Behavioral Insomnia of Childhood

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1

Disclosure Information

Comer School Nurse Day
Lisa Medalie, PsyD, DBSM

- I have the following relevant financial relationship to disclose:

  Owner of DrLullaby, LLC – *Digital Health CBT-I Services*

  While I am not presenting material on DrLullaby in this presentation, if it comes up in discussion, please understand that I have financial interest as the owner of the company.

2

Outline

- Diagnosis
- Prevalence
- Impact
- Assessment
- Treatment

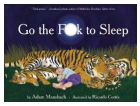
3

International Classification of Sleep Disorders 2nd Ed. (ICSD-2), 2005

Behavioral Insomnia of Childhood (BIC)

Sleep Onset Association Type
Falling asleep requires special conditions
Without them, sleep onset is delayed
Nighttime awakenings require conditions for return to sleep

Limit-Setting Type
Child stalls or refuses to got to bed
Caregiver demonstrates insufficient rules
"Curtain calls", tantrums



Combined Type
Features of both Sleep Onset Association Type and Limit Setting Type

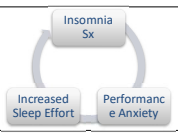
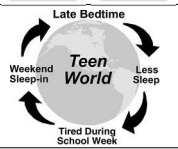
4

International Classification of Sleep Disorders 3rd Ed. (ICSD-3), 2014

Insomnia Disorder
Chronic Insomnia 3 or more times per week 3 or more months 20 minutes or more in children
Short-term Insomnia Less than 3 months Related to identified stressor Resolves when stressor resolves or when individual adapts to stressor
Other Complain of difficulty initiating or maintaining sleep but does not meet all criteria for short-term or chronic insomnia

5

Teen Differentials

Psychophysiological Insomnia (ICSD-2)	
Delayed sleep-wake phase disorder	
Chronic volitional sleep restriction	

6

PEDIATRICS
OFFICIAL JOURNAL OF THE AMERICAN ACADEMY OF PEDIATRICS

ELECTRONIC ARTICLE

The Practice of Pediatric Sleep Medicine: Results of a Community Survey

Judith A. Owens
Pediatrics September 2001, 108 (3) e51; DOI: https://doi.org/10.1542/peds.108.3.e51

Age	Problem	Prevalence	References
Infants	Difficulty settling and frequent night wakings	40%	Anders (1979); Carey (1979); Carey (1975)
Preschoolers	Bedtime resistance, delayed sleep onset and disruptive night wakings	25-50%	Anders, Carkskadon, Dement, et al. (1978); Lozoff, Wolf & Davis (1985); Richman, Douglas, Hunt, et al. (1985); Lavigne, Arend, Rosenbaum, et al. (1999)
School-Aged	Parent-reported problematic sleep behaviors	37%	Owens, Spirito, McGuinn et al. (2000)

7

Impact of Sleep Loss

- Mood: irritability, anxiety, depression
- Behavioral problems: hyperactivity, impulsivity, aggression
- Cognitive deficits: attention, processing speed, response time
- Performance deficits: academic, social, work and driving-related
- Health: pain, immune system, metabolism
- Family: conflict, parent sleep loss, parent bed

8

Insomnia Assessment

- Clinical interview
- Subjective measures
- Sleep diaries
- Actigraphy
- Polysomnography not indicated unless medically based sleep disorder is suspected

(Honaker & Meltzer, 2014)

9

How does tired look?

Tired Adult

Tired Child

10

ADHD or Sleep Loss?

PSG on 82 healthy children randomized to sleep deprivation or optimal sleep

Measures of Attention, Overactivity, and Impulsivity by Condition

Measure	Variable	Optimized[a]		Restricted[b]		F
		M	SD	M	SD	
Child Attention Profile	Inattentive	0.7	0.8	1.8	2.6	5.8*
	Overactive/Impulsive	1.0	1.4	1.7	2.0	ns
Restricted Academic Situation	Hyperactive epochs	29.6	17.9	25.7	15.5	ns
	Sleepy epochs	1.3	1.9	4.3	7.8	5.4*
GDS-Delay	Total Correct	54.2	9.0	54.0	7.7	ns
	Total Responses	67.1	9.8	63.3	9.3	3.1†
	Efficiency Ratio, %	82.0	14.0	86.0	9.0	ns
GDS-Vigilance	Total Commissions	6.9	7.1	4.7	4.7	2.8†
	Total Correct	41.8	3.3	42.7	2.6	ns
	Response Latency	0.4	0.1	0.4	0.1	ns

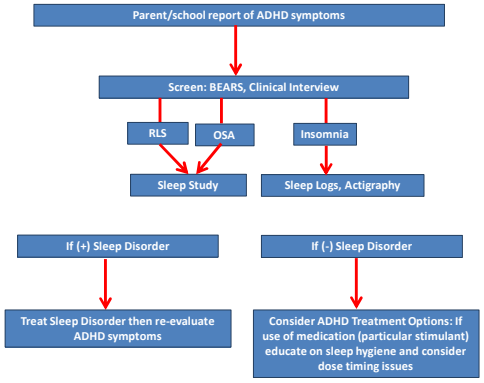
[a] $n = 37$. [b] $n = 45$ except for Restricted Academic Situation and GDS-Delay where $n = 44$. †$p < .10$. *$p < .05$.

Found patients in sleep deprived group exhibited increased symptoms of ADHD the following day

(Fallone et al. 2001)

11

Minimize false positive ADHD



12

BEARS

B = bedtime problems
E = excessive daytime sleepiness
A = awakenings during the night
R = regularity and duration of sleep
S = snoring

	Toddler/preschool (2-5 years)	School-aged (6-12 years)	Adolescent (13-18 years)
1. Bedtime problems	Does your child have any problems going to bed? Falling asleep?	Does your child have any problems at bedtime? (P) Do you have any problems going to bed? (C)	Do you have any problems falling asleep at bedtime? (C)
2. Excessive daytime sleepiness	Does your child seem overtired or sleepy a lot during the day? Does she still take naps?	Does your child have difficulty waking in the morning, seem sleepy during the day or take naps? (P) Do you feel tired a lot? (C)	Do you feel sleep a lot during the day? In school? While driving? (C)
3. Awakenings during the night	Does your child wake up a lot at night?	Does your child seem to wake up a lot at night? Any sleepwalking or nightmares? (P) Do you wake up a lot at night? Have trouble getting back to sleep? (C)	Do you wake up a lot at night? Have trouble getting back to sleep? (C)
4. Regularity and duration of sleep	Does your child have a regular bedtime and wake time? What are they?	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)	What time do you usually go to bed on school nights? Weekends? How much sleep do you usually get? (C)
5. Snoring	Does your child snore a lot or have difficult breathing at night?	Does your child have loud or nightly snoring or any breathing difficulties at night? (P)	Does your teenager snore loudly or nightly? (P)

(Owens & Dalzell, 2004)

13

Pediatric Insomnia Severity Index

Please answer each of the following questions about your child's sleep. The following statements are about your child's sleep habits and possible difficulties with sleep. Think about the past week in your child's life when answering these questions. If last week was unusual for a specific reason (such as your child had an ear infection and did not sleep well or the TV set was broken), choose the most recent typical week.

Use the following scale when answering the questions

	0 Never (0 nights)	1 Once in a while (1-2 nights)	2 Sometimes (2-3 nights)	3 Quite Often (4-5 nights)	4 Frequently (5-6 nights)	5 Always (7 nights)
1) My child takes longer than 30 minutes to fall asleep after going to bed	0	1	2	3	4	5
2) My child has trouble falling asleep at bedtime.	0	1	2	3	4	5
3) My child awakes more than once during the night	0	1	2	3	4	5
4) After waking during the night may child has trouble returning to sleep	0	1	2	3	4	5
5) My child appears sleepy during the day	0	1	2	3	4	5

Number of hours per night

	11-13	9-11	8-9	7-8	5-7	less than 5
6) How many hours of sleep does your child get on most nights?	0	1	2	3	4	5

(Byars et al. 2016)

14

Sleep Log

Calculations:
Total Sleep Time
Time in Bed
Sleep Efficiency

A. What time did your turn off the light intending to go to sleep?

B. How many minutes did it take you to fall asleep?

C. After falling asleep, how many times did you wake (not including the final time)?

D. How long were you awake if you add together the # of minutes awake during "C"?

E. What time did you wake in the morning?

F. What time did you get out of bed in the morning?

G. How many minutes were you awake in bed between #E and # F?

H. In total, how long was your Sleep Period in minutes? This is the time between #A and # F.

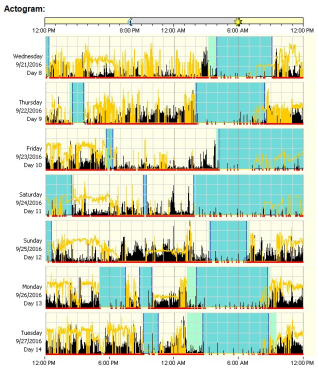
I. Overall, how much sleep did you get, in minutes? This is #H - #B - #D - #G.

J. Sleep Efficiency

= Total Sleep Time (# I) / Sleep Period (# H)

15

"Spy Equipment" for sleepy teens



16

Narcolepsy vs. Insufficient Sleep

	Narcolepsy	Insufficient Sleep Syndrome
Excessive Daytime Sleepiness	Yes	Yes
Abnormal MSLT – including mean sleep latency =8 min with 2 or more SOREMPs	Yes	Potentially
Uncontrollable need for sleep during day	Yes	Yes
CSF hypocretin level low	Potentially	Unlikely
HLA typing showing HLA DQB1*0602	Potentially	Unlikely
Sleep paralysis, Hypnagogic hallucinations	Potentially	Potentially
Total sleep time under age requirements	No	Yes

17

Practice Parameters for Management of Sleep Problems in Children

American Academy of SLEEP MEDICINE™

GENERAL RECOMMENDATION

3.1. Behavioral interventions are effective and recommended in the treatment of bedtime problems and night wakings in young children. [4.1] (Standard)

Of the 52 selected studies examining the effectiveness of behavioral interventions for the treatment of bedtime problems and night wakings, 94% (49 of 52) reported that behavioral interventions as a whole produced clinically significant improvements in bedtime resistance and night waking, while the remaining three studies reported equivocal findings. Nine of the 52 (17%) represented randomized treatment control trials that were classified as Level I. Four studies (8%) were classified as Level II. The primary outcome measures in these thirteen studies were child sleep parameters.

(Morganthaler et al. 2006)

18

e172 Review Article

THIEME OPEN ACCESS

Pediatric Insomnia: Update and Future Directions

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J Child Sci 2018;8:e172–e180.

Abstract

Throughout their childhood, pediatric insomnia impacts approximately 25% of all children in the general population. Although it can occur as an isolated condition, it commonly associates with other comorbidities, such as autism, developmental delay, and psychiatric disorders. Careful and detailed history is essential, and sleep logs and actigraphy are useful tools in the assessment and diagnosis of pediatric insomnia. However, polysomnography is usually not warranted in the assessment of pediatric insomnia unless underlying medically-based sleep symptoms are concurrently identified and justify such test. In the majority of cases, behavioral interventions are the recommended approach for treatment. Despite the fact that many pharmacological approaches are used for child insomnia off-label, there are currently no FDA (Food and Drug Administration) approved medications for the management of pediatric insomnia. The high prevalence of pediatric insomnia, coupled with the low number of providers, who are formally trained in behavioral treatment for this prevalent condition, highlights the urgent need for improving primary care practitioner awareness, while expanding alternative routes to access to care, such as interactive virtual technology-based treatments, parent education and manuals, along with ongoing efforts to increase professional training opportunities.

Keywords
- pediatric
- insomnia
- review

19

Cognitive Behavioral Treatment for Insomnia (CBT-I)

Therapy component	Description
Stimulus control	Set of instructions aimed at breaking conditioned arousal and strengthening the bed and bedroom as stimuli for sleep
Sleep restriction	Limiting the time allowed in bed to the patient's average reported actual sleep time and subsequently slowly increasing the time allowed in bed as sleep improves
Cognitive therapy	Targets beliefs and thoughts that directly interfere with sleep by increasing arousal in bed or indirectly by interfering with adherence to stimulus control and sleep restriction
Relaxation techniques	Diaphragmatic breathing, progressive muscle relaxation, and visual imagery to reduce psychic and somatic anxiety related to sleep

- CBT improved sleep latency, wake after sleep onset, and sleep efficiency (all p .003), but not total sleep time (p > .05).
- Gains were maintained 6 months post-treatment

(Paine & Gradisar, 2011)

20

THE CARE AND FEEDING OF CHILDREN

A CATECHISM FOR THE USE OF MOTHERS AND CHILDREN'S NURSES

By

L. EMMETT HOLT, M.D., LL.D.
1907

How should a baby be put to sleep?

The room should be darkened and quiet, the child's hunger satisfied, and the child made generally comfortable and laid in its crib while awake.

Is rocking necessary?

By no means. It is a habit easily acquired, but hard to break, and a very useless and sometimes injurious one. The same may be said of sucking a rubber nipple, or "pacifier," and all other devices for putting children to sleep.

What are the principal causes of disturbed sleep?

As quiet peaceful sleep is a sign of perfect health, disorders of sleep may be produced by almost anything which is wrong with the child.

1. Habitual disturbance of sleep in infants is most frequently associated with the food or feeding. It may be from the discomfort of chronic indigestion due to improper food. In bottle-fed infants it is often the result of overfeeding; in those who are nursed it is often due to hunger. A common cause is frequent night feeding; an infant who is fed three or four times during the night is almost invariably a bad sleeper.

2. Disturbed sleep or sleeplessness may be due to causes purely nervous. Such are bad habits acquired by faulty training; as when the nursery is lighted and the child taken from its crib whenever it wakes or cries; or when some of the contrivances for inducing sleep have been used. Any excitement or romping play just before bedtime, and fears aroused by pictures or stories, are frequent causes. Children who inherit from their parents a nervous constitution are especially likely to suffer thus.

3. There may be physical discomfort from cold feet, insufficient or too much clothing, or want of fresh air in the sleeping room.

4. Interference with breathing due to obstruction from large tonsils or adenoids. These cause great restlessness and lead a child to assume many different postures during sleep, often lying upon the face or upon the hands and knees.

5. Chronic pains or frequently recurring night pains may be causes of disordered sleep, when a child wakes with a sudden sharp cry. In infants this is most often due to scurvy, sometimes to syphilis. In older children it may be the earliest symptom of disease of the hip or spine.

6. Sleeplessness and disturbed sleep are frequent whenever the general condition falls much below a healthy standard; e.g., in infants who are not thriving and in children suffering from marked anæmia.

21

Behavioral Insomnia of Childhood, Sleep Onset Association Type

Standard and Graduated Extinction

- Extinction: placing the child in bed and then ignoring inappropriate child behavior (e.g., unreasonable requests, crying) until morning
  - Continuous schedule
  - Extinction burst
  - Spontaneous recovery
  - Maternal guilt and distress

- Graduated Extinction: extinction combined with occasional parental checks that are usually faded over time
  - Camping out
  - Scheduled checks

22

Extinction

The Elimination of Tantrum Behavior by Extinction Procedures
21 mo old child

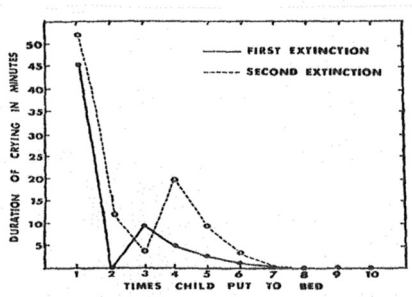
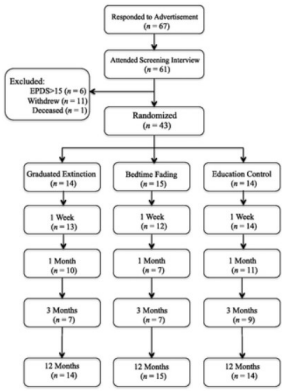


FIG. 1. LENGTH OF CRYING IN TWO EXTINCTION SERIES AS A FUNCTION OF SUCCESSIVE OCCASIONS OF BEING PUT TO BED

After bedtime pleasantries, the parent left the bedroom and closed the door. The child screamed and raged, but the parent did not re-enter the room. The duration of screaming and crying was obtained from the time the door was closed.

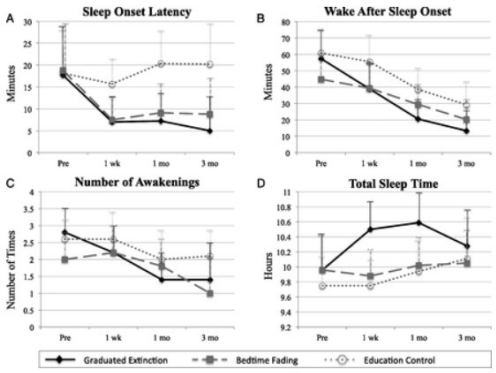
(Williams, CD, 1959)

23



Gradisar, Jackson, Spurrier, et al. (2016). *Pediatrics*, 137 (6)

24



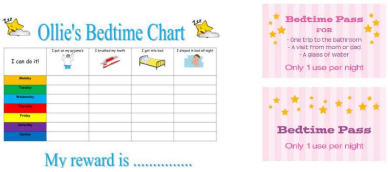
Gradisar, Jackson, Spurrier, et al. (2016). *Pediatrics*, 137 (6)

25

Behavioral Insomnia of Childhood, Limit Setting Type

Parent Training

https://www.cdc.gov



26

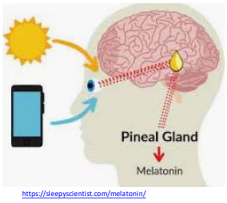
Inadequate Sleep Hygiene

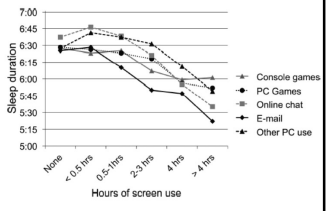
Sleep Hygiene

http://thoracicandsleep.com.au

27

Leave electronics out of the bedroom



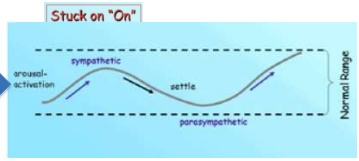


(Hysing, Pallesen, Stormark et al., 2015)

28

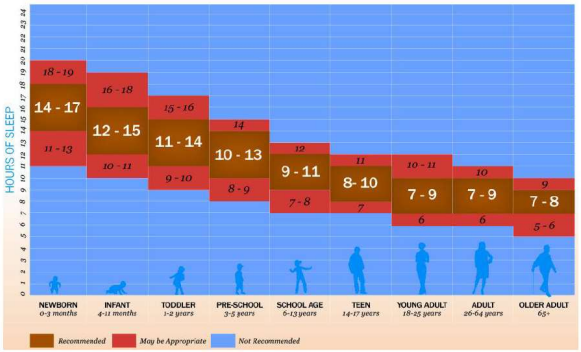
Relaxing pre-sleep ritual

Emphasize lowering the somatic arousal system before attempting sleep



29

Encourage adequate sleep



(Leila Kheirandish-Gozal, MD, MSc et al., 2015)

30

Medication

- FDA has not approved medication for treatment of insomnia in children
  - Many providers are prescribing sleep aids to children based on clinical experience, data on adults, or small case series on pediatrics
- Melatonin:
  - Phase shifting and mild hypnotic effects
  - Small dose (eg 0.5mg) several hours before bedtime to advance sleep phase
  - Higher doses (eg 3-5mg) closer to bedtime for non-DSPD insomnia
  - Research supports adjunct use for children with autism, developmental delay and ADHD

(Owens & Mindell, 2011)

31

Sleep. 2020 Apr 15;43(4):zsz268. doi: 10.1093/sleep/zsz268.

Behavioral interventions for pediatric insomnia: one treatment may not fit all

Michal Kahn [1], Michal Juda-Hanael [1], Efrat Livne-Karp [1], Liat Tikotzky [2], Thomas F Anders [3], Avi Sadeh [1]

Affiliations + expand

PMID: 31676910 DOI: 10.1093/sleep/zsz268

Final Points

- There is no evidence to suggest any one approach is more effective than another (Honaker & Meltzer 2014)
  - Tailor approach to fit case conceptualization
- Remember to rule out sleep problems before considering an ADHD diagnosis
  - Consider the BEARS
- 164 board-certified formally-trained Insomnia Specialists yet 25-50% of children struggle with sleep
  - Access to care
  - Assess for sleep problems
  - Increased training opportunities

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32

Cause

Intrinsic Factors	Extrinsic Factors
Temperament	Caregiver mental illness/stress
Medical issues	Inconsistent parenting styles
Circadian preference	Poor limit setting
Developmental delay	Sleep onset associations
Psychiatric	Living accommodations

(Owens & Mindell, 2011)

33

Standard vs. Graduated Extinction
Mean (SD)

	Bedtime Stdl Grp (n=12)	Bedtime Grdl Grp (n=13)	Nighttime Stdl Grp (n=14)	Nighttime Grdl Grp (n=11)
Compliance				
Week 1	2.65 (.43)	2.71 (.48)	2.65 (.46)	2.83 (1.59)
Week 2	2.79 (.30)	2.88 (.25)	**2.62 (.44)**	**2.37 (1.05)**
Week 3	2.76 (.36)	2.85 (.40)	2.62 (.56)	2.57 (1.59)
Stress				
Week 1	2.83 (1.23)	2.58 (.94)	2.58 (.94)	1.91 (.81)
Week 2	2.01 (.78)	1.71 (1.15)	**1.71 (1.15)**	**1.21 (.24)**
Week 3	**2.09 (1.51)**	**1.71 (.83)**	**1.71 (.83)**	**1.25 (.45)**

Key:
Compliance: 1 = significant noncompliance, 3 = complete compliance
Stress: 1 = not stressful at all, 7 = extremely stressful
Stdl = Standard ignoring treatment; Grdl = Graduated ignoring treatment

- Conclusions: Both significant improvements and better than control; Increased compliance and less stress with graduated ignoring for nighttimes

(Reid & O'Leary, 1999)

34

Psychophysiological Insomnia in Children

Pediatric modifications to CBT-I strategies

CBT-I Strategy	Pediatric Modification
Sleep restriction (see ►**Table 1**)	Faded bedtime • Instead of prescribing a time in bed coinciding with the total sleep time from the baseline week, the bedtime is simply pushed back later for children • This approach often utilizes less restriction to the prescribed sleep window • Each week, the bedtime is advanced with improved sleep efficiency
Stimulus control (see ►**Table 1**)	Response cost • Instead of having the child decide when to get out of bed and read, the parent is involved in the process • The parent checks on the child after 15–20 min and if the child is awake they have the child get out of bed and read for 5–10 min
Relaxation strategies (see ►**Table 1**)	• Parents are involved by reading scripts and working with children to ensure effective use of strategies • "Child-friendly" terminology is utilized in the script (e.g., instead of "tensing your hands and arms," "imagine you are squeezing a lemon")
Worry-time (see ►**Table 1**)	• Parents are involved by sitting down with children and asking the questions from the handout • Sometimes children can draw their worries instead of writing them out
Cognitive restructuring (see ►**Table 1**)	• Parents are involved by working with children to identify thoughts and emotions • "Child friendly" terminology is utilized for cognitive errors and chart columns • Pictures and coloring sheets can be integrated (e.g., child colors in how much of the "emotional thermometer" they initially feel when the thought error is present and then color in a how much of the new "emotional thermometer" they feel following identification of a replacement thought)

Medalie & Gozal (2018). J Child Sci;8:e172–e180.

35