

Insomnia in Children and Adolescents

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Definition and Classification

Insomnia in children and adolescents, as in adults, is a symptom and not a diagnosis. The causes of childhood insomnia are varied, ranging from primarily medical (i.e., medication-related; associated with primary sleep disorders, such as obstructive sleep apnea) to the behavioral (i.e., related to poor sleep hygiene or inappropriate sleep-onset associations) and often represent a combination of these factors. While insomnia in adults is generally defined as difficulty initiating and/or maintaining sleep and/or early morning awakening and/or nonrestorative sleep in association with daytime consequences,¹ defining insomnia in children is much more challenging for a number of reasons. First, sleep problems in children must be viewed in the context of the normal, but nevertheless profound, physical, cognitive, neurobehavioral, and emotional developmental changes that occur throughout childhood. The range of childhood sleep behaviors that may be considered “normal” or “pathologic” is also wide, and these categorizations are often highly subjective. Unlike strict research definitions of sleep problems, the validity of parental concerns and opinions regarding their child’s sleep patterns and behaviors must be considered in defining sleep disturbances in the clinical context. Parental recognition and reporting of sleep problems in children also vary across cultures² and age groups, with parents of younger children more likely to be aware of sleep concerns than those of school-aged children and adolescents.³ Finally, any assessment of the impact of sleep problems in children must include an appreciation of the resulting stress on the family as well as an understanding of how daytime sequelae (i.e., mood, behavior, academic performance, etc.) in children frequently differs from those in adults.⁴

Keeping these caveats in mind, a recent American Academy of Sleep Medicine Task Force developed a consensus working definition of pediatric insomnia as follows:⁵ Pediatric insomnia may be defined as difficulty initiating or maintaining sleep that is viewed as a problem by the child or caregiver, and the significance of the sleep problem may be characterized by its severity, chronicity, and frequency and associated impairment in daytime function in the child or family. It should be noted that, in most instances, the standard adult definition of insomnia may be applied to adolescents and that pediatric insomnia refers largely to children under the age of 12 years. In terms of specific diagnostic categories, the current International Classification of Sleep Disorders

nosology⁶ includes a number of insomnias that are common to both adults and children and several, outlined below, which are largely unique to the pediatric population:

Sleep onset association disorder is one of the most common sleep disorders in infants. In this disorder, a child learns to fall asleep only under certain conditions or associations, such as being rocked or fed and, thus, does not develop the ability to self-soothe. During the night, when a child experiences the type of brief arousal that normally occurs at the end of a sleep cycle (depending upon age, from 4–6 to 7–10 times a night) or awakens for other reasons, he or she is not able to get back to sleep without those same conditions being present. The infant then “signals” the parent by crying (or coming into the parents’ bedroom if developmentally capable) until the necessary associations are provided. Thus, the problem is generally one of prolonged night waking, rather than sleep onset delay, resulting in insufficient sleep.^{7,8}

Limit setting sleep disorder is, in contrast, a disorder most common in children preschool-aged and older and is characterized by bedtime resistance and difficulty falling asleep, rather than night wakings.⁹ Most commonly, this disorder is a result of a parent’s inability or unwillingness to set consistent bedtime rules and enforce a regular bedtime, often exacerbated by the child’s oppositional behavior. In some cases, however, the child’s resistance at bedtime is due to an underlying problem in falling asleep caused by other factors (e.g., medical conditions or a primary sleep disorder) or a mismatch between the child’s intrinsic circadian rhythm (delayed sleep-wake phase) and parental expectations.

Food Allergy Insomnia typically involves difficulty initiating and maintaining sleep related to gastrointestinal, dermatologic, etc. symptoms of atopy, usually in young infants.

Nocturnal Eating (Drinking) Syndrome is a disorder occurring largely in infants that involves both “conditioned hunger” and sleep disruption related to consumption of large volumes of food/liquid during the night.

Screening and Diagnosis

A number of studies have suggested that screening for sleep problems in pediatric practice is inadequate and may result in significant under-diagnosis of sleep disorders.^{10,11} Several brief parent and self-report sleep survey tools have been developed to facilitate the screening process and yield important information about the nature and severity of any coexisting sleep complaints and possible daytime sequelae.^{12–15} The clinical evaluation of a child presenting with a sleep problem involves a careful medical history to assess for potential medical causes of sleep dis-

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turbances; a developmental history and assessment of the child's current level of functioning (at school, home, etc.) in order to evaluate possible mood, behavioral, and neurocognitive sequelae of sleep problems; and a review of past and current sleep patterns (including usual sleep duration and sleep-wake schedule, often best assessed with a sleep diary) and sleep habits, such as bedtime routines, daily caffeine intake, and the sleeping environment, which may reveal environmental factors that contribute to the sleep problems.¹⁶ Use of additional diagnostic tools, such as polysomnographic evaluation, is seldom warranted for routine evaluation of pediatric insomnia but may be appropriate if organic sleep disorders are suspected.¹⁷

Etiology

Although sleep disturbances are transient in many children, there is considerable evidence that sleep problems may persist or recur in a substantial percentage.^{18,19} A number of intrinsic and extrinsic variables may affect the type, relative prevalence, chronicity, and severity of sleep problems; these include child variables, such as temperament and behavioral style, individual variations in circadian preference, cognitive or language delays, and the presence of comorbid medical and psychiatric conditions; parental variables, such as parenting and discipline styles,²⁰ parents' education level and knowledge of child development, and mental health issues, such as maternal depression and family stress;²¹ and environmental variables, such as the physical environment (e.g., space, noise, perceived environmental threats to safety, room and bed sharing), family composition (e.g., number, ages, and health status of siblings and extended family members), and lifestyle issues (e.g., parental work status, competing priorities for time) as well as the cultural and family context within which sleep behaviors in children occur.

Prevalence, Natural History, Incidence, and Risk Factors

It should be noted that, for the reasons cited above regarding the challenges in defining pediatric insomnia, prevalence and incidence rates are at best approximations; indeed, there are relatively little large-scale epidemiological data currently available to systematically define normal sleep and wakefulness patterns and sleep duration in infants, children, and adolescents.²² It is estimated that approximately 25 percent of all children are reported to experience some type of sleep problem at some point during childhood.²³ Specific studies have reported an overall prevalence of a variety of parent-reported sleep problems²⁴ ranging from 25 to 50 percent in preschool-aged samples⁹ to 37 percent in a community sample of 4- to 10-year-olds³ to an upward of 40 percent in adolescents.²⁵ Furthermore, sleep concerns are one of the most frequent parental complaints in pediatric practices, following illness, feeding, behavior problems, and physical abnormalities.

Sleep disturbances in pediatric special needs populations and in children with comorbid psychiatric and medical conditions are extremely common. Significant sleep problems occur in 30–80 percent of children with severe mental retardation and in at least half of children with less severe cognitive impairment as well as in 50–70 percent of children with autism spectrum disorders.^{26,27} Significant problems with initiation and maintenance of sleep, shortened sleep duration, irregular sleeping patterns, and early morning waking have been reported in a variety of different neurodevelopmental disorders, including Asperger's syndrome, An-

gelman's syndrome, Rett's syndrome, Smith-Magenis syndrome, and Tourette syndrome (increased nocturnal movements). Virtually all psychiatric disorders in children, especially mood and anxiety disorders, may be associated with sleep disruption.^{28–30} Children with attention-deficit/hyperactivity disorders are often reported by parents to have sleep-onset difficulties and restless sleep and present one of the more common chronic conditions for which sedatives are recommended by pediatric practitioners.^{31–33} Sleep complaints are also common in children who have experienced severely traumatic events,³⁴ including physical and sexual abuse. A few recent studies have also begun to examine the role of sleep disturbances in a number of chronic medical conditions of childhood, such as asthma and atopy, burns, juvenile rheumatoid arthritis, and headaches, which may be particularly prone to sleep disruption.^{35–38} Factors, such as the impact of hospitalization, family dynamics, underlying disease processes, and concurrent medications, are also clearly important to consider in assessing the bi-directional relationship of insomnia and chronic illness in children. Finally, vulnerable populations, such as children living with poverty, parental substance abuse and mental illness, or violence in the home, may be at higher risk for developing sleep problems as a result of such conditions as chaotic home environments and neglect; they may also be less likely to have sleep problems diagnosed because of limited access to health care services and may suffer more serious consequences from those sleep problems than their less vulnerable peers.

Impact

In addition to their high prevalence and chronicity, recent evidence also suggests that sleep disorders may have significant short- and long-term consequences on children's academic and social functioning and health. A wealth of empirical evidence from several lines of research clearly indicates that children and adolescents experience significant daytime sleepiness as a result of inadequate or disturbed sleep and that significant neurobehavioral and performance impairments and mood dysfunction are associated with that daytime sleepiness.^{39,40} Higher-level cognitive functions, such as cognitive flexibility and the ability to reason and think abstractly, appear to be particularly sensitive to the effects of disturbed or insufficient sleep.^{4,41} Finally, health outcomes of inadequate sleep include an increase in accidental injuries (ranging from minor injuries to drowsy, driving-related motor vehicle fatalities)^{42,43} and potential deleterious effects on the cardiovascular, immune, and various metabolic systems, including glucose metabolism and endocrine function.⁴⁴

Treatment

Any discussion of interventions in the treatment of pediatric insomnia must be prefaced by a statement regarding the importance of good sleep hygiene as a necessary component of every treatment package. Sleep hygiene refers to the basic environmental (e.g., temperature, noise level, ambient light), scheduling (e.g., regular sleep-wake schedule), sleep practice (e.g., bedtime routine), and physiologic (e.g., exercise, timing of meals, caffeine use) factors that promote optimal sleep. Furthermore, it should be emphasized that behavioral (i.e., nonpharmacologic) treatment approaches to insomnia in children have a well-documented empirical basis and are the mainstay of treatment, and that pharmacologic approaches should be largely considered adjuncts in

Table 1—Summary of Empirically-Based Nonpharmacologic Treatments for Pediatric Insomnia

Intervention	Target Problems	Description	Selected References
Extinction	Bedtime disturbances/ night wakings	Putting the child in bed and systematically ignoring inappropriate child behaviors (e.g., crying) until morning	(1) Rickert VI, Johnson CM. Reducing nocturnal awakenings and crying episodes in infants and young children. <i>Pediatrics</i> . 1988;81:203–212. (2) Seymour FW, Bayfield G, Brock P, During M. Management of night waking in young children. <i>Aust J Fam Ther</i> . 1983;4:217–223.
Graduated extinction	Bedtime disturbances/ night wakings	Combining extinction with scheduled parental checks	(1) Reid MJ, Walter AL, O’Leary SG. Treatment of young children’s bedtime refusal and nighttime wakings: a comparison of “standard” and graduated ignoring procedures. <i>J Abnorm Child Psychol</i> . 1999;27:5–16. (2) Hiscock H, Wade M. Randomized controlled trial of behavioural infant sleep intervention to improve infant sleep and maternal mood. <i>BMJ</i> . 2002;324:1062.
Early intervention/parent education	Bedtime disturbances/ night wakings	Education of parents in the establishment of appropriate sleep habits (e.g., sleep routines, put to bed awake) to prevent the development of sleep problems	(1) Wolfson A, Lacks P, Futterman A. Effects of parent training on infant sleeping patterns, parents’ stress, and perceived parental competence. <i>J Consult Clin Psychol</i> . 1992;60:41–48. (2) Adair R, Zuckerman B, Bauchner H, Philipp B, Levenson S. Reducing night waking in infancy: a primary care intervention. <i>Pediatrics</i> . 1992;89:585–588. (3) Kerr SM, Jowett SA, Smith LN. Preventing sleep problems in infants: a randomized controlled trial. <i>J Adv Nurs</i> . 1996;24:938–942.
Scheduled awakenings	Bedtime disturbances/ night wakings/ parasomnias	Parent waking child 15–30 minutes before usual spontaneous awakening or parasomnia	(1) Rickert VI, Johnson CM. Reducing nocturnal awakenings and crying episodes in infants and young children: a comparison between scheduled awakenings and systematic ignoring. <i>Pediatrics</i> . 1988;81:203–212. (2) Durand VM, Mindell JA. Behavioral intervention for childhood sleep terrors. <i>Behav Ther</i> . 1999;30:705–715. (3) Frank NC, Spirito A, Stark L, Owens-Stively J. The use of scheduled awakenings to eliminate sleepwalking. <i>J Pediatr Psychol</i> . 1997;22:345–353.
Extinction with parental presence	Bedtime disturbances/ night wakings	Parent feign sleep while staying in child’s room and ignoring inappropriate child behaviors (e.g., extinction)	(1) Sadeh A. Assessment and intervention for infant night waking: parental reports and activity-based home monitoring. <i>J Cons Clin Psych</i> . 1994;62:63–68.
Positive bedtime routines	Bedtime disturbances	Parent developing a set bedtime routine that the child enjoys and associating these routines with positive behaviors (e.g., falling asleep quickly)	(1) Adams LA, Rickert VI. Reducing bedtime tantrums: comparison between positive routines and graduated extinction. <i>Pediatrics</i> . 1992;89:585–588.
Phase advance or delay chronotherapy	Delayed sleep phase syndrome	Systematically advancing or delaying child’s sleep phase to desired sleep-wake schedule	(1) Okawa M, Uchiyama M, Ozaki S, Shibui K, Ichikawa H. Circadian rhythm sleep disorders in adolescents: clinical trials of combined treatments based on chronobiology. <i>Psychiatry Clin Neurosci</i> . 1998;52:483–490.

Note: For an extended review see: (1) Mindell JA. Empirically supported treatments in pediatric psychology: bedtime refusal and night wakings in young children. J Pediatr Psychol. 1999;24:465–481. (2) Kuhn BR, Elliott AJ. Treatment efficacy in behavioral pediatric sleep medicine. J Psychosomatic Res. 2003;54:587–597.

the treatment of pediatric insomnia.^{45,46} A brief description of the most common behavioral treatments for pediatric insomnia are included in Table 1.

There is a wide variety of medications that have been prescribed or recommended by pediatric practitioners for sleep disturbances in children, including antihistamines, chloral hydrate, barbiturates, phenothiazines, tricyclic antidepressants, benzodiazepines, alpha agonists, and melatonin.⁴⁷ The selection of medications in clinical practice which are prescribed for childhood sleep disturbances appears to be based largely on clinical experience, empiri-

cal data derived from adults, or small case series of medication use, as there are currently no medications approved for use as hypnotics in children by the U.S. Food and Drug Administration. Although the data are inadequate for an evidence-based approach to the use of pharmacologic agents for the treatment of pediatric insomnia, some basic clinical guidelines have recently been developed,⁵ including, in almost all cases, medication is not the first treatment choice nor the sole treatment strategy; medication use, except for very self-limited circumstances, such as travel, should be viewed only within the context of a more comprehensive treat-

ment plan; and medication should always be used in combination with nonpharmacologic strategies (e.g., behavioral interventions, parent education).

In summary, the development of a common nosology, more detailed classification systems, and methodological tools designed to be both developmentally appropriate and culturally sensitive represent future goals in the field of pediatric insomnia. Research is needed to further delineate the extent and impact of pediatric insomnia in both the general population and special populations in order to understand the natural history of and risk factors for childhood insomnia and develop more effective and acceptable behavioral and pharmacologic treatment strategies.

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