

COMMON SLEEP CONDITIONS IN INFANTS, CHILDREN AND ADOLESCENTS

SLEEP IS IMPORTANT

Sleep is an important part of healthy growth and development in children, just like nutrition and physical activity.

Contrary to the common perception that sleep is only a passive state during which the bodily processes slow down and the body rests itself at the end of the day, many active physiological processes take place in the body during sleep.

Amongst these are memory consolidation and growth hormone secretion which are important physiological processes in children.

The paediatric sleep specialist is concerned with both the quality and quantity of sleep in children.

What can affect sleep?

Sleep-related disorders such as obstructive sleep apnoea can disrupt a child's sleep.

Medical conditions in children, such as uncontrolled asthma, allergic rhinitis and eczema, can affect the quality and duration of a child's sleep.

School and social pressures and the **increased usage of electronic devices** in this day and age can also impact the bedtime and the duration of sleep in children and adolescents.



Children need sleep for growth and memory consolidation.

Why get a good night's sleep?

Effects of Poor Sleep

Poor sleep can have various adverse effects on a child's health:

- Sleep deprivation can affect daytime alertness, judgement, memory, reaction time and motor performance.
- The lack of sleep is associated with behavioural problems and emotional disturbances which may reduce the ability of the child to perform optimally at school.
- Decreased slow wave sleep (one of the stages of sleep) is associated with decreased growth hormone secretion during sleep.
- Sleep deprivation is related to type 2 diabetes, obesity, hypertension, metabolic syndrome, reduced immunity and cardiovascular problems.

SLEEP REQUIREMENTS IN INFANTS AND CHILDREN

Sleep architecture (the pattern and proportion of the different sleep stages during sleep) and sleep requirements evolve with the development and maturation of the central nervous system, as a child progresses from infancy through childhood and adolescence to adulthood.

Newborns spend an average of 14 to 17 hours in a 24-hour period asleep. They may sleep for three to five hours at a stretch (two to three hours in breastfed babies), and then wake for one to three hours in between.

Infants between four to 11 months old sleep for an average of 12 to 15 hours in a 24-hour period. This includes sleep in the night, with usually two to four daytime naps.

In toddlers, their sleep needs averages between 11 to 14 hours in a 24-hour period (including daytime naps). The sleep duration decreases further in pre-schoolers, to between 10 to 13 hours. By five years of age, most children stop taking daytime naps.

School-going children should be highly active and alert during waking hours, and the majority require between nine to 11 hours of sleep at night.

At the onset of puberty, **adolescents** may develop a two-hour phase delay in their circadian rhythm ('body clock') leading to a natural tendency to fall asleep at later times. The majority of adolescents require an average of about eight to 10 hours of sleep.

There is no 'golden rule' to the exact amount of sleep needed at different ages, and there are often individual variations in sleep requirements, sleep patterns as well as tolerance to sleep deprivation. In general, the duration of sleep is sufficient if the child feels well-rested on waking spontaneously and is able to function normally throughout the day.

Some of the signs of insufficient sleep include:

- Excessive daytime sleepiness
- Mood disturbances
- Behavioural problems such as inattention, hyperactivity, oppositional behaviour and poor impulse control
- Impaired cognitive functioning, such as poor concentration, impaired vigilance, delayed reaction time and learning problems

GOOD SLEEP HYGIENE AND PRACTICES

The following advice can help children achieve better sleep:

- Maintain a consistent sleep and wake time daily, including school days and non-school days.

- Avoid using the bed for any other activity (e.g. reading, watching television, playing games on personal electronic devices, eating) other than sleeping.
- Avoid using the bedroom for time-out or punishment.
- Ensure that the bedroom is conducive for sleeping. Keep it dim, cool and quiet.
- Establish a regular relaxing routine before bedtime (e.g. brushing teeth, changing into pyjamas, reading of a story).
- Go to bed only when tired or sleepy, rather than spending too much time awake on the bed. If your child is unable to fall asleep after 20 minutes, consider letting him get out of bed to do some low stimulation activity (e.g. quiet reading) and then returning to bed later.



Do not use the bed for other activities other than sleeping.

- Avoid caffeine (e.g. coffee, tea, chocolate, cola and soda drinks) and nicotine (exposure to environmental tobacco smoke) at least four to six hours before bedtime.
- Avoid going to bed with a full stomach or when too hungry.
- Avoid stimulating activities before sleep (for e.g. watching of exciting/frightening television programmes, playing of games on personal electronic devices).
- Regular exercise is encouraged, but avoid exercise or strenuous activities at least four hours before bedtime.
- Every baby is different; your baby may have different sleep patterns from other babies and still be normal and healthy.
- Your baby will begin to sleep for longer periods of time at night as he/she grows and develops over time.
- All babies wake up spontaneously at least a few times during the night. They may require soothing and intervention from caregivers to fall back to sleep in the first couple of months. From the age of three to six months onwards, most will have the ability to self-soothe themselves back to sleep.

SLEEP ADVICE FOR PARENTS OF NEWBORNS AND INFANTS

The sleep and wake times of newborns and infants are often influenced by their need to be fed or changed.

It is important that parents understand how newborns and infants sleep so that they can set realistic expectations.

- Babies do not understand what is 'sleeping through the night', and many do not do so until they are more than three to six months old.



Babies, before three to six months old, do not sleep through the night.

Parents with newborns and infants may consider the following advice to help their babies develop the ability to self-soothe (*It is never too early to start!*):

- **Put your baby to the crib/bed drowsy but still awake** so that he/she can learn to fall asleep on his/her own. Babies/children who are accustomed to parental assistance at bedtime often require help again to fall back to sleep when they wake in the night.
 - **Avoid breastfeeding or bottle feeding your baby to sleep** so that he/she does not require this to fall asleep. Some parents find gentle rhythmic patting of their babies helpful in settling them to sleep, but it is best to stop the patting when the baby is quiet and about to fall asleep.
 - **Learn to identify signs of sleepiness in your baby.** Babies may express their need to sleep in different ways. Some babies fuss or cry, some rub their eyes or pull their ears, others lose focus in ongoing play or activity.
 - **Avoid picking your baby up immediately each time** he/she cries or fusses in the night. As long as safety is not a concern, allow your baby to try to fall back to sleep on his/her own first. If you need to check on your baby in the night, keep it brief and avoid turning
- on bright lights and engaging/stimulating activities. When feeding or changing your baby during the night, do so in a quiet and calm manner.
 - **Wrapping newborns snugly** with a thin baby blanket may help them feel more secure and reduce 'startles' during sleep. Always check that the wrapping is not too tight and that the baby's breathing is not obstructed.
 - **Engage in play and stimulating activities during your baby's wake period**, but keep the environment dimmer and quieter with less activity as the evening approaches to help your baby sleep better and longer during the night.
 - **Avoid night feedings after the age of six months.** Night feedings are not necessary for growth after the age of six months and may potentially disrupt sleep.



Wrap newborns snugly to help them sleep better.

BEHAVIOURAL INSOMNIA IN CHILDHOOD (BIC)

Insomnia, which is the inability to initiate and/or maintain sleep, may not only affect children but also their parents and the whole household.

There are many possible causes of insomnia in children, including behavioural insomnia of childhood (which is discussed below), delayed sleep phase disorder (common in adolescents due to a 'shift in their body clock' at puberty), medical conditions (causing pain, itching or coughing in the night), psychological conditions (e.g. anxiety, depression, stress) and medications.

This section will discuss behavioural insomnia of childhood, which can be further classified into sleep-onset association type, limit-setting type, or combined. If you suspect that your child has insomnia, consult a doctor who may refer your child to a paediatric sleep specialist.

1. Sleep-Onset Association Type BIC

A child with sleep-onset association type BIC relies on a specific stimulation (object or setting) for the initiation of sleep at bedtime or to fall back to sleep following an awakening in the night.

Associations that are highly demanding or disruptive to the caregivers are considered negative sleep-onset associations (e.g. prolonged rocking, night feedings inappropriate for age).

How common is it?

This is common and estimated to affect between 25 to 50 percent of infants at the age of six to 12 months of age, and 15 to 20 percent of toddlers.

What to look out for?

The child with sleep-onset associations often presents with frequent night awakenings as he/she is unable to self-soothe back to sleep after a spontaneous night awakening.

The child may continue to cry and stay awake for prolonged periods, until the caregiver intervenes to provide the association required for him/her to fall back to sleep.

Risk factors

Factors that may increase the likelihood of night awakenings include breastfeeding, co-sleeping, colic, acute illness, changes in the sleep environment, a difficult temperament, parental anxiety, and when the child has just achieved a certain motor or cognitive developmental milestone (for e.g. pulling to stand, separation anxiety).

Management

The management of sleep-onset association type BIC, includes establishing a good sleep routine, and the use of positive sleep associations: e.g. a comforting object (stuffed toy or used mother's shirt) that the child can bring to bed with him/her each night.

There is no 'best' method to help a child fall asleep independently, but the key is to be 'consistent and persistent' every night, especially if more than one caregiver is involved.

Often, once the child is able to fall asleep independently at bedtime, he/she is more likely to be able to self-soothe to sleep during spontaneous night awakenings.



Have a good sleep routine with positive sleep associations.

Some methods that have been used include:

1. Extinction – Putting the child to bed at a fixed time and ignoring his/her cries until a specific 'wake' time. This method is not recommended for infants below the age of six months, and may be emotionally draining. Parents should be prepared for a 'post-extinction burst' (a period of worsening before improvement) in some children.
2. Graduated extinction – This is a 'gentler' method, where you can respond to your child briefly each time he/she calls (after being put to bed), but only after progressively longer periods of time e.g. five minutes, then 10 minutes, and then 15 minutes until he/she falls asleep. This method is likely to take longer to work but is less emotionally taxing.

3. Fading of adult intervention
 - Establish a bedtime routine before sleep, and gradually increase the physical distance between you and your child while he/she is falling asleep (sit by the crib or bed, and move the chair slightly further away each night, until out of sight of the child). This method is also likely to take longer, but is less emotionally taxing.

2. Limit-Setting Type BIC

In limit-setting type BIC, the inadequate enforcement of bedtime limits by parents results in the child delaying bedtime or refusing to go to bed.

How common is it?

Bedtime resistance is estimated to be present in 10 to 30 percent of pre-schoolers. About 15 percent of children aged four to 10 years old may still have significant limit-setting sleep issues.

What to look out for?

Bedtime stalling behaviours are attempts by the child to delay bedtime (e.g. requests for another book, another hug, another drink of milk).

Some children may also exhibit bedtime refusal behaviour, such as refusal to get ready for bed, or refusal to stay in bed. Some

children may indicate night-time fears in order to stall bedtime.

In some situations, parents do not set appropriate limits or are inconsistent in their limit-setting (e.g. allowing the child to fall asleep while watching television, or to fall asleep on the parent's bed). Other daytime behavioural problems and limit-setting difficulties may also be present in these children.

Risk factors

Factors that increase the risk of limit-setting disorders include the child sharing the parent's bedroom, conflicting parental disciplinary styles and family tension.

Management

Management includes the good sleep practices mentioned earlier, specifically setting a fixed bedtime, reviewing sleep schedules (e.g. avoid late afternoon naps) and consistent parental limit-setting.

Parents should aim to establish a set bedtime that coincides with the child's natural sleep time.

The method of 'bedtime fading' may be practised where the bedtime is initially set at the current bedtime, and brought forward gradually to the desired bedtime to reduce struggles between bedtime and sleep-onset.

Clear bedtime rules need to be set with the child (e.g. staying in bed, not calling out for parents), and ignoring complaints about bedtime (e.g. 'I am not tired yet').

Check on the child briefly if needed, provide reassurance and return the child to bed if he/she gets out of bed. A transient worsening of behaviour may occur in some children at the beginning. Caregivers are encouraged to be consistent and firm each time.

Positive reinforcement (e.g. sticker charts and small rewards) may help motivate the child.

PARASOMNIAS IN CHILDREN

Parasomnias are unpleasant or undesirable events that intrude into sleep. The common parasomnias in children are nightmares, confusional arousals, sleep terrors and sleepwalking.

With the exception of nightmares, parasomnias usually occur in slow wave sleep (within the first few hours of the night after the child falls asleep), and there is often no recollection of the event the next morning.



Set clear and consistent bedtime rules for your child.

These events can occur in otherwise healthy children, but may occur more frequently during episodes of acute illness and/or fever, stress, sleep deprivation or in association with any disorder that disrupts sleep.

This section will focus on some of these parasomnias in more detail:

1. Confusional Arousals

Confusional arousals consist of confused behaviour during and following arousals from sleep in the night, and/or upon attempted awakening from deep sleep in the morning.

How common is it?

Confusional arousals are present in five to 15 percent of children and are usually benign in nature. They usually start before five years of age and peak in frequency during mid-childhood before spontaneous remission. There may be a family history of confusional arousals or sleepwalking.

What to look out for?

Episodes of confusional arousals are usually sudden and may be startling. The child may appear to be awake but is disorientated and will be slow in speech and mentation, responding poorly to commands.

The child may sit up in bed, moan or whimper inconsolably, and say words like 'Go away!', 'No!' or may be even more bizarre, such as talking to a lamp. The episode usually lasts for a few minutes to half an hour, and sometimes longer.

2. Sleepwalking (Somnambulism)

Sleepwalking consists of a series of complex behaviours. It is usually initiated during arousal from sleep, and culminates in walking around with an altered state of consciousness and impaired judgement.

How common is it?

The onset of sleepwalking is usually between four to six years of age. About 15 to 40 percent of children have sleepwalked on at least one occasion, with three to four percent having frequent (weekly or monthly) episodes.

Episodes usually decrease during adolescence. In children who sleepwalk, a third of them continue to sleepwalk for five years, while 12 percent continue to do so for 10 years. There may be a family history of sleepwalking.

What to look out for?

Episodes of sleepwalking usually begin with the child sitting up in bed and looking around confused, before walking. It can involve routine behaviours (e.g. unlocking the door, walking out of the room) or more inappropriate behaviour (e.g. urinating into a waste paper basket). The child may sometimes speak but the speech is usually meaningless. The child usually appears to be awake with the eyes open with a confused 'glassy' stare.

The child may then return to sleep on his/her bed, or lie down at an inappropriate site to sleep. The child is usually very difficult to arouse during an episode of sleepwalking and will appear confused and disorientated if awoken.

3. Sleep Terrors (Night Terrors)

Sleep terrors are characterised by sudden arousals from sleep with behavioural manifestations of intense fear.

How common is it?

The typical onset of sleep terrors is between two to four years of age, and tends to decrease in frequency as the child grows older. It rarely persists beyond puberty.

Usually more males than females are affected, and a history of sleep terrors in family members may be present. It is estimated to affect three percent of prepubertal children, and one percent of adults.

What to look out for?

The event is often of sudden onset. The child sits up in bed and screams in fear, looking tensed with symptoms of flushing, sweating, fast breathing and an increased heart rate. The child is often inconsolable and attempts to pacify him/her may worsen the reaction.

If awoken, the child will appear disorientated and confused.

Episodes usually last for a few to five minutes, with the child returning to sleep on his/her own thereafter.

Sleep terrors may be confused with another more common parasomnia – nightmares. In contrast to night terrors, nightmares tend to occur

in the last one-third of the night (during a sleep stage known as ‘rapid eye movement sleep’ or ‘dream sleep’), and if awoken, the child is orientated and able to recall events vividly.

Management of Parasomnias

In the majority of cases, a reassurance and education of the child and parents will suffice.

Parents should be encouraged to maintain good sleep hygiene and practices, specifically a consistent bedtime routine and schedule for the child.

The prevention of physical injuries is important in sleepwalking (e.g. installing gates at the top of the stairway, locking of windows and the main door). Parents should be advised to guide the child slowly and calmly back to the bed during a sleepwalking episode, without waking him/her. In children where these episodes are recurrent, a scheduled awakening just before the usual time of the first episode, on a nightly basis for a few weeks, may be effective.

Causes of fragmented sleep (e.g. obstructive sleep apnoea, periodic leg movement disorder) may worsen parasomnias, and if suspected, should be identified and treated. Medications are rarely needed.



Maintain good sleep hygiene and practices to help manage parasomnias.

OBSTRUCTIVE SLEEP APNOEA (OSA) IN CHILDREN

Obstructive sleep apnoea is a condition where there is recurrent 'blockage' of the upper airway during sleep, leading to a reduced airflow to the lungs and sleep disruption.

Snoring is an important symptom of obstructive sleep apnoea, but not all children with snoring will have obstructive sleep apnoea. Children with habitual snoring but no evidence of compromised breathing and sleep disruption have 'primary snoring'.

How common is it?

It is estimated that overall, three to 12 percent of children have habitual snoring, and one to three percent of children have snoring with obstructive sleep apnoea. Boys and girls are equally

affected. The peak age is between four to seven years of age, usually in children with enlarged tonsils and/or adenoids. There is a second peak seen in older children above eight years old who tend to be obese.

Causes

The two most important causes of obstructive sleep apnoea in children, are enlarged tonsils and/or adenoids, and obesity.

Risk factors

Other children at risk for obstructive sleep apnoea, include children with neuromuscular (central nervous system and muscle) disorders, abnormalities in the jaw and/or face, Trisomy 21 (Down syndrome), and those with a family history of sleep and breathing disorders.

What to look out for?

Some of the symptoms suggestive of obstructive sleep apnoea, include:

- Snoring
- Apnoea (pauses in breathing during sleep)
- Snorting, gasping noises during sleep
- Laboured breathing during sleep, with a 'sucking in' of the chest
- Unusual sleeping positions, such as hyperextending the neck to breathe better, sitting up, or propped up with many pillows
- Restlessness and frequent awakenings during sleep
- Sweating during sleep
- Mouth breathing in the day or during sleep
- Cyanosis (blue discolouration of the lips/face)
- Difficulty waking in the morning
- Feeling unrefreshed after an overnight sleep
- Morning headaches
- Irritability or aggressive behaviour during the day

- Learning difficulty
- Excessive sleepiness during the day

Complications

Some of the complications of untreated obstructive sleep apnoea, include:

- Learning and/or behavioural problems
- Poor growth
- Diabetes, obesity, hypertension, heart failure, stroke
- Death (in very severe, untreated cases – rare)

DIAGNOSIS

A clinical history and physical examination are not sufficiently reliable to differentiate primary snoring from obstructive sleep apnoea. If the doctor suspects that your child has obstructive sleep apnoea, he will refer your child to a paediatric sleep specialist for review, and for an overnight polysomnography (sleep study).

Your child will be admitted overnight to a single room in a sleep laboratory, where his/her sleep and breathing will be monitored and recorded continuously during sleep.

There will be sensors placed on your child's head and body, and elastic bands placed around his/her chest

and abdomen, connected by wires to a computer system that records the data.

This is not a painful procedure, and most children will be able to fall asleep, after they get used to the set-up. A caregiver is allowed to stay overnight with the child during the study.

TREATMENT

The treatment of obstructive sleep apnoea in children depends on the underlying cause.

In children with enlarged tonsils and/or adenoids, surgery would be recommended.

For more information, please refer to our booklet: 'Up Close: Get the answers to common Ear, Nose and Throat Conditions'. For more details on surgical treatment, including adenotonsillectomy, please refer to the sections: Common ENT conditions among Children – "Snoring in children", and "Tonsils and adenoids".

In children who are obese, weight loss measures such as healthy eating and regular exercise are encouraged.

They may also be referred to paediatric specialists for weight management programmes and to screen for conditions such as diabetes, hypertension and hyperlipidaemia.

In some children where surgery is not an option, or if they continue to have significant residual obstructive sleep apnoea after surgery, they may be recommended the use of Continuous Positive Airway Pressure (CPAP) during sleep.

The CPAP set-up consists of a face mask connected by a tubing to a machine that generates and delivers a positive pressure.

This pressure helps to keep the upper airway of your child open during sleep. Children who are treated with CPAP will need to be managed by a paediatric sleep specialist, who will recommend regular follow-up checks and sleep studies.

Besides the treatments mentioned above, a small group of children may benefit from an orthodontic assessment and other procedures or surgeries for their sleep apnoea.

For enquiries, contact SingHealth Duke-NUS Sleep Centre at:

Singapore General Hospital Tel: 6321 4377

Changi General Hospital Tel: 6850 3333

Sengkang General Hospital Tel: 6930 6000

KK Women's and Children's Hospital Tel: 6294 4050

National Dental Centre Singapore Tel: 6324 8802

National Neuroscience Institute Tel: 6321 4377