

ARTICLE

Sleep disorders in children and adolescents[†]

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SUMMARY

Disordered sleep has long been recognised as both a consequence of psychiatric illness and a contributory factor to its development. Significant sleep disturbance occurs in about 25% of children and adolescents and 80% or more of children in high-risk groups; it often continues into adulthood. All psychiatrists should therefore be familiar with the principles of sleep medicine and the impact of sleep and its disorders. In this article, the relationship between sleep disorders and the breadth of child and adolescent psychiatry in particular is explored. The classification, aetiology and implications of sleep disorders are discussed, as well as the practicalities of screening, diagnosis and management, with a view to informing readers how accurate diagnosis, prevention and successful treatment of sleep disorders can benefit patients and their families.

LEARNING OBJECTIVES

- Develop a working knowledge of sleep medicine as applied to child and adolescent mental health services
- Understand how to screen accurately for sleep disorders
- Understand the treatments available for children and adolescents with sleep disorders

DECLARATION OF INTEREST

None

Much knowledge about sleep and its disorders has accumulated in recent times, but awareness of these advances among both the general public and professionals remains inadequate. This is especially so regarding sleep disorders in children and adolescents, despite the publication of valuable sources of information relevant to clinical practice such as that by Mindell & Owens (2010).

Before the scientific study of sleep began, important observations were made by some writers. For example, Charles Dickens provided some of the best descriptions of a wide variety of sleep disorders (presumably based on his observations of real people), including some in children and adolescents (Cosnett 1992). The most notable of these is Joe the Fat Boy in *The*

Pickwick Papers, who might well have suffered from obstructive sleep apnoea. Dickens's literary accounts of this and other sleep disorders preceded those of clinicians by many years.

Although sleep medicine is now a specialty in its own right, all clinicians would benefit from having at least a working knowledge of the field. Many patients seen in both primary and secondary care are likely to have sleep problems, and these can often be treated without recourse to the special sleep centres that are now available for complicated cases. This article reviews main aspects of sleep and its disorders, with special emphasis on clinical practice in child and adolescent psychiatry. More detailed accounts are provided elsewhere, both of children's sleep disorders in general (Stores 2006a) and of sleep disturbance in children and adolescents who have a neurodevelopmental disorder (Stores 2014). This later source also contains a general account of sleep and its disorders in children and adolescents.

Only selected references to the literature are provided. In places, 'child' or 'children' can be taken to include adolescents.

Links between disturbed sleep and child and adolescent psychiatry

Sleep medicine is a multidisciplinary specialty based on approaches and information from general medicine and paediatrics, adult and child psychiatry, neuropsychiatry, psychology (including developmental aspects) and several other disciplines. Increasingly, advances are being made concerning the neurobiology of sleep, aspects of which are reflected in disorders of sleep and wakefulness (Schwartz 2008). Mahowald and colleagues (2011) refer to wakefulness, rapid eye movement (REM) sleep and non-rapid eye movement (NREM) sleep as the 'primary states of being'. These are not necessarily mutually exclusive states and they can occur in various combinations to produce intriguing and surprising clinical consequences in various sleep disorders. In sleepwalking, for example, both children and adults can perform highly complicated acts while still asleep. Failure to recognise this fact

easily leads to misinterpretation of the episodes as attention-seeking or otherwise intentional behaviour.

In considering the relationships between sleep problems and psychiatric disorders in children and adolescents, the following points are worthy of note. First, the rate of significant sleep disturbance is increased in children and adolescents with a wide range of psychiatric problems, and not just anxiety states and depression (Ivanenko 2008; Alfano 2009). Conversely, children with inadequate or poor-quality sleep are at increased risk of developing psychological or psychiatric conditions such as attention-deficit hyperactivity disorder (ADHD)-type behaviour. Second, certain psychotropic medications can disturb sleep. Examples include sleeplessness caused by some antidepressant and stimulant drugs, and daytime sleepiness produced by sedative-hypnotic drugs. Third, some forms of sleep disturbance may be misdiagnosed as psychiatric disorders (Stores 2010). For example, pathological sleepiness may be misinterpreted as depression.

Prevalence of sleep disturbance

Overall, a significant sleep disturbance occurs in about 25% of children and adolescents (Owens 2008). However, prevalence rates well in excess of this are reported in certain high-risk groups, namely, children with an intellectual disability, other neurodevelopmental disorder, psychiatric condition or other chronic paediatric condition. For example, estimated rates are reported to be 50–80% in children with autism spectrum disorders (Richdale 2009) and up to 50% in those diagnosed with ADHD (Corkum 2011).

Disturbed sleep and its consequences are highly likely to complicate further the lives of such children (and those of their parents). Children with these high-risk conditions do not have a separate set of underlying sleep disorders compared with other children. The differences lie in the relative pattern of occurrence of the various sleep disorders, the degree of severity and a greater tendency for the sleep disorder to persist if untreated.

The distinction between sleep problems and sleep disorders

It is essential to distinguish between a sleep problem and a sleep disorder. At any age, there are just three basic sleep problems:

- not sleeping well (insomnia or sleeplessness), taking the form of not readily getting to sleep, difficulty staying asleep, or waking early and not returning to sleep
 - excessive daytime sleepiness, including sleeping during the day or prolonged overnight sleeping
 - behaving in unusual ways, having strange experiences or exhibiting unusual movements at various stages of the sleep process (parasomnias and sleep-related movement disorders).
- Sleep disorder refers to the underlying cause of the sleep problem. The latest edition of the International Classification of Sleep Disorders, ICSD-3 (American Academy of Sleep Medicine 2014), describes about 80 sleep disorders, many of which occur in children and adolescents. There is some merit in using this system of classification (which replaces ICSD-2) as it is considered to be more diagnostically specific and up to date than the DSM and ICD classifications of sleep disturbance.
- ### Aetiological factors
- In children, as in adults, psychological, neurological, respiratory, metabolic, endocrine, genetic, pharmacological and other physical factors may influence sleep. The following examples illustrate the need to consider a wide range of possible explanations for a child's sleep disturbance.
- In very young children, a degree of early brain maturation is required for the biological clock controlling sleep–wake rhythms to develop.
 - Parenting practices can profoundly influence young children's sleep patterns: lack of routine, poor limit-setting, and reinforcement by paying too much attention to a child's reluctance to settle to sleep can cause or maintain sleep problems.
 - Adolescent sleep difficulties may be caused by a combination of pubertal changes in sleep physiology and altered lifestyle, as well as emotional problems.
 - At any age, the possibility of medical causes of sleep problems needs to be considered, such as traumatic brain injury (Stores 2013a) or medications the child is taking.
- There may be additional considerations with children whose development is delayed.
- A child's intellectual limitations or communication problems can interfere with learning good sleep habits, as may parents' mental health and parenting abilities.
 - Additional (comorbid) physical and psychiatric conditions associated with the child's condition are likely to contribute to sleep disturbance. This is so in the case, for example, of children diagnosed with ADHD, who may have sleep apnoea and other psychiatric conditions (Konofal 2010), and also those with autism spectrum disorders, where comorbidities can include epilepsy and mood disorders (Richdale 2009). Such comorbidities

are common throughout neurodevelopmental disorders (Stores 2014). For instance, in Down syndrome, children are prone to many specific medical problems, including obstructive sleep apnoea, and also various psychiatric conditions (Stores 2013b).

Continuity of sleep disorders into adulthood

Not all sleep disorders continue into adulthood but the following may, to a varying extent, do so.

- Rhythmic movement disorders such as head-banging usually remit spontaneously by about 3 years of age, and arousal disorders (such as sleepwalking) by puberty. In a minority, both may persist into adulthood.
- Adenotonsillar hypertrophy is the usual cause of obstructive sleep apnoea in children. It is treatable by surgery, but anatomically more complex causes (as in some neurodevelopmental disorders) are more difficult to correct.
- Behavioural insomnia of childhood, largely the result of failure to learn good sleep habits, can continue into adult life if untreated.
- Nightmares usually cease spontaneously by adolescence or adulthood, but if they are part of post-traumatic stress disorder (PTSD) they might persist long term.
- Narcolepsy often begins in childhood or adolescence and can continue well into adult life.
- If untreated, delayed sleep–wake phase disorder (previously known as delayed sleep phase syndrome) may persist or give rise to potentially long-lasting secondary sleep-disrupting difficulties such as depression, the use of alcohol to combat insomnia and stimulant drugs to counteract daytime sleepiness (this disorder is discussed below in ‘Insufficient sleep owing to delayed sleep–wake phase disorder’).
- Conditioned or learned insomnia results from associating being in bed with being awake and distressed about being unable to sleep. The problem can persist if this negative association is not replaced by positive associations.
- Idiopathic insomnia typically begins in childhood, is resistant to treatment and may well be lifelong.

Developmental aspects of sleep disorders, including differences between children and adults

The literature on sleep disturbance in adults cannot be drawn on freely when considering children and adolescents, as many changes take place before adulthood is reached. There are alterations in sleep physiology, for example, including the gradual reduction of REM sleep, which is particularly abundant in very young children (perhaps because

of its importance for early brain development), and the need for daytime naps, which has usually tailed off by 3 years of age. Sleep requirements also gradually lessen throughout childhood until about the time of puberty, when the need for sleep may increase again during the teens.

The pattern of sleep disorders in children and adolescents is different from that in adults. Characteristically, childhood sleep disorders are bedtime settling and troublesome night-waking, rhythmic movement disorders, nocturnal enuresis and arousal disorders. Parental behaviour may well be aetiologically relevant to the sleep disorder. Parents’ knowledge, attitudes and emotional state often determine whether they see their child’s sleep pattern as a problem or not.

Basically, a particular sleep disorder can have different clinical associations in children than in adults. For example, adult obstructive sleep apnoea generally causes sleepiness and reduced activity during the day; but children with this condition (or other sleep disorders causing sleep loss or disruption) can be abnormally active. There may also be differences in significance. Many childhood sleep disorders can be expected to resolve spontaneously in a way that is unusual in adults, and sleep disorders in children are generally less frequently associated with psychiatric illness than in adults. Finally, the need for multidisciplinary involvement in assessment and management of children with disturbed sleep can be greater than in the case of adults. In addition to medical specialties, developmental psychology and child and family psychiatry often have important contributions to make.

Effects of persistently disturbed sleep on child development

There are many potentially serious psychological/psychiatric, social and physical effects of persistently disturbed sleep.

Emotional state and behaviour

‘Overtired’ children are often irritable and even aggressive. Bedtime can become distressing if associated with upsetting experiences such as night-time fears. Delayed sleep–wake phase disorder can lead to mood and other emotional changes, both directly because of sleep deprivation and also as a result of the psychosocial consequences of the condition (Gregory 2012).

Intellectual function and education

Insufficient sleep can cause impaired concentration, memory, decision-making and general ability to learn (Fallone 2002). Studies in the USA have suggested that 80% of adolescents obtain less

BOX 1 Screening for sleep disturbance

The clinician should ask whether the child:

- has difficulties at bedtime or settling to sleep
- wakes during the night
- has breathing problems while asleep
- shows unusual behaviours, experiences or movements at night
- has difficulty waking up in the morning
- is unusually sleepy or 'overtired' during the day

than the average 9 hours of sleep required for satisfactory daytime functioning, 25% obtain less than 6 hours and over 25% fall asleep in class. Also, students whose sleep becomes insufficient generally see their school grades falling (National Sleep Foundation 2006).

Physical effects

As the production of growth hormone is closely linked to deep NREM sleep, disruption of this type of sleep may affect physical growth (Spruyt 2011). Similarly, obstructive sleep apnoea can impair the depth and quality of sleep, causing failure to thrive in some young children. In addition, persistent sleep loss may be associated with impaired immunity, obesity, hypertension and diabetes.

Family and other social effects

As a consequence of their own loss of sleep, parents (mainly mothers) may become anxious and depressed and unable to cope (sometimes even resorting to an increased use of physical punishment) (Meltzer 2007). Marital relationships can become seriously strained.

Principles of assessment**Screening for sleep disturbance**

Routinely, history-taking should at least include questions about the items in Box 1. If the answers are positive, further details may be obtained using a brief standardised screening questionnaire such as the Children's Sleep Habits Questionnaire, which has versions for school-age children (Owens 2000) and toddlers/preschool children (Goodlin-Jones 2008). It has been used with typically developing children and others whose development is delayed.

Diagnosis of the sleep disorder

Screening for sleep symptoms simply highlights the possibility of a sleep disorder and does not constitute a diagnosis. Identification of a sleep disorder requires the information listed in Box 2.

BOX 2 Diagnosis of a sleep disorder

This mainly depends on:

- detailed histories, especially about the sleep problem
- the child's 24 hour sleep-wake pattern, including parenting practices
- the child's developmental history
- family history and circumstances
- physical and behavioural examination
- possibly further assessment in the form of a sleep diary and objective sleep studies such as actigraphy or polysomnography

It may be necessary to refer the child for assessment at a specialised paediatric service (such as an ear, nose and throat clinic if sleep apnoea is a possibility) or a paediatric sleep disorders service. Sleep centres in the UK can be located through the British Sleep Society's website (www.sleepsociety.org.uk/sleep-centre-locator).

General principles of treatment

There are many forms of treatment for sleep disorders. Choice depends on accurate diagnosis of the child's problem. The evidence for the efficacy of these treatments varies (Kuhn 2003) and is often based on a consensus of clinical experience.

Education of parents about the developmental importance of sleep, how to promote good sleep habits from an early age, and also what are realistic expectations at different ages is an important general requirement. An optimistic view of treatment possibilities should be encouraged.

Principles of sleep hygiene help to promote good sleep habits (Jan 2008). These might be sufficient in themselves to prevent or treat disturbed sleep, and they are also useful as an accompaniment to more specific treatment for a given sleep disorder. Good sleep hygiene (the details of which vary with the child's age) includes aspects such as those listed in Box 3.

BOX 3 Some fundamentals of good sleep hygiene

- Regular daytime and bedtime routines and timing
- The avoidance of arousing activities and stimulating drinks near bedtime
- A bedroom conducive to relaxation and sleep, and not associated with entertainment
- Prevention of negative associations with sleeplessness, such as distress when lying awake in bed unable to sleep

Behavioural methods are appropriate, especially (although not only) for insomnia. Pharmacological treatments are suitable in a limited number of circumstances, including when behavioural methods have failed (Gringras 2008; Hollway 2011).

Other treatments include chronotherapy (resetting the biological clock) for sleep–wake cycle disorders, and physical interventions (such as adenotonsillectomy, weight reduction and continuous positive airway pressure (CPAP) for obstructive sleep apnoea). It goes without saying that further assessment and specific treatments may be needed if emotional disturbance is marked in either the child or members of the family.

Management of specific sleep disorders

The following summary is organised in terms of the sleep disorders that might underlie the three basic sleep problems mentioned earlier. Child psychiatrists and their teams might usefully incorporate the principles and practices into their approaches to patients with disturbed sleep whatever their primary diagnosis. The importance of screening for sleep problems and, where indicated, accurate diagnosis of the underlying sleep disorder has already been emphasised. Treatment possibilities and issues are considered in detail elsewhere (Kotagal 2012).

Insomnia

The origins of insomnia might lie in a failure to encourage good sleep habits at an early age (under 5). Basic guidelines for achieving this are well described, including teaching children to fall asleep alone so that when they wake in the night they will be able to fall asleep again without requiring parents' attention ('self-soothing') and establishing a consistent 24-hour routine, especially at bedtime.

Problems of resisting going to bed at the required time and/or waking repeatedly at night and demanding their parents' attention (including coming into their bed) are extensively treated by behavioural methods (such as 'graduated extinction') in typically developing children (Mindell 2006). They are also advocated for children with developmental disorders in whom insomnia is particularly common because of medical, psychiatric as well as neurodevelopmental conditions (Richdale 2005).

In general, behavioural methods are recommended in preference to pharmacological treatment. However, sedative/hypnotic drugs are often used, despite little evidence in support of the practice (Owens 2009).

Melatonin deserves special mention because of its current popularity, mainly as a treatment for

sleeplessness. How far it deserves this popularity has yet to be clarified because of the relatively few methodologically sound studies and inconsistent findings (London New Drugs Group, 2008). However, some recent reports (e.g. Gringras 2012; Lerchl 2012) provide more convincing evidence that melatonin can be effective, perhaps especially in children with neurodevelopmental disorders, although inconsistency of response from one child to another has yet to be explained. Other important issues concern dosage, short- and long-acting forms of the drug, possible adverse effects and long-term efficacy. Generally, it might be considered appropriate to assess the usefulness of melatonin if behavioural treatments have been adequately tried without success.

In school-age children some of the causes of insomnia in younger children still apply, but enquiry might reveal other factors such as night-time fears. These fears are usually transient and require only reassurance and comfort, but in some children they are so intense and persistent as part of an anxiety state, including PTSD, that they need special attention. Other possibilities include worry about daytime matters, conditioned insomnia and the restless legs syndrome.

Early morning waking, where the child wakes very early, does not go back to sleep and is noisy or demands attention, can be very distressing to parents and other members of the family. It can result from bedtime being too early (in which case the time the child goes to bed should be gradually reset), or it may be part of an anxiety state or depressive disorder.

High rates of insomnia have been consistently reported in adolescents. Implicated factors include worries, anxiety and depression, as well as an excess of caffeine-containing drinks, alcohol or nicotine, or illicit drug use and withdrawal. Difficulty getting to sleep because of a physiological shift in the sleep phase (as well as daytime sleepiness) is a prominent part of delayed sleep–wake phase disorder. Instead of recriminations and attempts to set limits, the timing of the sleep phase needs to be reset.

For further details of the clinical management of insomnia in children and adolescents see Mindell & Owens (2010).

Excessive daytime sleepiness

Excessive sleepiness is mainly a problem in older children and adolescents, in whom it has been associated with behavioural and psychiatric problems as well as with educational under-performance and other disadvantages (Carskadon 2011). Extreme sleepiness will cause a reduction

of activity at any age, but lesser degrees in young people may produce irritability, overactivity, restlessness, poor concentration, impulsiveness or aggression. These symptoms can lead to a diagnosis of ADHD without it being realised that the origin of the behaviour was a sleep disorder. Kothare & Kaleyias (2008) have described the diagnostic approach to excessive sleepiness. It is useful to consider the following three main categories of possible causes.

Insufficient sleep owing to delayed sleep–wake phase disorder

Delayed sleep–wake phase disorder causes both insomnia and excessive daytime sleepiness. It is said to be common in adolescents. Its main diagnostic features are listed in Box 4.

Treatment consists of gradually and consistently changing the sleep phase to an appropriate time. Additional measures to achieve or maintain the improved sleep schedule include early-morning exposure to light and possibly the use of melatonin (Gradisar 2011).

Poor-quality nocturnal sleep

Daytime sleepiness, despite sleep duration at night being within normal limits, suggests that the restorative quality of the sleep is impaired. Poor-quality sleep can be caused by physical illness and psychiatric disorders (such as anxiety or depression) and some of their pharmacological treatments, obstructive sleep apnoea (which occurs in at least 2% of all children, with a much higher prevalence in children with various intellectual disabilities, notably Down syndrome (Stores 2013b)), and other sleep disorders, such as periodic limb movements in sleep.

Disorders involving an increased tendency to sleep

In some cases, prolonged or otherwise excessive sleep is an intrinsic part of the condition, rather than a consequence of it. Narcolepsy is the prime example, with the classic combination of daytime sleep attacks, nocturnal sleep disruption, cataplexy, hypnagogic hallucinations and sleep paralysis. Narcolepsy with cataplexy occurs in about 0.1% of the population. Onset is common in childhood and adolescence, when its clinical manifestations can be complex and easily misinterpreted, with the correct diagnosis often delayed by many years (Stores 2006b). Narcolepsy can be associated with serious psychosocial difficulties and psychiatric disorders, as might other causes of excessive daytime sleepiness (Stores 2006c).

Other possibilities (usually involving intermittent episodes of excessive sleepiness)

BOX 4 Key diagnostic features of delayed sleep–wake phase disorder

- Persistently severe difficulty getting to sleep, often staying awake until very late
- Usually uninterrupted sound sleep once it is achieved
- Considerable reluctance to get up for school, college or work; school attendance may be sporadic or even discontinued
- Sleepiness and underfunctioning, especially during the first part of the day, giving way to alertness in the evening and early hours
- The abnormal sleep pattern is maintained by sleeping in very late when able to do so (e.g. at weekends and during holidays)

include Kleine–Levin syndrome (classically with the addition of bouts of hyperphagia and hypersexuality, as well as other bizarre behaviour), major depressive disorder, substance misuse, menstruation-related hypersomnia and certain other neurological diseases. Misdiagnosis is a particular risk in Kleine–Levin syndrome (Pike 1994).

Parasomnias and sleep-related movement disorders

More than 20 types of parasomnia are described in ICSD-3 (American Academy of Sleep Medicine 2014). They can easily be confused with each other if the distinctive features of each are not known, or not carefully described on clinical assessment. Precise diagnosis is important, as different parasomnias may well need contrasting types of treatment. Accurate diagnosis depends principally on a detailed account of the subjective and objective sequence of events from the onset of each episode to its resolution, as well as the circumstances in which it occurs. Audio-visual recordings combined with polysomnography can be helpful if the nature of the episodes remains unclear. Preliminary home video recordings by parents also may reveal features omitted from the descriptions provided in the clinic.

The more dramatic forms of parasomnia seem to be a main cause of diagnostic confusion and imprecision, as well as unnecessary concern about their psychological significance, as many are benign. However, parasomnias may lead to psychological complications if the child is frightened, embarrassed or otherwise upset by the experience, or because of the reactions of other people to the episodes.

MCQ answers

1 d 2 e 3 c 4 e 5 a

As many childhood primary parasomnias remit spontaneously within a few years, children and parents can often be reassured about the future, although protective measures (e.g. in severe headbanging or sleepwalking) may be required in the meantime.

Specific treatment, including medication, is needed in only a minority of cases of primary parasomnia, but is likely to be required for the underlying disorder in secondary parasomnias.

For more detailed information on parasomnias in children and adolescents see Stores (2007, 2009).

Primary parasomnias

Primary parasomnias are primary sleep phenomena and generally common in children. They include hypnagogic (at sleep onset) and hypnopompic (on waking) hallucinations, which are common and benign but can be frightening and even misdiagnosed as psychosis if associated with sleep paralysis (Stores 1998). Sleep-related rhythmic movement disorders (such as headbanging) occur in many young children, almost always remitting spontaneously by 3 to 4 years of age. Nocturnal enuresis can usually be classified as a primary parasomnia.

Parents are often distressed to witness confusional arousals, sleepwalking (especially of the agitated type) or sleep terrors, which are forms of 'arousal disorder' common in young children. The degree of agitation and confused behaviour may be extreme, suggesting that the child is suffering in some way. In fact, during an arousal disorder episode the child remains asleep and unaware of the events. Understandable attempts to arouse the child and provide comfort should be discouraged as this may cause real distress.

The term 'nightmare' is sometimes used misleadingly for any form of dramatic parasomnia. True nightmares (frightening dreams), if frequent and associated with intense bedtime fears, may indicate an anxiety disorder and their content may suggest a cause.

Secondary parasomnias

Secondary parasomnias are manifestations of a physical or psychiatric disorder. Examples of the former type are sleep-related epilepsies, including benign centrotemporal (Rolandic) epilepsy (the most common form of childhood epilepsy) and nocturnal frontal lobe epilepsy. As the clinical manifestations of seizures in these two forms of epilepsy can consist of changes in behaviour (which may be dramatic), the conditions are likely to be misdiagnosed as non-epileptic, such as attention-seeking or dissociative states.

Other parasomnias

Other parasomnias that are part of physical or psychiatric disorders include those associated with obstructive sleep apnoea, gastrointestinal reflux, REM sleep behaviour disorder (in many cases), nocturnal panic attacks, nocturnal disturbances in PTSD, and dissociative states. Simulated parasomnias, shown by polysomnography to be enacted during wakefulness, sometimes occur in children and adolescents.

Conclusions

In various ways sleep and its disorders can be seen as a central topic in child and adolescent psychiatry (and, indeed, other branches of psychiatry). Therefore, all psychiatrists should be familiar with the principles of modern sleep disorders medicine. The sleep disorders field is advancing rapidly, but the accumulated knowledge is not yet sufficiently represented in professional teaching and training (Peile 2010). However, in principle, there are now many opportunities for child and adolescent psychiatrists (including those whose work involves the care of children with neurodevelopmental disorders) to contribute as part of their practice to the accurate diagnosis, prevention and successful treatment of sleep disorders to the benefit of patients and their families.

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MCQs

Select the single best option for each question stem

1 Which of the following is not particularly associated with sleep disturbance?

- a comorbid psychiatric illness
- b traumatic brain injury
- c intellectual impairment
- d single-parent families
- e epilepsy.

2 The effects of persistently disturbed sleep can include:

- a mood disorders
- b failure to thrive
- c immunological problems
- d poor school performance
- e all of the above.

3 Which of the following is not characteristic of delayed sleep–wake phase disorder?

- a insomnia
- b sound sleep once asleep
- c sleeping until very late at weekends improves symptoms
- d poor school performance
- e excessive daytime sleepiness.

4 Treatments for childhood sleep disorders have included:

- a sleep hygiene
- b weight reduction
- c adenotonsillectomy
- d melatonin
- e all of the above.

5 Important information in routine preliminary screening for sleep disturbance includes:

- a history of breathing problems when asleep
- b results of polysomnography
- c birth history
- d actigraphy findings
- e history of drug misuse.