

Behavioural Sleep Disorders in Children and Adolescents

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Abstract

Studies indicate that sleep problems in children and adolescents are highly prevalent, with prevalence rates ranging from 25% to 40%. They are even more common in special populations, especially children with psychiatric issues. Furthermore, sleep issues are often persistent. Unfortunately, sleep disturbances often do not receive the attention that they deserve, especially since they are often highly amenable to intervention. Sleep problems, in general, range from those that are physiologically-based, such as obstructive sleep apnoea and restless legs syndrome, to those that are behaviourally-based. The behaviourally-based sleep disorders are reviewed, including a discussion of assessment, prevalence and treatment. Non-pharmacologic approaches are usually the preferred treatment and have received the most empirical support in paediatric populations. It is strongly recommended that all paediatric healthcare providers consider sleep issues in their comprehensive assessment of all children and adolescents, especially those with psychiatric issues, and provide preventive education as part of their usual standard of care.

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Overall, children spend one-third to one-half of their life sleeping. Although sleep comprises such a significant portion of a child's day, sleep disturbances are often overlooked by healthcare practitioners. Studies, however, indicate that sleep problems in children and adolescents are highly prevalent, with prevalence rates ranging from 25% to 40%, and they are often persistent.^{1,2} They are even more common in special populations, especially children with psychiatric issues. Sleep problems, in general, range from those that are physiologically-based, such as obstructive sleep apnoea and restless legs syndrome, to those that are behaviourally-based. These behaviourally-based sleep disorders will be reviewed here, including a discussion of assessment, prevalence and treatment considerations.

Assessment of Sleep Disorders

An assessment of sleep and sleep problems in children and adolescents should be included in any medical or psychiatric evaluation. Information will typically be provided by a parent or caregiver, however older children and adolescents can provide important additional information. A thorough assessment involves several steps.

Sleep history. The first step is a comprehensive sleep history. The first place to start is with a review of the *sleep*

schedule. Bedtime, wake time and naptimes should be considered, including differences across weekdays and weekends/holidays. All aspects of the sleep-wake cycle also need to be reviewed, including *bedtime*, *night-time* and *daytime*. Areas that need to be addressed as part of *bedtime* include evening activities, such as television viewing, computer use and studying, followed by bedtime routines. Bedtime difficulties, including bedtime stalling, bedtime refusal, bedtime fears, and inability to fall asleep independently need to be assessed. *Night-time* areas in need of evaluation include latency to sleep onset, behaviours during the night, and the number and duration of night-time awakenings. Details should also be collected about abnormal events during sleep, such as night terrors, confusional arousals, respiratory disturbances, seizures and enuresis. Furthermore, the bedroom environment should be considered as a potential contributor to sleep difficulties, including room temperature, noise and comfort level. *Daytime* behaviours include wake time and daytime sleepiness. It is important to understand that daytime sleepiness is often manifested differently across the developmental span. For example, younger children and school-aged children often present with overactivity and difficulties with behavioural and emotional regulation, rather than the more typical lethargy seen in adolescents

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and adults. Other daytime variables include naps, meals, medications and caffeine intake.

Overall daytime functioning should also be assessed, including school performance, psychological functioning, social functioning and family functioning. Life events, from the birth of a sibling to a recent move or family death, can lead to sleep problems. Family tension, due to such issues as financial or marital difficulties can also contribute to sleep difficulties. Note that often children, and especially adolescents, are much more aware of family tensions than parents recognise.

Sleep patterns. The second step in the evaluation of sleep problems is the keeping of sleep diaries. A typical sleep diary includes information on bedtime, latency to sleep onset, number and duration of night-time awakenings, wake time, total sleep time, and duration and timing of naps. Two weeks of baseline sleep diaries yield the most useful information. In this way, clinicians can clearly delineate sleep patterns.

Actigraphy can be useful as a more objective measure of sleep patterns. An actigraph is a watch-like device worn on the wrist or ankle and measures activity. Studies show that it can reliably distinguish between sleep and wake in children and adolescents.^{3,4} Actigraphy, thus, can provide a measure of sleep patterns over an extended period, such as 1 to 2 weeks. Actigraphy is being more commonly utilised in both clinical and research settings.

Daytime sleepiness. Additional information can also be gathered regarding daytime sleepiness, with self-report or parent-report questionnaires. Although the most well-known subjective measure of daytime sleepiness is the Epworth Sleepiness Scale⁵, the situations described are often not applicable to children and adolescents. An adaptation has been used in research studies, however, this revised scale has not been validated in children and adolescents.⁵ Recently, more appropriate alternatives have become available.^{6,7} The Cleveland Adolescent Sleepiness Questionnaire is a 16-item scale that has been validated as a measure of sleepiness in children and adolescents aged 11 to 17.⁸ Items such as “I feel wide awake the whole day” and “I fall asleep when I ride in a bus, car, or train” are measured on a 5-point Likert scale. Another measure is the Pediatric Daytime Sleepiness Scale (PDSS).⁹ This 8-item measure has been validated with children aged 11 to 15, and has been used in children and adolescents (aged 9 to 17). Each item on this scale assesses the frequency of behaviours that are indicative of sleepiness (e.g. how often do you fall asleep or get drowsy during class?). This measure of daytime sleepiness has been found to relate to negative daytime functioning, including low school achievement.

A more objective measure of daytime sleepiness is also available, namely a multiple sleep latency test (MSLT).

This test is usually conducted in conjunction with polysomnography (PSG), which measures sleep architecture and assesses underlying physiologically-based sleep disruptors (e.g. obstructive sleep apnoea and periodic limb movement disorder).

Sleep Hygiene

Basic sleep hygiene is the cornerstone to sleep across the ages. It is also a common contributor to behaviourally-based sleep disorders. There are basically 2 areas that contribute to inadequate sleep hygiene. First are issues with sleep organisation, including an irregular sleep-wake schedule, napping too late in the day, and an inappropriate sleep schedule (e.g. a bedtime of 8 pm for an adolescent). The other area is practices that increase arousal, including lack of a bedtime routine, caffeine, and use of technology in the bedroom. Inadequate sleep hygiene is often the result of inadequate parental supervision of bedtime and sleep behaviours or insufficient education about sleep needs and appropriate sleep behaviours.

Sleep organisation. Children of all ages should have a consistent and age appropriate sleep-wake schedule. An age-appropriate bedtime is an essential component of this schedule. For example, a later bedtime is often appropriate for adolescents consistent with the shift in their internal clocks concomitant to puberty. For younger children, earlier bedtimes are more appropriate. If a young child's bedtime is too late, he/she will often become overtired, resulting in hyperactivity and emotion dysregulation.¹⁰ Naps also should be encouraged as appropriate for age and developmental stage. Regular naps are important for infants and toddlers, while children and adolescents who are unable to obtain sufficient sleep at night may benefit from a 30 to 45 minute nap in the early afternoon. Skipping or withholding naps in a younger child will not facilitate sleep at bedtime, but can instead result in the child becoming overtired and thus having more difficulty falling asleep and staying asleep. The sleep-wake schedule should also include no more than 1 to 2 hour differences between weekday and weekend bedtimes and wake times.

Arousal. Children should have a consistent bedtime routine that is short (20-30 min) and involves the same 3 to 4 activities every night.¹¹ Parents must also be consistent every night in terms of their management of their child's bedtime behaviour. Bedrooms should be sleep-conducive, including being comfortable, cool, dark and quiet. In addition, all technology should be removed from the bedroom, including televisions, computers and cell phones. Caffeine should be avoided, especially in the late afternoon and evening. A review of all potential caffeinated-products should be discussed, as parents and children are often unaware of the products that contain caffeine (e.g. energy drinks).

Behavioural Sleep Disorders

Behaviourally-based sleep disorders typically present with at least 1 of the following complaints: (1) bedtime problems, including bedtime stalling or resistance; (2) difficulties in falling asleep; (3) night wakings or (4) excessive daytime sleepiness. The causes, diagnoses and treatments for behavioural sleep disorders, however, vary depending upon the exact sleep problem. The prevalence, causes and recommended treatment approaches for the most common behavioural sleep disorders in children and adolescents are reviewed below.

Behavioural Insomnia of Childhood

Behavioural insomnia of childhood (BIC) typically presents with complaints of bedtime problems and/or night wakings.¹² The majority of studies on these issues have been conducted in the United States and other predominantly Caucasian countries. In these studies, the prevalence of these sleep problems range between 20% to 30%.¹³⁻¹⁵ A few studies have been done in several predominantly Asian countries, indicating an even higher prevalence of these sleep disturbances. For example, a recent study of 506 children (aged 0 to 6 years) in Taiwan found that 38% experienced frequent night wakings and 70% of children took 30 minutes or longer to fall asleep.¹⁶ Additionally, 64% of caregivers perceived that their child had a sleep problem. In another study of 1129 children (aged 1 to 23 months) in China,¹⁷ 66% were identified as having a sleep problem, which was defined as requiring parental presence at time of sleep onset, having a sleep latency of greater than 30 minutes, or experiencing frequent night wakings.

The ICSD-2¹² defines 3 subtypes of BIC based on the etiology of the bedtime problem or night waking: sleep onset association type, limit setting type and combined type. The BIC sleep onset association type typically presents as frequent night wakings. It is most often seen in infants and toddlers (aged 6 months to 3 years) and is usually the result of inappropriate sleep associations (e.g. rocking, nursing, watching TV, sleeping in the parents' bedroom), which are required for the child to fall asleep at bedtime and return to sleep following normal night-time arousals. Children with BIC limit-setting type often present as refusing to go to bed or delaying bedtime with repeated requests. The BIC limit setting type occurs most commonly in toddlers, preschoolers and school-aged children. The BIC limit setting type is often the result of inconsistent or nonexistent limit-setting by parents. Finally, the combined type is usually manifested with both bedtime problems and night wakings. In these children, negative sleep associations often follow a prolonged bedtime struggle. For example, the parent will finally lie down with the child to help him/her fall asleep after a 2-hour bedtime struggle.

Recently, the American Academy of Sleep Medicine published a standards of practice document on behavioural treatments of bedtime problems and night wakings in young children.^{11,18} Across the board, behavioural interventions were found to be efficacious, with 94% of studies finding that treatment is efficacious and improvement was seen in 80% of children. Empirical support was found for both standard extinction approaches ("cry it out") and graduated extinction (checking method). Graduated extinction is the approach most commonly recommended, especially given high parental attrition rates for extinction.^{19,20}

The standard clinical approach to the treatment of bedtime problems and night wakings includes appropriate sleep hygiene, as discussed above, including a set sleep schedule and institution of a consistent bedtime routine, and helping children learn to fall asleep independently.¹⁸ A checking method is instituted, in which parents check on their child as frequently or infrequently as they wish until their child falls asleep. The frequency of checking is based upon parental tolerance and child temperament, with some parents utilising a fixed schedule (e.g. every 5 minutes) while others check at progressively increasing intervals (e.g. 5 minutes and then 10 minutes). The goal of this approach is to enable a child to develop self-soothing skills so that the child can fall asleep independently without negative sleep associations (e.g. feeding, rocking). This approach typically takes 3 to 7 nights, although sometimes longer. The key to successful treatment is consistency in how parents respond to their child. Studies indicate that once a child learns to fall asleep independently at bedtime, it frequently generalises to night wakings. Thus, it is often recommended that parents start sleep training at bedtime only.

In addition to support for behavioural treatments following the development of a problem, it is worth noting that preventive education aimed at parents and written materials or classes, have also been found to be highly successful.¹⁸ Education conducted during the prenatal and newborn period has been found to decrease the development of sleep issues throughout infancy. Thus, healthcare providers should discuss appropriate sleep practices with parents from early on. Such advice (see Table 1 for advice across the entire age span) can prevent the majority of bedtime problems and night wakings.

Insomnia

The term insomnia is broadly defined as difficulty initiating and/or maintaining sleep. Insomnia can be short-term and transient, usually related to a stressful event, or it can become long-term and chronic. For insomnia to be considered a disorder, it cannot be secondary to another sleep disturbance or a psychiatric or medical problem. The

specific name and diagnostic criteria for insomnia differ according to the diagnostic manual used. The Diagnostic and Statistical Manual of Mental Disorders IV-TR²¹ refers to “Primary Insomnia,” whereas the most common type of insomnia in the ICSD-2¹² is “Psychophysiological Insomnia.” Insomnia, however, is difficult to define in children and adolescents using either of these systems due to developmental issues and differences in presentation. One of the main areas that children fail to meet the diagnostic criteria for “insomnia” per se is that children often do not complain about their sleep or perceive it as problematic. Rather, it is usually the parents or caregivers who bring the issue to the attention of healthcare professionals. In addition, it is often difficult to ascertain the impact of the insomnia on daytime functioning, especially for children and adolescents with special needs. In response to these concerns, a consensus definition was developed by experts in the field of paediatric insomnia.²² Basing the definition of insomnia on that utilised in ICSD-2, paediatric insomnia is defined as “repeated difficulty with sleep initiation, duration, consolidation, or quality that occurs despite *age-appropriate* time and opportunity for sleep and results in daytime functional impairment for the *child and/or family*.”

Very few studies have focused on insomnia in children and adolescents, with the majority only having been conducted in the past few years. A few studies have focused on the prevalence of insomnia in adolescents, with prevalence rates ranging from 4.4% (point prevalence) to 13.4% (past year) to 10.7% (lifetime insomnia). The most recent study of over 4000 adolescents (aged 11 to 17 years) found a prevalence of 14% for 1 or more symptoms according to DSM-IV criteria and 5% for those that met the authors’ proxy for meeting diagnostic criteria.²³⁻²⁷ Some studies have found that insomnia is more prevalent in girls than boys, but this finding is not consistent across studies. There are also few racial differences found.^{25,27}

Treatment for insomnia focuses on changing maladaptive sleep behaviours and negative sleep cognitions that contribute to the problem. There has been a great deal of empirical support for behavioural treatments for insomnia in adults, with no studies having evaluated its efficacy specifically in children or adolescents. Empirically-supported psychological and behavioural approaches include a number of cognitive-behavioural components, including stimulus control, sleep restriction, relaxation and cognitive reframing.²⁸ Stimulus control therapy is designed to associate the bed with only sleep and to establish a consistent sleep-wake schedule. Recommendations that are made include using the bed only for sleep, only going to bed when sleepy, getting out of bed when unable to sleep, getting up at the same time every morning, and avoiding

napping. Sleep restriction involves having the child’s sleep opportunity (time in bed) be equal to their average total sleep time. Therefore, if an adolescent usually obtains 7 hours of sleep at night, treatment is begun with restricting time in bed to 7 hours. The time for sleep onset is determined by a set wake time, with bedtime gradually advanced when sleep efficiency is 80% to 85%. Relaxation strategies have primarily focused on the use of progressive muscle relaxation; however, any form of relaxation (e.g. imagery, meditation) can be utilised. The goal of relaxation strategies is to reduce muscle tension and intrusive thoughts that interfere with sleep. Finally, cognitive reframing includes challenging and changing faulty beliefs about insomnia and misperceptions about sleep (e.g. “I can never sleep”). In addition, almost all treatment interventions also include basic sleep hygiene, as discussed above.

Delayed Sleep Phase Syndrome

Circadian rhythm disorder, delayed sleep phase type (also known as delayed sleep phase syndrome or DSPS) is most commonly seen in adolescents, although occasionally is also experienced by children. The defining feature of DSPS is a sleep-wake schedule that is significantly and persistently delayed by 2 or more hours beyond the desired bedtime, and conflicts with an individual’s activities of daily living (e.g. school, work, scheduled activities).¹² The most common clinical presentation of DSPS is a complaint of being awake until the early morning hours (e.g. 3:00 or 4:00 am), and then being extremely difficult to wake up in the morning. It should be noted that adolescents with DSPS often complain of insomnia. However, this is the result of attempting to sleep at a time that is inconsistent with their internal clock. For example, an adolescent with DSPS will have no difficulties falling asleep at his/her usual fall asleep time (e.g. 3:00 am), whereas an adolescent with insomnia will have difficulties falling asleep regardless of bedtime.

DSPS is a multi-component disorder, caused by genetic, biological and psychosocial factors.²⁹ For example, nocturnal melatonin secretion appears to be delayed in individuals with DSPS and there is often an intrinsic evening preference during childhood that is exacerbated after puberty when there is a normal physiological circadian shift by approximately 2 hours. In addition, there are also multiple psychosocial factors that can contribute to DSPS, including academic, family and social issues.

Treatment for DSPS involves first shifting sleep timing and then maintaining a strict and consistent sleep-wake schedule.³⁰ To shift the sleep-wake schedule, either phase advancement (bedtime is advanced by 15 minutes every few nights) or phase delay/chronotherapy (bedtime and waketime are delayed by 2 to 3 hours each day) can be conducted. The initial treatment phase is generally intense

and requires strict adherence to the treatment protocol. Maintenance, however, is also important, as there is a natural tendency to gradually shift over time to a later bedtime and wake time. Successful treatment requires a motivated patient and family, as well as a coordinated approach. Medication and/or bright light therapy can also be considered in conjunction with shifting the sleep-wake cycle. The most common medication considered is melatonin. However, there is unfortunately no clear consensus on its timing or dosing.

Referral to Specialist

Although many behavioural sleep problems are easily treated by primary care paediatricians, a referral to a sleep centre or sleep specialist is warranted in cases where the sleep problem persists and/or causes significant daytime impairment (e.g. sleepiness, poor school performance). In addition, referrals may be especially warranted for children with special needs (e.g. autism, developmental delay). Finally, there is a high comorbidity of behavioural and physiological sleep disorders, thus a referral is appropriate if there is a suspicion of an underlying sleep disruptor (e.g. sleep apnoea, narcolepsy).

Sleep and Psychiatric Disorders

As mentioned above, sleep difficulties are especially common in children and adolescents with psychiatric issues. For example, a study of children and adolescents receiving psychiatric services in Singapore found that 62% experienced at least 1 sleep problem.³¹ The 3 psychiatric disorders in which sleep problems are most common are children and adolescents with attention-deficit/hyperactivity disorder (ADHD), autism, and mood/anxiety disorders.³² Studies of children with ADHD find prevalence rates of sleep problems ranging from 25% to 50%.³³ In addition to prolonged sleep latency onset, decreased night-time sleep, and increased night-to-night variability in sleep,^{34,35} there have been studies indicating that there is a relatively higher prevalence of obstructive sleep apnoea in children with ADHD, as well as restless legs syndrome.^{7,36} Sleep problems are also highly prevalent in children with autism spectrum disorders (ASDs), with estimates ranging from 44% to 83%.³⁷⁻³⁹ The most common sleep problems include night wakings, early morning awakenings, and shorter total sleep times.^{40,41} Finally, children and adolescents with mood/anxiety disorders are particularly at risk for sleep disturbances. Several studies have found that 90% of children with major depressive disorder report sleep disturbances, primarily with insomnia.^{42,43}

The relationship between these psychiatric issues and sleep problems is often complex and usually bidirectional. That is, sleep problems can both exacerbate and be caused by psychiatric problems. For example, children with ADHD

are often reported by parents to have difficulties settling down and falling asleep at bedtime, and at the same time, sleep deprivation at night will result in increased difficulties with attention and focus during the day. Depression will lead to symptoms of insomnia and concomitant sleep deprivation will clearly affect the mood on the next day.

Studies have clearly documented significant improvements in sleep with non-pharmacological treatments, especially in children with special needs who frequently experience behaviourally-based sleep issues. Treatment for sleep disturbances in children and adolescents with psychiatric issues, however, requires a multi-modal integrated approach that addresses both the sleep difficulties and the psychiatric issues. Consideration needs to be given to any medications that are being used to treat the psychiatric problem, especially with stimulants and even some antidepressants, to limit their negative impact on sleep. Appropriate sleep hygiene is particularly important for these children and adolescents to ensure adequate sleep and to reduce the impact of sleeplessness on daytime functioning.

Summary

Behaviourally-based sleep disorders are highly prevalent in children and adolescents. Unfortunately they do not often receive the attention that they deserve, especially given that they are often highly amenable to intervention, and thus should not be ignored. Non-pharmacologic approaches are usually the preferred treatments and have received the most empirical support in paediatric populations. Therefore, it is highly recommended that all paediatric healthcare providers consider sleep issues in their comprehensive assessment of all children and adolescents, especially those with psychiatric issues, and provide preventive education as part of their usual standard of care.

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Appendix 1. Sleep Tips

Sleep Tips for Newborns

- Learn your baby's signs of being sleepy.
- Follow your baby's cues, as your newborn may prefer to be rocked or fed to sleep. By 3 months, however, begin to establish good sleep habits.
- Place your baby on his or her back to sleep.
- Encourage night-time sleep.
- Make sleep a family priority.

Sleep Tips for Infants

- Establish a regular sleep schedule for your baby.
- Create a consistent and enjoyable bedtime routine.
- Avoid feeding your baby to sleep. Move giving your baby a bottle or nursing to earlier in the evening.
- Put your baby to bed drowsy but awake, to encourage him/her to fall asleep independently. A baby who can self-soothe to sleep at bedtime will be able to fall back to sleep on her own when she naturally awakens during the night.

Sleep Tips for Toddlers and Preschoolers

- Maintain a daily sleep schedule with regular naptimes and bedtime.
- Establish a consistent bedtime routine.
- Make the bedroom environment the same every night and maintain it throughout the night.
- Have your child fall asleep independently.
- Set limits that are consistent and enforced.
- Encourage use of a security object, such as a blanket or stuffed animal.

Sleep Tips for Children

- Your child's bedtime and wake-up time should be about the same time every day. There should not be more than an hour difference in bedtime and wake-up time between school nights and non-school nights.
- Your child should have a 20- to 30-minute bedtime routine that is the same every night.
- Your child's bedroom should be comfortable, quiet and dark.
- Your child should avoid caffeine.
- Keep the television set out of your child's bedroom.
- Your child should spend time outside every day and get daily exercise.

Sleep Tips for Adolescents

- Wake up and go to bed at about the same time on school nights and non-school nights. Bedtime and wake time should not differ from one day to the next by more than an hour or so.
 - Do not let your adolescent sleep in on weekends to "catch up" on sleep. This makes it more likely that he or she will have problems falling asleep at bedtime.
 - A nap for 30 to 45 minutes in the early afternoon can help combat sleepiness. Don't nap too long or too late or your adolescent will have difficulty falling asleep at bedtime.
 - Sunlight. Spend time outside every day, especially in the morning, as exposure to bright light helps to keep an adolescent's internal clock on track.
 - Avoid eating or drinking products containing caffeine in the late afternoon and evening. These include caffeinated sodas, coffee, tea and chocolate.
-