with irregular bedtime routines (Sadeh et al, 2008)
- Children with late bedtimes (after 9 pm) (Mindell et al., 2009)
- Television as part of the bedtime routine (Mindell et al., 2009)
- Children without daytime naps (Mindell et al., 2009)
- Inconsistent routines between settling for naps and settling at night

Sleep Promoting Strategies

- Consistent daytime and nighttime routines (Sadeh et al, 2008)
- Consistent bedtime routines or rituals (Sadeh et al, 2008)
- Consistent meal time and feeding, but not just before bed
- Use bed as a place for relaxation and sleep (Mindell et al., 2009)
- Limit caffeine intake after noon (chocolate, tea, cola, many carbonated soft drinks) (Mindell et al., 2009)
- Avoid stimulation and parental presence (Mindell et al., 2009)
- Bedrooms should be dark, not too warm, with noise to a minimum (Mindell et al., 2009)

Rule Out - Obstructive Sleep Apnea

- Disorder of breathing characterized by complete or partial upper airway obstruction during sleep
- Rates of 2-3% with highest rates in pre-schoolers
- Night snoring accompanied by sporadic pauses, gasping or choking, and disrupted sleep
- Can be associated with chronic rhinitis, nasal congestion, mouth breathing, otitis media, sore throats, enlarged tonsils and adenoids or frequent upper airway infections

- These children should be seen by a specialist or a pediatric sleep clinic for evaluation
- Children may require tonsillectomy or adenoidectomy to remove obstructive tissue, but this is not always effective
- Obstructive sleep apnea or airway obstruction are also associated with restless sleep and extended head postures

Effects of Behavioral Sleep Problems on Children

- Short sleep trajectories can persist from infancy to early childhood and beyond (Touchette et al., 2005)
- In several countries, infants' and children's sleep problems linked to overweight/obesity in early childhood (Jiang et al, 2009; von Kries et al., 2002; Taveras et al., 2008; Touchette et al., 2008)
- More likelihood of hyperactivity (Hiscock et al., 2007; Touchette et al., 2007; 2009)
- More likelihood of lower scores on intelligence tests (Touchette et al., 2007)
- More likelihood of emotional difficulties (Hall et al., 2007; Reid et al., 2009)

Effects of Children's Behavioral Sleep Problems on Parents

- Parents' depressed mood, poorer sleep quality, and fatigue (Hall et al, 2006)
- Given fatigue, potential for parental accidents (e.g. micro sleep when driving) (Mellor, 2010)
- Mothers and fathers with infants reported poorer general health. Mothers with preschoolers reported poorer general health (Martin et al., 2007)
- Parental disagreement about managing infant sleep (Bayer et al., 2007)
- Persisting child sleep problems to 2 & 3 years of age associated with maternal depression, limitations to daily functioning and partners undermining parenting (Lam et al., 2003)
- Changes in maternal-child interaction persist after sleep problem corrected in older children (Minde et al., 1994)

Conclusion

- Behavioral sleep problems are a significant public health issue.
- Parents can help children sleep better and improve their outcomes
- Most behavioral sleep problems are amenable to interventions because it is about changing parents' behavior and thinking about negative sleep associations, limit setting, and sleep hygiene
- There are well supported interventions that can be offered by Public Health Nurses (Rocky Sleep Study)