Clinical Practice Guideline on Sleep Disorders in Childhood and Adolescence in Primary Care

NOTE:

More than 5 years have passed since the publication of this Clinical Practice Guideline, and **its validity has not been reviewed**.

Therefore, **it is unclear whether its recommendations remain valid**; they should therefore be treated with caution and applied in accordance with **clinical judgement and the individual circumstances of each patient**.

CLINICAL PRACTICE GUIDELINTES IN THE NHS
MINISTRY OF HEALTH, SOCIAL SERVICES AND EQUALITY

MINISTERIO DE CIENCIA E INNOVACIÓN
MINISTERIO DE SANIDAD, POLÍTICA SOCIAL E IGUALDAD
Plan de Calidad para el Sistema Nacional de Salud
SaludMadrid
Agencia Laín Entralgo para la Formación, Investigación y Estudios Sanitarios
Comunidad de Madrid

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This CPG is an aid for decision-making in healthcare. It is not mandatory, and it is not a substitute for the clinical judgement of healthcare personnel.

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Presentation

Documenting the variability of clinical practices, analysing the causes of such variability and adopting strategies oriented at eliminating it have proved to be initiatives that promote effective, safe and patient-oriented decision-making by healthcare professionals. Among these strategies, the preparation of clinical practice guidelines (CPGs) stands out, which are '*systematically developed recommendations for helping professionals and patients to make decisions about the most appropriate healthcare and select the most appropriate diagnostic or therapeutic options when dealing with a health problem or specific clinical condition*'.

The 2010 Quality Plan for the National Health System (SNS) endeavours to respond to the challenges posed for the SNS by increasing the cohesion of the system, guaranteeing fairness in healthcare for citizens, regardless of the place where they live, and assuring that this care is the best quality. Its objectives include promoting the preparation and use of CPGs linked to health strategies, thereby consolidating and extending the Health-Guidelines Project. This is the context within which this **CPG on Sleep Disorders in Childhood and Adolescence in Primary Care Health Centers** is framed.

Sleep plays a fundamental role in many spheres of child development, such as behaviour, academic performance and growth. Sleep alterations in childhood are frequent, and unlike what generally happens in adulthood, they also and intensely affect the quality of life of a child's family environment, not just the child's own development.

Sleep alterations in childhood and adolescence, which have a multifactorial aetiology, can appear in the form of difficulty getting to sleep or staying asleep, anomalous behaviours during sleep or excessive daytime sleepiness. This Clinical Practice Guideline responds to clinical questions concerning these three aspects, and it is mainly directed at Primary Care paediatricians and family physicians to provide them with the appropriate tools for taking on and treating these situations, as well as give them guidelines for coordinating with Hospital Care.

This guideline is the result of a major effort by a group of healthcare professionals coming from different autonomous communities, professionals from the Health Technologies Assessment Unit and other departments of the Regional Department of Health of Madrid and representatives of relatives of patients affected by these types of disorders.

From the Quality Agency, we would like to thank all of them for their work, and we congratulate them on this CPG, which we hope will allow healthcare professionals to improve the care given to girls, boys and adolescents who have sleep alterations, thereby favouring the improvement of their quality of life and that of their relatives and caretakers.

CARMEN MOYA GARCÍA

Director General of the Quality Agency of the SNS

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Collaborating Societies

This CPG has the endorsement of the following societies:

Spanish Association of Paediatrics, **AEP**.

Spanish Association of Primary Care Paediatrics, **AEPap**.

Spanish Association of Behavioral Psychology, **AEPC**.

Spanish Sleep Association, **ASENARCO**.

Spanish Society of Adolescent Medicine, **SEMA**.

Spanish Society of Primary Healthcare Physicians, **SEMERGEN**.

Spanish Society of Family and Community Medicine, **SEMFYC**.

Spanish Society of General and Family Physicians, **SEMG**.

Spanish Society of Paediatric Neurology, **SENEP**.

Spanish Society of Clinical Neurophysiology, **SENFC**.

Spanish Society of Paediatric Respiratory Medicine, **SENP**.

Spanish Society of Otolaryngology, **SEORL**.

Spanish Society of Respiratory Medicine and Thoracic Surgery, **SEPAR**.

Spanish Society of Out-of-Hospital Paediatrics and Primary Care, **SEPEAP**.

Spanish Sleep Society, **SES**.

Declaration of interests: All the members of the Guideline Development Group, as well as the people who have participated in the expert collaboration and in the external review, have made the declarations of interests that are presented in Appendix 18.

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Questions to be answered

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CONCEPTS AND CLASSIFICATIONS

1. What are the general concepts about sleep?
2. What are the general clinical features of sleep?
3. What is the classification of sleep disorders?

GENERAL ASSESSMENT AND PREVENTIVE STRATEGIES

4. How should sleep be assessed in PC consultations?
5. Are there key questions that can help Primary Care professionals detect sleep disorders in an interview with parents/caretakers/children/adolescents?
6. What tests or tools can we use for an overall assessment of child and adolescent sleep in Primary Care Health Centers?
7. What are the complementary tests to keep in mind?
8. What are the differential diagnoses to keep in mind?
9. Are there preventive strategies for sleep disorders?

DEFINITION, DIAGNOSIS AND TREATMENT OF SLEEP DISORDERS

10. What is insomnia due to inadequate sleep hygiene?
11. What is behavioral insomnia?
12. What is the restless legs syndrome?
13. What is the delayed sleepphase syndrome?
14. What is the obstructive sleep apnea-hypopnea syndrome?
15. What is sleepwalking?
16. What are night or sleep terrors?
17. What are confusional arousals?
18. What are nightmares?
19. What are sleep related rhythmic movements disorder?
20. What is excessive daytime sleepiness or hypersomnia?
21. How are hypersomnias classified?
22. What is the most frequent cause of excessive daytime sleepiness?
23. What is narcolepsy?
24. What is the most suitable definition for these specific disorders?

25. What is the aetiology of these disorders?
26. Are there conditioning factors of these disorders: physiological, psychophysiological, psychological, environmental (family context)?
27. What are the clinical criteria for suspecting these disorders?
28. What are the diagnostic criteria for these disorders?
29. How are they classified?
30. What are the differential diagnoses?
31. Are there key questions that can help Primary Care professionals detect these disorders in an interview with the patient/parents/caretakers?
32. What are the tests or tools that we can use to diagnose these disorders in PC?
33. What are the criteria for referring to HospitalCare?
34. What are the effective treatments for these disorders in Primary Care Health Centers?
35. What are the authorised treatments in the paediatric population?
36. What are the most effective psychological interventions for these disorders?
37. When are drugs indicated for these disorders?
38. Are there preventive strategies of these disorders?

INFORMATION FOR AND COMMUNICATION WITH THE PATIENT

39. What is the basic information that must be provided to relatives and patients with sleep disorders?
40. How can better compliance with/adherence to the treatment of sleep disorders in childhood and adolescence be achieved?

DIAGNOSTIC AND THERAPEUTIC STRATEGIES

41. What are the steps to follow with a child or adolescent who has sleep disorders?

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Levels of evidence and grades of recommendations

Table 1. Levels of scientific evidence and grades of recommendations of SIGN

Levels of evidence	
1++	High quality meta-analyses, systematic reviews of RCTs, or RCTs with a very low risk of bias.
1+	Well-conducted meta-analyses, systematic reviews, or RCTs with a low risk of bias.
1-	Meta-analyses, systematic reviews, or RCTs with a high risk of bias.
2++	High quality systematic reviews of case control or cohort or studies. High quality case control or cohort studies with a very low risk of confounding or bias and a high probability that the relationship is causal.
2+	Well-conducted case control or cohort studies with a low risk of confounding or bias and a moderate probability that the relationship is causal.
2-	Case control or cohort studies with a high risk of confounding or bias and a significant risk that the relationship is not causal.
3	Non-analytic studies, e.g. case reports, case series.
4	Expert opinion.

Qualitative research[1]

1. This category includes qualitative methodology studies and is not contemplated by SIGN. The included studies have been assessed regarding methodology, and this category includes the most rigorous studies.

Grades of recommendation	
A	At least one meta-analysis, systematic review, or RCT rated as 1++, and directly applicable to the target population; or. A body of evidence consisting principally of studies rated as 1+, directly applicable to the target population, and demonstrating overall consistency of results.
B	A body of evidence including studies rated as 2++, directly applicable to the target population, and demonstrating overall consistency of results; or. Extrapolated evidence from studies rated as 1++ or 1+.
C	A body of evidence including studies rated as 2+, directly applicable to the target population and demonstrating overall consistency of results; or.Extrapolated evidence from studies rated as 2++.
D	Evidence level 3 or 4; or.Extrapolated evidence from studies rated as 2+.

Studies classified as 1- and 2- must not be used in the process of developing recommendations due to their high potential for bias.

√[2]	Recommended best practice based on the clinical experience of the guideline development group.

2. Sometimes the guideline development group becomes aware that there are some significant practical aspects they wish to emphasise and for which there is probably no supporting scientific evidence available. Generally, these cases are related to some aspect of the treatment, considered to be a good clinical practice and that nobody would normally question. These aspects are considered good clinical practice points. These messages are not an alternative to evidence based recommendations, but must be only considered when there is not another way to highlight the aspect mentioned above.

Q	Evidence taken from relevant, good quality qualitative studies. This category is not included in SIGN.

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Table 2. Levels of evidence and grades of recommendation for diagnostic studies (NICE adaptation of the levels of evidence of the Oxford Centre for Evidence-based Medicine and the Centre for Reviews an Dissemination)

Levels of scientific evidence	Type of scientific evidence
Ia	Systematic review with homogeneity level 1 studies.
Ib	Level **1 studies.**
II	Level 2 studies. Systematic review of level **2 studies.**
III	Level 3 studies. Systematic review of level **3 studies.**
IV	Consensus, expert opinions without explicit critical appraisal.
Level 1 studies	They meet the following: Masked comparison with a valid reference test ("gold standard"). Adequate spectrum of patients.
Level 2 studies	They have only one of these biases: Population not representative (the sample does not reflect the population where the test will be applied). Comparison with the inadequate reference standard ("gold standard") (the test that will be evaluated as part of the gold standard or the result affects the implementation of the gold standard). Comparison is not masked. Case-control studies.
Level 3 studies	Include two or more of the criteria described in level 2 studies.

Recommendation	Evidence
A	Ia or Ib
B	II
C	III
D	IV

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Recommendations of the CPG

Assessment of sleep disorders

√	In a general assessment of children in Primary Care (PC) Health Centers, a medical history that includes the following is recommended: a description of sleep over a 24-hour period, the age of onset, incorrect sleep habits (schedules), behaviour, school performance, evaluation of the day (not just the night), family medical history of sleep disorders, if this is an acute or ***chronic*** temporary disorder, other biological functions that are affected, the use of medicines and drugs and the presence of other pathologies and/or syndromes.
√	The use of ***key questions*** is recommended for detecting sleep disorders and to be able to discard other disorders (Appendix 2).
√	Percentiles curves for sleep duration can be used to help see the evolution of a child's sleep and for a comparison thereof with other children (Appendix 2).
D	The use of a sleep-wake diary/ log for at least 15 days is recommended in order to know the patient's sleep and wake times and to monitor the evolution thereof (Appendix 5).
√	If sleep-related breathing disorders, parasomnias, rhythmic movements and/or periodic limb movements are suspected, a home video-recording is recommended for the assessment thereof.
D	As a screening tool for sleep problems, the BISQ (Brief Infant Sleep Questionnaire) is recommended for infants under the age of 2 and a half (Appendix 6).
D	As a screening tool of sleep problems in children from 2 to 18 years of age, the use of the ***BEARS*** questionnaire is recommended (B = Bedtime Issues, E = Excessive Daytime Sleepiness, A = Night Awakenings, R = Regularity and Duration of Sleep, S = Snoring) (Appendix 6).
D	To assess the presence of sleep disorders in school age, the use of Bruni's SDSC questionnaire is commended (Sleep disturbance Scale for Children) (Appendix 6).
√	The schematic presented in Appendix 7 is recommended for handling sleep problems/disorders in PC paediatric consultations using the aforementioned questionnaires.

Preventive strategies for sleep disorders

D	The characteristic aspects of sleep according to age ranges should be taken into account to be able to establish preventive recommendations (see Table 11).
√	Parents, caretakers and/or adolescents should be informed about the preventive strategies of sleep problems during visits to `Primary Care Health Centers according to the corresponding age (Appendix 8.1).
√	It is recommendable that educators keep in mind a series of preventive strategies of sleep problems to be able to adequately handle and inform parents/caretakers and/or adolescents, depending on the corresponding education-learning cycle (Appendix 8.2).

The child who has trouble falling asleep

Insomnia

Diagnosis

D	The diagnosis should be made basically through a medical record, and sometimes with the help of the information gathered by the family in sleep-wake diaries/ logs/.

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Treatment

Sleep hygiene strategies

C	Educational interventions that include sleep hygiene practices are recommended, in addition to information about the importance of and need for sleep (see Appendixes 8 and 9).

Psychological interventions*

B	Techniques based on the principles of behavioral therapy (BT) for insomnia should at least include graduated extinction, after parent education. Other behavioral therapies that can be recommended are unmodified extinction, delaying bedtime in conjunction with the pre-sleep ritual and scheduled awakenings.
√	Before recommending the graduated extinction technique, it is recommendable to assess the parent's tolerance to this technique, for which a series of questions can help (Appendix 12).
B	For adolescents, sleep hygiene practices and behavioral interventions that at least include stimulus control is recommended for treating insomnia. Another intervention that could be recommended is cognitive restructuring.
B	For adolescents, sleep education and management programmes are recommended, including guidelines on sleep hygiene practices, instructions on stimulus control and information about consuming substances and the impact that sleep problems can have on mood and academic performance.
B	To reduce cognitive activation prior to sleep in adolescents who have insomnia and a tendency to think about their problems when it's time to go to bed, a structured problem-solving procedure is recommended.

**Appendix 11* includes information for PC professionals and for parents, caretakers and adolescents about the main interventions.

Pharmacological interventions

D	The pharmacological treatment of paediatric insomnia requires a careful selection of patients, after having made the correct diagnosis according to the professional's judgement.
B	Pharmacological treatment is not recommended either as a first option or as an exclusive treatment strategy for paediatric insomnia.
D	The use of drugs must be preceded by the application of sleep hygiene practices.
D	Pharmacological treatment is always recommended in combination with non-pharmacological strategies such as behavioral interventions and parent education.
D	Medication should only be used in the short term, and the drug should be selected according to the problem –short action for sleep onset problems and with a long half-life for maintenance problems– thereafter monitoring the benefits and adverse effects.
D	Prior to starting the use of drugs, clear treatment objectives should be established together with the parents/ caretakers or adolescents, and the use of other medicines, alcohol, drugs and the possibility of pregnancy should be explored.
√	Pharmacological treatment of paediatric insomnia is recommended when: • The safety or welfare of the child is threatened. • The parents are unable to implement non-pharmacological interventions. • The insomnia is within the context of a medical illness or an acute stressorl situation.

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D	The pharmacological treatment of paediatric insomnia is not recommended when: • There is an untreated, sleep-disorder breathing. • The insomnia is due to a developmentally based normal sleep behavior or due to false expectations of the parents about sleep. • The insomnia is due to a short duration, self-limited condition (e.g., teething). • There may be potential drug interactions with the usual medication or with substance or alcohol abuse. • It is not possible to follow up on and/or monitor the treatment (parents are incapable of going to scheduled appointments).

Melatonin

√	There is no evidence for recommending the use of melatonin in children under 6 years of age.
√	The Spanish Agency of Medicines and Healthcare Products (AEMPS) has not authorised melatonin for paediatric insomnia. However, the outcomes obtained from trials in children between 6 and 12 years of age who have chronic sleep onset insomnia and who do not respond to educational interventions with sleep hygiene practices and psychological interventions suggest that once approved, the use of melatonin at a dose of 0.05 mg/kg, administered at least 1 to 2 hours before the desired bedtime, could be assessed.
√	Melatonin must be chemically pure and always be administered at the same time and under adequate control by a paediatrician or a doctor specialising in sleep disorders, and the removal thereof should be assessed according to the clinical evolution. If, for any reason (forgotten, holiday, etc.), it cannot be administered at that time, the dose for that day should be eliminated.
√	Professionals are advised to ask parents about any type of melatonin acquired at a store or health food store to avoid the use of melatonin of animal origin and/or uncontrolled doses.

Other treatments

Nutritional supplements

B	More long-term comparative studies are needed to give a general recommendation for using nutritional supplements to treat paediatric insomnia.

Medicinal herbs

B	There is insufficient evidence to recommend the use of valerian or the use of valerian in combination with hops for treating paediatric insomnia.
D	Professionals are advised to ask parents/adolescents about any health food store product that is being taken or that may have been taken in order to alert them about the danger of self-medication in combination with drugs and herbal products.

White noise

B	There is insufficient evidence about efficacy and safety to recommend the use of white noise for treating paediatric insomnia.

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Restless Legs Syndrome (RLS)

Diagnosis

√	RLS should fundamentally be diagnosed through a complete medical record that includes personal and family medical history, a comprehensive physical examination and a haematological study (blood count, blood sugar, transaminases, kidney function, iron metabolism). The information gathered by families in sleep logs/diaries can be useful.
√	It is advisable to keep in mind the following pathologies when posing a differential diagnosis: Attention Deficit Hyperactivity Disorder (ADHD), positional discomfort, growth pains, motor ticks, muscle pains, muscle cramps, bone pathology, acathisia and other illnesses such as skin diseases, rheumatic illnesses, peripheral polyneuropathy, radiculopathy or muscular dystrophy, hypnic myoclonus, myoclonic crises and parasomnias.

Treatment

√	In less serious cases of RLS, a series of general, non-pharmacological strategies are recommended, which include reducing or eliminating those factors that bring on RLS (limiting the consumption of caffeine, chocolate, nicotine, alcohol and drugs) and applying rules based on the principles of sleep hygiene practices, mainly, and recommendations to relatives about adequate sleep schedules for their children, depending on the age.
√	To reduce discomfort in legs in class at school, family and school support is recommended, which can translate into strategies such as allowing the child to leave to take a walk during class, some physical activity during breaks or frequently changing positions.
D	More evidence is needed to make a general recommendation about physical exercise programmes for treating paediatric RLS.
D	The measurement of iron and ferritin levels in the blood is recommended if RLS symptoms are present, even when there is no anaemia or there is moderate anaemia.
√	In the event that the serum ferritin levels are below 35 µg/l, oral treatment with iron is recommended, at a therapeutic dose of iron-deficiency anaemia, followed by subsequent analytical control.
√	It is advisable that children with RLS who do not respond to the general strategies, to sleep hygiene practices or to the oral intake of iron, be referred to secondary care or Hospital Care.

Delayed Sleep-Phase Syndrome (DSPS)

Diagnosis

D	DSPS must be diagnosed by clinical evaluation, for which sleep diaries/logs with information collected by families can be used if it is suspected.
√	It is advisable to take into account the following for a differential diagnosis: both primary and secondary insomnia, inadequate sleep hygiene practices and some mood or anxiety disorders.

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Treatment

√	Basic sleep hygiene practices are recommended for reducing factors that precipitate DSPS (Appendix 8), with emphasis on the following: avoiding naps, understanding that the bed is for sleeping (and not for eating, studying, listening to music, talking on the phone, etc.), avoiding physical activity close to bedtime and avoiding excessive exposure to light (from the TV, computer, video games or other devices) at the end of the day and increasing exposure to natural light in the morning.
D	More evidence is needed to make a general recommendation for phototherapy or bright light for the treatment of DSPS in children.
√	The Spanish Agency of Medicines and Healthcare Products (AEMPS) has not authorised melatonin for DSPS in children, although the outcomes of trials on children over 6 years of age who have the delayed sleep-phase syndrome and who do not respond to sleep hygiene interventions suggest that, once approved, the use thereof could be assessed at a dose in the 0.3-6 mg range up to 6 hours before the usual bedtime.
√	Melatonin must always be administered under adequate control by a paediatrician or a doctor specialising in sleep disorders, and the removal thereof should be assessed according to the clinical evolution.
B, C	More evidence is needed to recommend chronotherapy for the treatment of DSPS in children.
D	The administration of vitamin B12 for the treatment of DSPS in children is not recommended.

The child who has abnormal events at night

Obstructive Sleep Apnea-Hypopnea Syndrome (OSAHS)

Diagnosis

√	The diagnosis of suspected OSAHS in Primary Care Health Centers must be initiated according to adequate medical history and a physical examination (Table 21), initially including three key questions (Table 23) and paying attention to warning signs and symptoms (Table 22).
D	Chervin's Pediatric Sleep Questionnaire (reduced PSQ) is recommended for helping to establish the diagnosis of suspected obstructive sleep apnea-hypopnea syndrome (OSAHS) (Appendix 6).
D	In addition, a home video-recording could be requested, which can be assessed using Sivan's videotape recording score to help with the diagnostic suspicion (Appendix 6).
D	In the event of the confirmed clinical suspicion of OSAHS, it is advisable to refer the patient to secondary care or Hospital Care (see Chapter 9, algorithm 4).

Treatment

√	As treatment for OSAHS in Primary Care Health Centers, a conservative treatment is recommended (sleep hygiene strategies, Appendix 8) until definitive treatment is established at a secondary care or Hospital Care and after the treatment.
√	Clinical re-assessment and follow-up after treatment of children with OSAHS are recommended upon return to Primary Care Health Centers after having been treated in Hospital Care. Children should be sent back to Hospital Care under certain circumstances (see Chapter 9, algorithm 4).

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Sleepwalking, night or sleep terrors and confusional arousals

Diagnosis

D	A complete medical record should be drawn up, including a detailed description of the episodes, with special emphasis on the age of onset, the time when it occurs, the frequency, the regularity and duration of the episodes, any family medcial history of sleep disorders and factors associated with predisposition or precipitation of episodes, as well as the impact that the disorder is causing to the patient's daily life.
√	In addition to a physical examination, it is recommendable to complete the medicall history with an assessment of development and an assessment of behaviour in the social, family and school environments.
D	It is advisable to keep in mind the following pathologies when posing a differential diagnosis: REM sleep behaviour disorder, nightmares, nocturnal panic attacks and nocturnal epilepsy (nocturnal frontal lobe epilepsy).
C	It is advisable to use the FLEP (Frontal Lobe Epilepsy and Parasomnias) scale in the event that there might be diagnostic doubts between frontal lobe epilepsy and parasomnias (Appendix 6).
D	It is recommendable to refer patients to a unit specialising in sleep disorders or to centres of reference if they show symptoms suggesting unusual or atypical parasomnias (due to the age of onset, the time when the episodes occur, the frequency, the regularity and duration of the episodes and the motor patterns), if another sleep disorder is suspected as the trigger (obstructive sleep apnea syndrome or periodic leg movements), in cases when legal considerations may require it or when there is no response to conventional treatment.
D	Cases in which it is suspected that a sleep disorder may be related to epileptic crises should be referred to a unit specialising in sleep disorders or to a secondary care or Hospital Care. This is also true for assessing sleep-related behaviours that are violent or potentially dangerous to the patient or others.
D	Referring cases of typical parasomnias that are not complicated or that have not caused injuries to a unit specialising in sleep disorders or to a secondary care or Hospital Care is not recommended.

Treatment

√	It is recommendable to discuss the generally benign and self-limiting nature of the episodes with the parents of an affected child.
D	The first measure that should be taken is to improve sleep hygiene practices: the child must sleep enough hours, naps should not be eliminated if they are usually taken, a regular sleep schedule should be maintained and possible triggers should be avoided.
D	Parents should be advised about how to act when an episode occurs: lead the child back to bed, avoid waking them up and interfering and avoid discussing the episode the following day.
D	It is recommendable to advise parents about the appropriate safety practices that should be taken at home.
D	When episodes are not successfully managed using sleep hygiene practices, the attempt can be made to control them by scheduled awakenings if the episodes usually occur at approximately the same time.
√	In more serious or intense cases, or cases that have consequences for wakefulness or that have not responded to the preceding practices, the patient should be referred to a secondary care or Hospital Care.
D	If there is evidence of a primary sleep disorder (OSAHS, RLS-PLM) or other comorbid disorders (ADHD), these disorders should be treated to correct the parasomnias.

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Nightmares

Diagnosis

D	The diagnosis should be made fundamentally through the medical record, with the help of sleep logs/ diaries.
D	A polysomnography is not recommended routinely for diagnosing nightmares.

Treatment

√	It is recommendable to put the family at ease, thereby insisting on the benign and limited nature of the symptoms.
D	The following actions are recommended to prevent the appearance of nightmares: maintaining good sleep hygiene strategies (see Appendix 8); maintaining a calm and relaxed period before going to bed; avoiding watching horror films or television series or listening to horror stories before going to bed; reducing those factors that can be stressful to the child; restricting the intake of liquids after dinner; and having the child urinate before going to bed.
D	When a child has a nightmare, it is recommendable that the parents use any or several of the following strategies: soothing and calming the child, emphasising that it has only been a nightmare, or using objects that transmit security to the child to help them go back to sleep.
D	It is recommendable to ask the child, depending on their age, to draw or describe the nightmare with the help of the parents, thereby changing the ending of the same so that the child feels secure with this new ending.
√	Whenever nightmares occur almost every night or there are several episodes in the same night, or there is a risk that the subject might become injured or injure others or when the nightmares affect the activities of daily life, the child should be referred to a secondary care or Hospital Care.

Sleep-related rhythmic movement disorder

Diagnosis

√	The diagnosis must be made fundamentally through the medical record, a physical examination, sleep logs/ diaries and, sometimes, with the help of home videos-recording by the family.
D	A video-polysomnography must be reserved for cases in which the diagnosis is doubtful, when other sleep disorders coexist (such as OSAHS) and when it is necessary to determine how the movements affect sleep quality or daily activities.
D	The differential diagnosis of sleep-related rhythmic movement disorders should include developmental disorders, medical disorders (neurological, pain, gastroesophageal reflux, ear infection, blindness or others), self-stimulating behaviours, convulsions and other parasomnias and movement disorders (bruxism, sleep spasms, tics, spasmus nutans, REM sleep behaviour disorder or restless legs syndrome with periodic limb movement disorder or RLS-PLMD).

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Treatment

D	As the first measure, it is recommendable to put the family at ease, thereby insisting on the benign and limited nature of the symptoms.
D	Parents should be instructed about the safety practices for preventing a child from injuring himself: tightening the screws on a crib, placing bumpers in cribs and placing protective bars on beds.
√	In more serious or intense cases, or cases that have consequences on wake times or that persist beyond six years of age, the patient should be referred to a secondary care or Hospital Care.

The child who falls asleep during the day

Excessive daytime sleepiness (EDS)

Diagnosis

√	EDS should be fundamentally diagnosed through a complete medical record that includes the medical background, any medicines or drugs that are being taken and the patient's habits, in addition to any daily consequences using the help of information gathered by families in sleep logs/diaries and the Paediatric Daytime Sleepiness Scale (PDSS).

Narcolepsy

Diagnosis

√	To help with the diagnosis of narcolepsy, it is necessary to investigate if there is a family medical history of other causes of EDS or of narcolepsy.
√	Diagnostic tests targeted at confirming or discarding this disorder must be performed at a hospital, preferably at a secondary care or Hospital Care.

Treatment

√	Parents/guardians should be advised to inform schools about the needs of children so that their schedules and school work can be adapted according to their needs, without affecting their academic performance.
√	Children should receive supervision when they perform potentially dangerous activities (such as swimming).
√	Adolescents who are diagnosed with narcolepsy and who have driver's licenses will be advised not to drive and to notify their status to the Department of Motor Vehicles. They will also be informed about legislation in force, which states that persons with narcolepsy may not obtain or extend a driver's license, unless a favourable medical report is issued, in which case the validity period of the license can be reduced according to the physician's opinion.
√	Sleep hygiene strategies must be explained, thereby insisting on education about healthy habits (Appendix 8).
√	It is recommendable to take a short, scheduled nap throughout the day.

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Information for the patient/relatives of the patient

√	It is recommendable to provide information to the parents/caretakers and children/adolescents who have sleep problems (or who are suspected of having them), thereby including general information about the problem and about effective interventions (see Appendix 15 – information for the patient).
√	To improve adherence to treatment and facilitate shared decision-making, the experiences, preferences and expectations of the parents/caretakers and children/adolescents regarding the therapeutic decisions to be made must be taken into account.
√	It is recommendable to help parents/caretakers and children/adolescents acquire a certain degree of motivation to carry out a health professional's recommendations regarding sleep hygiene strategies and psychological interventions that require behaviour modification.
√	Parents/caretakers and children/adolescents must be made aware of the barriers that can arise and the effort involved in complying with certain psychological interventions regarding the adoption of new patterns of behaviour (keeping the same sleep times every day, getting out of bed until becoming sleepy again, eliminating certain habits that can alter sleep behaviour [such as playing video games], foods/drinks with caffeine, eating chocolate, etc.).

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1. Introduction

Sleep plays a fundamental role in many important spheres of child development, and as such, knowing about sleep habits provides professionals with one of the gateways into child development[1-4]. Sleep medicine is still in its second infancy, and paediatric sleep medicine is a baby just taking its first steps; perhaps because many of the problems of and with sleep require an inter-disciplinary or multidisciplinary approach. Sleep problems in childhood and adolescence are increasingly more frequent as reasons for consultation in Primary Care Health Centers, and a large number of the demands due to these clinical symptoms can be resolved or could be resolved at this level of care, wherefore professionals at this level of care play a key role in detecting and managing these disorders.

Sleep problems in children, unlike what generally occurs in adult ages, can have negative implications for both child development (behaviour, school performance, growth) and for the quality of life of relatives[5-7]; even the preference for a certain sleep schedule of a child (the so-called "chronotype") means that some children need to go to bed and get up early, while others need to do so later. Parents must know the "chronotype" of their children, given that it will often condition the duration of sleep and the family attitude towards sleep. Primary Care professionals are normally the first, within the health system, to be consulted by the parents of these patients in order to seek advise and receive treatment.

It is fundamental to provide professionals with tools, practices and mechanisms for handling these disorders, thereby decreasing variability in diagnoses and in therapy, considering that even some recent studies talk about a probable under-diagnosis of these disorders within the context of Primary Care Health Centers[8]. Through suitable assessment and treatment in the youngest patients, it would be possible to prevent the development of many sleep disorders in adults. Therefore, for the correct therapeutic approach to sleep problems of children and adolescents in Primary Care Health Centers, it is essential to have an updated CPG that is based on evidence.

This document constitutes the *complete* version of the CPG on sleep disorders in childhood and adolescence in Primary Care Health Centers. The CPG is structured by chapters in which answers are given to the questions included at the beginning. The summary of evidence and the recommendations are presented at the end of each chapter. Throughout the text, the type of study and the possibility of bias of the reviewed bibliography are indicated in the right-hand margin.

The material where detailed information is presented on the methodological process of the CPG (description of the techniques used in qualitative investigations, search strategy for each clinical question, evidence tables) is available at both the web page of GuíaSalud and at the web page of the Health Technologies Assessment Unit (UETS) of the Laín Entralgo Agency, the unit from where the preparation of this CPG has been coordinated. *The Methodological Manual of CPG Preparation*, which includes the general methodology used, can also be consulted at these web pages. Moreover, there is a *summarised version* of the CPG, which is less extensive and has the main appendixes of the *complete version*, in addition to a *quick version* with the recommendations and main algorithms, both in a printed version and at the aforesaid web pages. There is also a version with *information for patients* at the aforementioned web pages (UETS, GuíaSalud).

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2. Scope and Objectives

The main objective of this guideline is to orient health professionals in *Primary Care Health Centers (PC) on recognising sleep problems and disorders in childhood and adolescence* and, above all, on selecting the recommendations, based on available scientific evidence, of therapeutic interventions for managing patients who are encompassed within three large blocks:

- **The child who has trouble falling asleep:** insomnia due to inadequate sleep hygiene, behavioral insomnia, restless legs syndrome, delayed sleep phase syndrome.
- **The child who has abnormal events at night:** obstructive sleep apnea-hypopnea syndrome (OSAHS), sleepwalking, night or sleep terrors, confusional arousals, nightmares, sleep-related rhythmic movement disorder.
- **The child who sleeps during the day:** chronic sleep deprivation of multifactorial origin, narcolepsy.

The CPG takes on these three large groups of sleep disorders, highlighting in each one those disorders that are the most relevant due to their frequency and seriousness in childhood and adolescence. Other sleep disorders will only be taken into account, when discussing the differential diagnosis, with the disorders included in this CPG.

The guideline is therefore targeted at health professional who are involved in managing patients with *sleep disorders in childhood and adolescence* and who work within the Primary Care area (paediatricians, family physicians, nurses), and it is also directed at all patients and relatives who resort to this first level of care. For the latter, it is a tool that will allow them to know the therapeutic strategies and possibilities that these disorders have, such that treatment guidelines not backed by scientific evidence can be avoided.

The guideline presents various therapeutic alternatives (non-pharmacological and pharmacological treatment) that can be used in Primary Care Health Centers according to the available resources. In fact, the resources that are currently available have been taken into account in the definitive preparation of the recommendations.

Given that this CPG has a national approach, it does not take on organisational matters, although it does attempt to establish a basic circuit of patients between the two healthcare levels (Primary Care and Hospital Care), wherefore it will also be distributed among all other professionals involved in healthcare, thereby seeking comprehensive patient care. It may also be useful to other professionals, both in the socio-health area (social workers) and in the educational sphere (teachers, counsellors) so that they are capable of recognising the early warning signs of a health problem that can affect the normal development of children and adolescents.

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3. Methodology

The methodology used is included in the Methodology Manual for Drafting CPGs in the National Health System[9].

The steps that have been followed are the following:

- The formation of the guideline development group, composed of professionals from: Primary Care (paediatrics, family physician, nursing), HospitalCare (paediatrics, clinical neurophysiology, psychology, respiratory medicine), education (psychologist-counsellor) and technicians of the Health Technologies Assessment Unit (UETS). Moreover, for the preparation of this guideline, there has been participation by two patients/representatives of patients within the development group as from the initial phases of the work.
- The formation of a sub-group, with members of the guideline group, for preparing information directed at the patient.
- The definition of the scope and objectives of the guideline, including the social viewpoint of disorders through the use of qualitative research techniques.
- First of all, the guideline development group was consulted in advance. Using a questionnaire designed to define the scope and objectives, and via e-mail, the group assessed those aspects that could help define the key areas of the CPG.
- Subsequently, patients and relatives of patients were recruited, with whom a discussion group and in-depth interviews were conducted so that they could freely express their experiences, interests and concerns about managing these disorders.
- The formulation of clinical questions following the Patient-Intervention-Comparison-Outcome (PICO) format.
- A bibliographical search in: Medline, Embase, PsycINFO, CINAHL, Cochrane Plus, DARE, HTA, Clinical Evidence, INAHTA, NHS EED and CINDOC. Languages: Spanish, English and French. Study population: childhood and adolescence. No limit on the year of publication.

First a search was performed to locate clinical practice guidelines. The objective was to obtain a secondary source of evidence in order to respond to specific sections of the guideline (diagnostic strategies, therapeutic strategies and information for/communication with the patient).

In the second phase, there was a search for systematic reviews, meta-analyses and assessment reports in the aforementioned databases. In the third phase, there was an expanded search of primary studies (clinical trials, observational studies, studies of diagnostic and prognostic tests).

- Assessment of the quality of the studies and a summary of evidence for each question, thereby following the recommendations of SIGN (Scottish Intercollegiate Guidelines Network).
- The formulation of recommendations based on the "formal assessment" or "reasoned judgement" of SIGN. The evidence has been classified and the recommendations have been rated according to the SIGN system. Controversial recommendations or recommendations with an absence of evidence were resolved by informal consensus of the guideline development group.

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- Expert collaborators participated in the formulation of questions and on specific aspects of the guideline.
- The external review of the CPG was conducted with the participation of a group of professionals selected because of their knowledge of guidelines preparation methodology, the pathology addressed and the scope of application (professionals from paediatrics; family physician; nursing; clinical neurophysiology; ear, nose and throat; respiratory medicine; and psychiatry). Relatives of patients have also participated.
- Different scientific societies and patient associations that approach this health problem from various areas have collaborated on drafting the guideline: Asociación Española de Pediatría [Spanish Association of Paediatrics] **(AEP)**, Asociación Española de Pediatría de Atención Primaria [Spanish Association of Primary Care Paediatrics] **(AEPap)**, Asociación Española de Psicología Conductual [Spanish Association of Behavioral Psychology] **(AEPC)**, Asociación Española del Sueño [Spanish Sleep Association] **(ASENARCO)**, Sociedad Española de Medicina de la Adolescencia [Spanish Society of Adolescent Medicine] **(SEMA)**, Sociedad Española de Médicos de Atención Primaria [Spanish Society of Primary Healthcare Physicians] **(SEMERGEN)**, Sociedad Española de Medicina de Familia y Comunitaria [Spanish Society of Family and Community Medicine] **(SEMFYC)**, Sociedad Española de Médicos Generales y de Familia [Spanish Society of General and Family Physicians] **(SEMG)**, Sociedad Española de Neurología Pediátrica [Spanish Society of Paediatric Neurology] **(SENEP)**, Sociedad Española de Neurofisiología Clínica [Spanish Society of Clinical Neurophysiology] **(SENFC)**, Sociedad Española de Neumología Pediátrica [Spanish Society of Paediatric Respiratory Medicine] **(SENP)**, Sociedad Española de Otorrinolaringología [Spanish Society of Otolaryngology] **(SEORL)**, Sociedad Española de Neumología y Cirugía Torácica [Spanish Society of Respiratory Medicine and Thoracic Surgery] **(SEPAR)**, Sociedad Española de Pediatría Extrahospitalaria y Atención Primaria [Spanish Society of Out-of-Hospital Paediatrics and Primary Care] **(SEPEAP)** and the Sociedad Española del Sueño [Spanish Sleep Society] **(SES)**. All the societies are represented by some member of the development group, expert collaborators or external reviewers.
- The material is available at www.guiasalud.es, where the information is presented in detail with the methodological process of the CPG (description of the techniques used in qualitative research, the search strategy for each clinical question and evidence tables).
- Planning calls for the CPG to be updated every three years, or earlier if new scientific evidence appears that could modify some of the recommendations offered in this guideline. Updates will be made to the electronic version of the CPG, available at http://www.guiasalud.es.

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4. Epidemiology of sleep disorders

Sleep disorders are an increasingly more frequent reason for consultations at paediatric visits, with repercussions that range from within the sphere of the child himself (irritability, decreased attention and concentration) to the quality of life of the child's parents and relatives (disturbing the parents' and siblings' sleep, alteration of the parents-child-family relationship).

Knowing the epidemiology of sleep disorders in childhood and adolescence will help to understand the clinical relevance of these disorders.

4.1. Prevalence

There are few studies in Spain that have analysed the prevalence of sleep disorders in childhood and adolescence, because sleep habits and the prevalence of sleep alterations have been scarcely assessed as a whole. The prevalence of sleep orders varies according to the definition used and the type of problem under study. The definition of sleep disorders in childhood is surprisingly difficult for several reasons:

- There are often sleep problems, as opposed to true sleep disorders. Sleep problems are easy to define: they are sleep patterns that are unsatisfactory for the parents, the child or the paediatrician. They can be related to a child's well-being or the family's well-being, but not all sleep problems are abnormalities and not all of them require treatment. Conversely, a sleep disorder is defined as a true alteration, not a variation, of a physiological function that controls sleep and operates during sleep. So, a disorder represents an abnormal function, while a problem may or may not represent one.

- Frequently, the inconveniences are for the parents and not for the child. Situations that are problematic for some families are not problematic for other families in the same environment. It has been calculated that in the first year of a child's life, parents usually lose between 400 and 750 hours of sleep.

- The differences between what is normal and what is abnormal are often defined according to age and not according to the sleep pattern. The assessment and definition of sleep disorders in childhood also get complicated if we take into account that the same symptoms can have very different meanings according to a child's age: for example, knowing that a patient wets his bed is of scarce value if we don't know their age, given that it is a normal situation up to two years of age and pathological at nine.

In general, it is estimated that approximately 30% of children under the age of five have sleep problems and/or alterations of various types. A review of several studies shows that between 13% and 27% of parents of children between 4 and 12 years of age make reference to the presence of difficulties with sleep, which include reluctance to going to bed, anxiety when going to bed, delayed sleep onset, reactive co-sleeping, snoring, enuresis, nocturnal awakenings, nightmares, sleep terrors, sleepwalking, early-morning awakening and excessive daytime sleepiness. These problems are usually stable throughout childhood, such that a child with sleep difficulties at 8 months will probably continue to show sleep difficulties at 3 years of age, and those with problems at 2 years will continue having difficulties with sleep at 12 years of age[10-13]. This tendency is also observed in another, more recent study conducted in the American context, where between 6% and 11% of the parents/caretakers of children from 0 to 10 years think that a child has sleep

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problems[14]. Another recent study, within the same international context and in Primary Care paediatrics, nevertheless clearly shows an overall prevalence of 3.7% of sleep disorders according to the International Classification of Diseases (ICD-9) in children from 0 to 18 years of age. They attribute this low prevalence with respect to other studies to a probable under-diagnosis within the Primary Care context[8].

The epidemiology of sleep disorders in childhood and adolescence is presented below, thereby dividing these disorders into five large groups according to the International Classification of Sleep Disorders: Diagnostic and Coding Manual. 2nd edition (ICSD-2), American Academy of Sleep Medicine (AASM), and within each group, highlighting the most relevant ones due to their frequency in childhood.

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4.1.1. Insomnia

Childhood insomnia affects 30% of children between 6 months and 5 years of age. In 5% of the cases it occurs due to medical causes, and in the remaining 25% it is behavioral in origin[15-19].

Within our context, in a survey conducted in the Community of Valencia, less than 50% of children from 6 to 12 months of age slept on their own. 18.6% of those under the age of 6 presented nocturnal awakenings at least 3 nights per week, and 11.3% presented sleep latency exceeding 30 minutes. In this same survey, 52.8% of adolescents in Valencia from 14 to 15 years of age went to class having slept less than 8 hours, and of this group, 17% showed symptoms of excessive daytime sleepiness[20]. This also seems to be happening with adolescents outside of our environment, specifically in the United States, where the majority of students don't get the sleep they need, and parents don't seem to know about the sleep of their adolescent child[21].

Subjectively, in a recently assessed random sample of the entire Community of Valencia[22], 34.5% of 13-year olds thought that, regularly (at least 5 days per week), they slept less than what was necessary and 24% of them did not feel rested when they got up. These data confirm that, in our environment, the most frequent cause of excessive daytime sleepiness in childhood is not giving children and adolescents the opportunity to sleep the required hours for each age group. One out of every 5 children from 6 to 13 years of age gets up tired, and there is a clear correlation between excessive daytime sleepiness and falling sleep watching television. According to these data, in the Community of Valencia, overall 27% of children from 5 to 12 years of age have problems when going to bed; 11.3% have excessively long sleep latency (the time that they take to fall asleep); 6.5% present nocturnal awakenings; 17% have difficulties getting up in the morning and 17% tell of fatigue-related to sleep alterations.

The data published by Kahn in pre-adolescents from 8 to 10 years of age indicate that 43% experience sleep problems during at least 6 months[23]. 38.5% of a sample of Spanish adolescents relate bad subjective sleep quality, and 23.1% state a sleep latency of more than 30 minutes on a regular basis[24]. In adolescents (17-18 years old), 16.5% are bad sleepers (19% females and 11.7% males), and this was associated with emotional factors, poor sleep hygiene practices and certain parasomnias.

4.1.2. Sleep-related movement disorders

Periodic limb movements (PLM) show a prevalence of 1.28%[25]. 40% of these children have parasomnia symptoms (arousal disorders). Regarding rhythmic movements, in most cases the onset is before the age of one year, and they are very frequent up to nine months (59%)[26]. As from that age, the prevalence decreases gradually, varying according to age and oscillating, according to

different studies, between 9.2% in children from 2.5 to 6 years of age[27], 1.5% in children from 5 to 7 years of age[11] and 2.9% in children from 6 to 17 years of age[28]. Very rarely do they persist in adulthood[26].

Restless legs syndrome (RLS) has an estimated prevalence of 1.9% in children from 8 to 11 years of age and 2% in adolescents from 12 to 17 years of age, of whom 27% and 52%, respectively, show moderate-severe symptoms. One recent study of adolescents ranging from 15 to 18 years of age estimates a prevalence of RLS of 3.6% in these ages[29]. RLS is as frequent as epileptic disorders (2%) and is much more common among children with attention deficit hyperactivity disorder (ADHD)[30]. It is also usually associated with PLM[26].

Regarding the onset of symptoms, in 15% of the cases they usually start at the age of 5, 63% of cases between 5 and 7 years old and 2% of cases above 8 years of age. Moreover, it has been observed that children with RLS show, significantly and with greater frequency than children without RLS, a history of growth pains (80.6% versus 63.2%)[31]. In fact, some patients diagnosed as carriers of growth pains actually suffer from restless legs syndrome, which will be diagnosed at an adult age, especially if the parents have suffered from growth pains that subsequently derived into RLS[32]. Studies performed on the adult population have established that up to 46% of patients with RLS state having had the initial symptoms between 10 and 20 years of age, with subsequent worsening and without having been diagnosed with RLS during that period. Having RLS in childhood increases the risk of suffering from it in adult age, with an OR of 2.64 (IC 1.31-5.29) in males and an OR of 2.54 (IC 1.41-4.59) in females[33].

4.1.3. Circadian rhythm sleep disorders

In circadian rhythm disorders, the quantity and quality of sleep are normal, but the quantity and quality occur at the wrong time according to normal schedules. According to these symptoms, the nighttime sleep period is incorrectly positioned within the circadian cycle. In the paediatric population, the most common clinical picture is the delayed sleep-phase syndrome, in which the patient tends to go to sleep and wake up later. The usual time for sleep onset varies between 23:30 and 05:15, with a greater frequency around 02:00. It frequently occurs in the adolescent population and in young adults (7%-16%). In the population with this disorder, a greater frequency of psychopathological problems/symptoms is found (alterations of the personality, depressive symptoms)[26].

4.1.4. Sleep-related breathing disorders (SRBD)

SRBDs describe a continuous nosological range that includes habitual snoring, the increased upper airway resistance syndrome (UARS), obstructive hypopneas, obstructive sleep apnea-hypopnea (OSAHS), as well as nighttime involvement of asthma and other chronic respiratory alterations. It is estimated that the use made of health services by children affected by non-diagnosed and untreated SRBD increases the number of visits by 20%[34].

In adults, epidemiological data put the prevalence of SRBD at approximately 9% of the population from 30 to 60 years of age[35]. In children, despite the advances of recent years regarding diagnosis, treatment and consequences, these data are more disputed due to a series of circumstances:

- SRBD, obstructive hypoventilation and the apnea syndrome without the presence of snoring are excluded from most epidemiological studies of prevalence conducted through the use of questionnaires.

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- The absence of a single definition of snoring. A review of 25 epidemiological studies by Pin *et. al*.[36] shows the presence of up to 10 different definitions of normal snoring.

- Many clinical features of paediatric OSAHS and of the determinants of the epidemiology thereof are different from adult OSAHS, wherefore we could be talking about different entities that must be assessed differently[37]. For example, the upper airways of children are more resistant to collapse during sleep than those of adults. Children maintain the responses by the upper airway to subatmospheric pressure and to hypercapnia during sleep, while in adults these responses seem to be decreased. Children can have a different activation pattern of the upper airways, and keeping these responses could be a compensation mechanism for the relative narrowness of a child's airway[38].

- There is significant familial aggregation, apart from the familial similarities in weight[39], although the role of genetics and of the different risk factors is unknown. Currently, it is estimated that 35%-40% of the variability can be attributed to genetic factors[40].

- *Habitual snoring*. *Snoring* is the symptom that clinical respiratory syndromes during sleep have in common. Approximately 10-12% of children snore, and many of them have so-called "habitual snoring", which is snoring that occurs more than three days per week for more than three weeks, without showing infection of the upper airway and without being associated with apnea, gas exchange alterations or excessive arousals. The natural history of snoring indicates that the maximum peak of incidence appears around 2-3 years of age, and the decline occurs after 9 years of age[41]. It is not currently considered as harmless as it was in the past. Snoring more than 4 nights per week is significantly associated with nighttime coughing and asthma[42]. In French children, the following were found as independent variables associated with habitual snoring: a history of exercise-induced asthma (OR: 8.7 [IC: 2.8-2.6]), atopic dermatitis in early childhood (OR: 3.9 [IC: 2.0-7.7]) and adenoidal hypertrophy (OR: 2.2 [IC: 1.1-4.4]). In the study by Ali, habitual snorers had a greater risk of having hypertrophic tonsils versus those who never snored (OR of 8.8 [IC: 4.2-22]). The accompanying symptomatology (breathing through the mouth, repeated colds and difficulties with sleep) increased in frequency, starting with a child who never snored up to a habitual snorer. The results from habitual snorers, obtained in a questionnaire, were compared with those obtained by a recording in the home and nighttime pulse oximetry, and it was found that questionnaires have high sensitivity but low specificity, such that parents could overestimate snoring, thereby contradicting the findings of other studies.

A review of the six most important European population studies on *habitual snoring*, conducted with a similar and adequate methodology, is reflected in the following table (Table 1).

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Table 1. Prevalence of habitual snoring in European countries[36]

Author	Age (years)	N Final	% response	Prevalence (IC 95%)	Comments
Corbo (Italy)	6-13	1.615	97%	7.3% (6%-9%)	747 children who did not share a room were excluded in order to reduce false negatives. No differences between sexes. Habitual snorers. OR 2.9% (1.7-4.8) for rhinitis.
Tecuelescu (France)	5-6	190	100%	10,0% (5.7%-14.3%)	124 children from the original population were excluded. Non-Caucasian children and children with a low socio-economic status were excluded. ORL examination of all. No differences between sexes. 54% never snored.
Ali (England)	4-5	782	79%	12.1%	Video monitoring in the home and nighttime pulse oximetry.
Gislason (Iceland)	0.5-6	489	81.8%	3.2% (1.7%-5.1%)	22.5% of males and 14.4% of girls had had previous operations (adenoidectomy).
Hulcrantz (Sweden)	4	325	100%	6.2% (3.8%-9.3%)	Habitual snoring is statistically associated with repeat tonsillitis and the use of a pacifier. Snorers have a shorter mandibular arch, and with greater frequency, they have a parent who has had a tonsillectomy.
Own (England)	0-10	245	46%	11.0% (7.8%-16.5%)	All nighttime pulse oximetry 63% never snored.

Thus, as reported by parents, habitual snoring is present in 7.45% of the child population (95% IC: 5.75-9.61)[36].

Obstructive sleep apnea. The observation of episodes of apnea by parents or caretakers is calculated at 0.2-4%. When the diagnosis is made through direct questionnaires of parents, its prevalence increases to 4-11%. If the diagnosis is made by objective means, its prevalence oscillates between 1% and 4% and if we study populations with comorbidity (obese), the prevalence oscillates between 4.69% and 6.6%[36]. The prevalence of the obstructive sleep apnea-hypopnea syndrome (OSAHS) among children that are 4-5 years old is estimated to be between 0.7% and 3%, with an incidence peak of between 2 and 6 years of age. The average age of onset of apnea is 34.7 months of age, while simple snoring has an average onset age of 22.7 months, with an annual incidence of between 7% and 9%. Unlike what happens with adults, children with obstructive apnea breath better in the supine position[43].

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The data taken from a systematic review are summarised in tables 2 and 3, according to laboratory diagnostic criteria and according to the presence of obesity, in which data from our context are also included[37].

Table 2. Prevalence of obstructive sleep apnea according to laboratory criteria[36]

Criterion	Country	N	Age (years)	%	Reference
AHI ≥ 10	United States	126	2-18	1.6	Redline *et al*. Am J Respir Crit Care Med. 1999; 159:1527-32
REI ≥ 10	Spain	100	12-16	2.0	Sánchez-Armengol *et al*. Chest. 2001; 119:1393-400
AHI ≥ 10/ AI ≥1	Greece	3680	1-18	4.3	Kaditis *et al*. Pediatr Pulmonol. 2004;37:499-509
AHI ≥ 5	United States	5728	5-7	5.7	O'Brien *et al*. Pediatrics. 2003; 111:554-63
AHI ≥ 5	United States	850	8-11	2.5	Rosen *et al*. J Pediatr. 2003; 142:383-9
AHI ≥ 3	Italy	895	3-11	1.0	Anuntaseree *et al*. Pediatr Pulmonol. 2005; 39:415-20
AHI ≥ 3	Turkey	1198	3-11	0.9	Sogut *et al*. Pediatr Pulmonol. 2005; 39:251-66
AHI ≥ 1	Thailand	755	9-10	1.3	Anuntaseree *et al*. Pediatr Pulmonol. 2005; 39:415-20
AHI ≥ 1	Thailand	1088	6-13	0.7	Anuntaseree *et al*. Pediatr Pulmonol. 2001; 32:222-7
AHI ≥ 1	Singapore	200	6.4 ± 4	0.1	Ng *et al*. Singapore Med J. 2002; 43:554-6

AHI: apnea-hypopnea index, AI: apnea index, REI: respiratory events index per hour of study (in nighttime respiratory polygraphy).

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Table 3. Prevalence of obstructive sleep apnea in the presence of obesity[36]

Criterion	Country	N	Age (years)	BMI	%	Reference
Frequent snoring/ no snoring	France	25,703	17-20	Low	1.00 (M)/1.00 (V)	Delasnerie-Laupretre *et al.* J Sleep Res. 1993; 2:138-42
				Medium	1.60 (1.13-2.27)/ 1.11 (0.86-1.43)	
				High	2.52 (1.89-3.64)/ 1.76 (1.39-2.23)	
Snoring > 3/s/ no snoring	Italy	2209	10-15	< PC 75	1.00	Corbo *et al.* Pediatrics. 2001; 108:1149-54
				76-90 PC 91-95 PC 96-100 PC	0.97 (0.6-1.6) 1.99 (1.1-3.5) 2.66 (1.4-4.9)	
SRBD in PSG/ no SRBD in PSG	United States	399	2-18	< 28	1.00	Redline *et al.* Am J Respir Crit Care Med. 1999; 159:1527-32
AHI > 3	Spain	44	7-14	> 28 > 85 PC	4.69 (1.59-14.15) 6.6 (3.5-14.5)	Pin and Lluch.Acta Pediatr Esp. 2007; 65:74-8

AHI: apnea-hypopnea index, BMI: body mass index, PSG: polysomnography, SRBD: sleep-related breathing disorders. The first three studies use questionnaires. The last two assess SRBD by PSG, with similarity in the prevalence.

Increased upper airway resistance syndrome (UARS). These children snore and have a partial obstruction of the upper airway that causes repetitive episodes of increased breathing effort, which ends in arousal. The sleep pattern is altered, and the daytime symptoms can be similar to those of obstructive apnea, although these children show no evidence of apneas or hypopneas or gas exchange alterations in the PSG. Its incidence in children is unknown, although it appears to be more frequent than OSAHS[44].

4.1.5. Parasomnias

Sleepwalking is probably the most frequent disorder of childhood, with a prevalence of 15% in the ages between 3 and 15 years. It is a familial disorder that has a concordance of 40% in identical twins. In studies with twins, high concordance has been seen in both identical and non-identical twins[45]. In children from 5 to 18 years of age, sleepwalking reaches figures of between 14% and 21%, and weekly nightmares, 6%. In children with parasomnias, we cannot forget the high frequency of comorbidities. Thus, Guilleminault found that, in 84 children with parasomnias, 51 of them (61%) had another sleep problem, 49 had sleep-related breathing problems and 2 had restless legs syndrome. Likewise, 29 of 49 children with parasomnias had a family history of sleep problems[46].

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Night terrors or sleep terrors is a less-frequent disorder than sleepwalking, although it is sometimes associated with sleepwalking. Its prevalence is estimated at between 1% and 5% in school-age children (Cirignotta et al., 1983; Coecagna, 1992; Kales, Soldatos and Kales, 1987). Perhaps it is the most dramatic arousal disorder, and it is typical between 3 and 4 years of age, although it sometimes reproduces between 5 and 6 years of age. The frequency of the episodes is highest right when the process starts. If the terrors start before the age of 3.5 years, they usually have a frequency peak of at least once a week, while in children in which the terrors start between 3.5 and 7.5 years, the maximum frequency peak is usually 1-2 episodes per month. The average duration of the process is about 3.9 years, with a tendency towards a greater duration in those children who have a family background of sleepwalking. 50% of the cases usually disappear at 8 years of age, but 36% continue into adolescence[47].

Nightmares are diagnosed, according to criteria of the DSM-IV, in between 10% and 50% of children from 3 to 5 years of age. They are especially prevalent among females (they are often present in 20% of males, versus 35.2% of females, at the age of 16 years)[48].

Table 4 shows a review of different studies on the prevalence of the most frequent parasomnias by ages.

Table 4. Prevalence of parasomnias

Author, country, year	Ages (years)	Sleepwalking	Night terrors	Nightmares
Petit, 2007. Canada[27]	2.5-6	14.5%	39.8%	
Ohayon, 2000.United Kingdom, Italy, Germany[49]	7-10 11-12 15-24	11.3 12.5 4.9	15.4% 12.5% 2.6%	
García-Jiménez, 2004. Spain[24]	11-18	10.5%		29.4%
Canet-Sanz, 2007. Spain[50]	8-11	1.4%	0%	1.9%
Tomás- Vila, 2008. Spain[28]	6-17	12.5%	18.4%	12.8%
Huang, 2007. Taiwan[51]	12-18	12.7%		17.1%
Liu, 2005. China[52]	2 years 3-5 6-10 11-12	1.1% 0.2% 0.6% 0.9%		
Ipsiroglu, 2002. Austria[53]	10-15	15.1% (frequently or occasionally)	10.2% (frequently or occasionally)	61.4% (frequently or occasionally)
Blader, 1997. USA[30]	5-12	1%	1.3% (in the last 6 months)	

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Contreras, 2008. Colombia[54]	5-12	7.4%	6.1%	12.8%
Bharti, 2006. India[55]	3-10	1.9%	2.9%	6.8%
Goodwin, 2004. USA[56]	6-11	3.5%	6.3%	
Archbold, 2002. USA[57]	2-13	15%	27%	
Cai, 2008. China[58]	2-12	0.9%		
Buhler, 1981. Switzerland[59]	2-18	5%		
Abuduhaer, 2007. China[60]	6-14	1.5%		
Neveus, 2001. Sweden[61]	6-10	7%		
Smedje, 1999. Sweden[11]	5-7	0.6%	1%	3.1%

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4.1.6. Excessive daytime sleepiness (EDS) or hypersomnia

Excessive daytime sleepiness (EDS) or hypersomnia is present in 11% of children[10] and 52.8% of adolescents[22]. It is necessary to differentiate between "primary" or idiopathic hypersomnias, characterised by an excessive need for sleep, and "secondary" hypersomnias, which are all situations or pathologies that are present with insufficient sleep and cause EDS. The most frequent kind of secondary hypersomnia is chronic sleep deprivation, which is the main cause of EDS in children and adolescents. Primary hypersomnias, or hypersomnias originating in the central nervous system, are less frequent, and of all these hypersomnias, narcolepsy is the most prominent, as the most relevant disorder and due to the serious repercussions on a patient's quality of life. Narcolepsy is a chronic disorder that typically comes out in adolescence, although a third of patients describe the start of the symptoms in childhood[62], and they were not identified in the paediatric age due to the complexity of the manifestations. It is an infrequent illness that affects between 0.25% and 0.56% of the population, without a predominance of either sex and with two peaks of incidence (at 15 years of age and at 30-35 years)[63]. Even though the prevalence of familial narcolepsy is low and most cases are sporadic, the risk of developing narcolepsy in first-degree relatives of narcoleptic patients is 1%-2%, which represents up to 40 times more than the general population[64].

A summary table is presented below, which includes the most relevant data on the prevalence of each one of the disorders by age, according to the previously reviewed studies (Table 5):

Table 5. Summary of the prevalence of sleep disorders by age

Ages (years)	Insomnia	Sleepwalking	Night terrors	Nightmares	Restless legs S.	Rhythmic movements	Habitual snoring	Sleep apnea-hypopnea syndrome	Narcolepsy
0.5-5	30%								
3-5			1%-5%	10%-50%					
4-5								0.7%-3%	
2.5-6						9.2%		2%-3%	
5-7						1.5%			
8-11					1.9%				
0-14							7.5%		
3-15		15%							
6-17				12.8%		2.9%			
12-17					2%				0.2%-0.6%
5-18		14%-21%							

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4.2. Impact of the disorders

4.2.1. Quality of life and school performance

Research on sleep disorders in adults has clearly demonstrated the impact that they have on mood, from a cognitive point of view and regarding functional capacity, as well as on the social dimensions of quality of life related to health[65, 66]. In children, likewise, it has been seen that, in addition to affecting behaviour and mood, sleep disorders can also alter cognitive functions, as revealed by the verification of a decrease in selective attention, alertness and memory[67-69].

A recent review, which includes experimental, quasi-experimental and case-control studies, has examined if sleep during childhood and adolescence is related to daily functioning[70]. The results suggest that inadequate sleep, due to quality and/or quantity, can cause sleepiness, attention difficulties and, very probably, other cognitive and behavioral deficits that significantly affect the functioning of children and adolescents. The review concludes that the evidence found supports both the integration of sleep screening and interventions in the daily clinical routine, as well as the need for aid through public policies, to attempt to improve sleep in children and adolescents.

Several studies have likewise expressed, for some time, the relationship between sleep difficulties and worse school performance. For example, 17% of adolescent children with symptoms of delayed sleep-phase syndrome showed worse academic results[71]. Other studies that have been

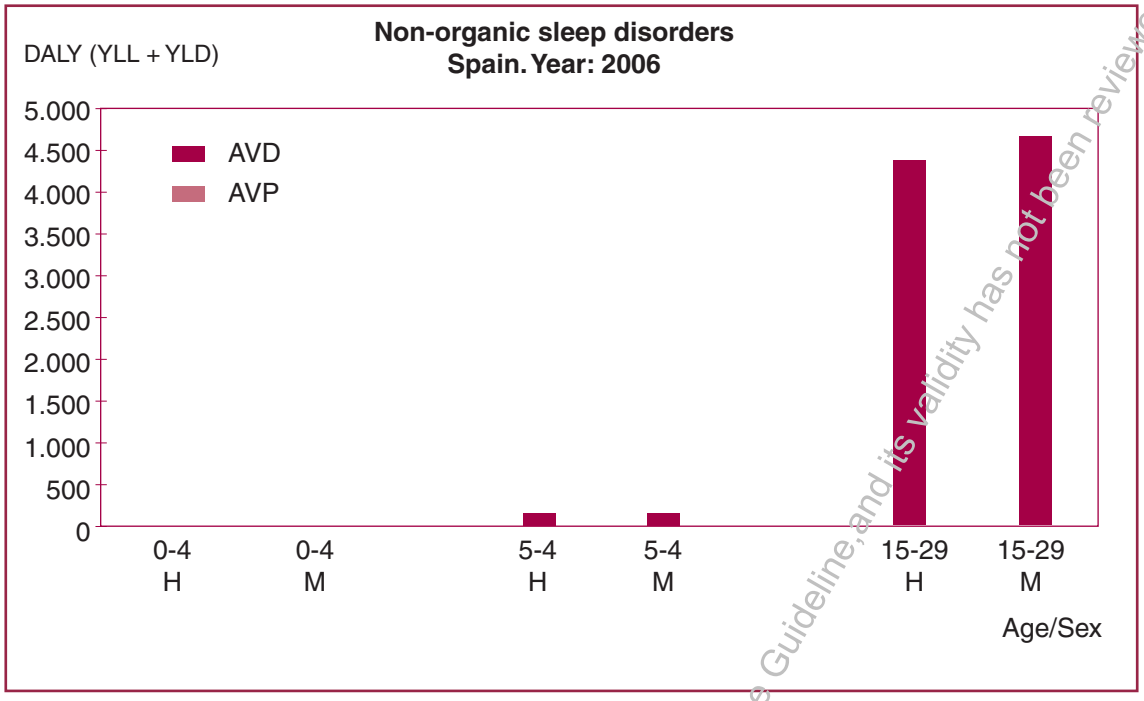
conducted, also on adolescents, have pointed out that insufficient total sleep time, going to bed late during the week and even later on the weekends were associated with worse notes[72]. Other research has gone further and has demonstrated that sleep habits are, more than other health-related behaviours, what have the greatest predictive value of academic development among students[73]. In this regard, recent studies show that the students who are at the greatest risk of sleep disorders, which are those who state that they sleep for an insufficient amount of time and have discrepancies between the quantity of sleep during the week and the weekend, are those students who showed worse academic results[74]. This has also been seen to happen in younger children, both from 5 to 6 years of age[75] and in children from 7 to 11 years of age[76]. The same thing happens when talking about sleep disorders that have already been diagnosed, in which it is demonstrated that there is an association between said disorders and worse performance in school[77, 78].

4.2.2. Burden of disease

It is estimated that in 2006 the under-30 Spanish population had a burden of disease due to non-organic sleep disorders (F51 of the ICD-10) that was equivalent to 9.278 years of life lost (322 years in children under the age of 15)[79]. Given that no death from this cause was recorded, all the burden is attributable to the associated morbidity and disability. This figure of years of life lived with poor health represents 1.6% of the total burden of disease due to neuropsychiatric illnesses in the under-30 population (0.4% in children under 15), 1.1% (0.2%) of the total of non-communicable diseases and 0.8% (0.1%) of the total of the disability-adjusted life years (DALY). The burden of disease due to non-organic sleep disorders in the population from 0 to 29 years of age is somewhat higher in women (51.3% of the DALY for this cause) than in men. In the population as a whole, the greater DALY proportion for these causes is concentrated in the adult population, wherefore the share by children under 15 is scarce.

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Graph 1. Burden of disease due to non-organic sleep disorders. Spain, 2006.



YLD: years lived with disability or poor health.

YLL: years of life lost due to premature mortality.

DALY: Disability-adjusted life years. Obtained by aggregation of YLD and YLL.

Source: information provided and prepared by the Health Reports and Studies Service. Regional Department of Health, Community of Madrid.

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5. Concepts and classifications

Questions to be answered:

- What are the general concepts about sleep?
- What are the clinical features of sleep?
- What is the classification of sleep disorders?

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5.1. General concepts: architecture of sleep

Sleep is a physiological, reversible and cyclical state that opposes the state of wakefulness, and it shows characteristic behavioral manifestations, such as the relative absence of motility and an increase in the response threshold to external stimulation. Organically, there are functional modifications and changes of activity in the nervous system, accompanied by a modification of the intellectual activity, which constitute dreams.

Sleep used to be considered a passive state, but it is now known that sleep is an active state in which several neural systems take part and mutually influence each other: the diencephalon, the brain stem and the cerebral cortex.

Human beings spend approximately one third of their lives sleeping. It has been demonstrated that sleeping is an absolutely necessary activity, given that, during sleep, physiological functions that are essential for mental and physical equilibrium of people are carried out: restoring the homeostasis of the central nervous system and all other tissues, re-establishing stores of cellular energy and consolidating memory[80, 81]. The duration of nighttime sleep varies according to age, state of health, emotional state and other factors, and the ideal duration is that which allows us to perform daily activities in a normal fashion.

Sleep has always been considered to be a state related to behaviour. However, the characteristics of the cerebral electrical function, which is recorded through electroencephalography (EEG), confirm that there is a relationship between cerebral activity and the stage of sleep. The polysomnography or PSG has therefore been developed, which consists of the standardised and simultaneous recording of multiple biological signals during the states of wakefulness and sleep, thereby allowing them to be identified. Currently, these bioelectrical signals are processed through digital systems.

There are two, well-differentiated types of sleep: *Rapid Eye Movement sleep* (REM sleep) and *Non-Rapid Eye Movement Sleep* (NREM sleep). REM sleep is associated with elevated neuronal activity and with dreams[82,83]. NREM sleep is subdivided into three stages, according to the new terminology recommended by the American Academy of Sleep Medicine: phase N1 is the shortest and corresponds to the superficial phase of sleep, phase N2 represents 50% of total sleep time and phase N3 corresponds to the deepest and most restorative sleep[82]. During the nighttime sleep period, REM and NREM sleep alternate cyclically (4 to 6 times). At the start of the night, deep sleep predominates, while the duration of REM sleep periods increases in the successive cycles. Appendix 1 presents a more detailed schematic of the physiology of sleep.

5.1.1. Sleep in childhood and adolescence.

Throughout life, sleep behaviour varies depending on intrinsic biological cycles and the environment, in which we can observe changes linked to the development of the CNS or educational conditioning factors, labour factors, social factors, etc., which are different depending one's stage of life.

In the uterus, the human foetus at 30-32 weeks of gestation already shows ultradian cycles (lasting less than 24 hours) of sleep-wake.

During the initial days of life, a newborn remains asleep over 16 hours per day, distributed over several episodes.

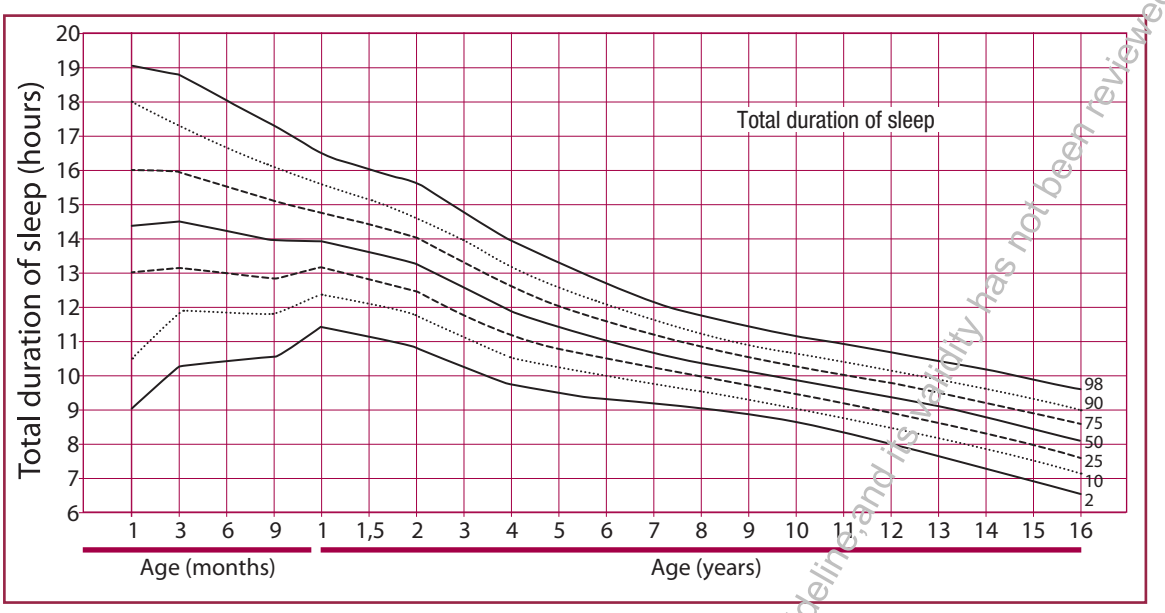
In newborns and nursing babies under 3 months of age, active sleep, the precursor of REM sleep, is what shows the greatest proportion, reaching up to 50% of the total sleep time during the initial days of life[84]. This sleep is characterised by irregular respiration and heart beat, rapid eye movements, axial muscle atonia and brief muscular contractions that are accompanied by facial grimaces such as smiles and sucking.

At 2-3 months of age, sleep *spindles*[82] appear (characteristic of phase N2), and it is now possible to differentiate all the sleep phases. As from this age, the hours of sleep start to decrease, and changes related to cerebral maturation start, fundamentally a reduction of the quantity of REM sleep.

At 12 months, the sleep average is 12-13 hours per day, and 30% of this time is REM sleep. Figure 1 shows the percentiles for the total time of sleep hours as from the first months of life up to adolescence, in a paediatric population of Zurich.

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Figure 1. Percentiles of total sleep duration in 24 hours, from childhood to adolescence.



Modified from Iglowstein I. et al. Pediatrics, 2003[85].

At 2 years of age, there is an average of 13 hours of sleep per day, which is reduced to 10-12 hours at 3-5 years of age, and at 5 years of age, a child sleeps approximately 11 hours per day. Between 6 and 10 years, the CNS has matured to a large extent, and the average number of hours of sleep is 10 hours per day.

Under normal conditions, awakenings during sleep decrease significantly in the pre-puberty stage with respect to childhood. In adolescence, an increase in sleep is observed, in addition to a physiological tendency to delay the nighttime sleep episode. The young adult sleeps about 8 hours per day, and most of the sleep is the NREM type (approximately, N1: 5%, N2: 50% and N3: 20%). At this age, REM sleep represents no more than 25% of total sleep. Appendix 1 presents more detailed information on the physiology of sleep.

5.1.2. Functions of sleep

Given that REM sleep and NREM sleep are physiologically different, their functions are also different. NREM sleep has a restorative function, it favours the energy processes and protein synthesis, it increases the release of the human growth hormone, it decreases the response to stress (synthesis of cortisol), and it favours cellular regeneration. REM sleep has a relevant role in the attention and memory processes, and in the consolidation of learning.

Sleep deprivation. Studies on sleep deprivation, total or partial, allow a better understanding of the functions of sleep and its physiopathology. In adults, a lack of sleep causes sleepiness, cognitive deficit and psychiatric symptoms such as mood disorders and irritability. Total sleep deprivation promotes fatigue and a decrease in the perceptive, cognitive and psychomotor functions. If this lack of sleep is extended, there can be disorientation and hallucinations.

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In children, a lack of sleep is also related to behavioral manifestations that appear as paradoxical hyperactivity, attention deficit, learning problems and mental development problems.

Sleep deprivation can involve various consequences, according to the various types of sleep. NREM sleep has been related to deeper sleep and to the secretion of the growth hormone. A chronic decrease of this type of sleep causes delayed growth and lower tissue regeneration. A lack of REM sleep causes, in addition to the aforementioned cognitive and behavioral symptoms, difficulties for correct social interaction and a lower judgement and decision-making capacity, which is manifested in children as impulsiveness. Whenever there are sleep problems, and they exceed a certain intensity or exceed the adaptive capacity of a person, they become pathological, thereby causing significant distress with symptoms that affect both the physical sphere and the psychological and behavioral spheres.

Sleep as a biological rhythm. Most of the functions of almost any living system have a rhythm of approximately 24 hours, which is known as the "circadian rhythm" (from the Latin circa, which means 'almost', and dies, which means 'day'). Some environmental stimuli have the capacity to activate the biological rhythms, and light is the main external agent, although social stimuli also act at this level. Some rhythmic biological phenomena have a shorter period than circadian rhythms, and they are known as 'ultradian rhythms'. Eating, sleep cycles and the release of hormones have ultradian rhythms.

The sleep-wake cycle is a circadian rhythm, and the alternation between REM sleep and NREM sleep has an ultradian nature.

The clinical features of sleep in childhood and adolescence are presented in the following table (Table 6):

Table 6. General clinical features of sleep in childhood and adolescence

- At 6 months of age, a baby establishes his sleep-wake circadian rhythm, with nighttime sleep of up to 5 hours.
- Sleep needs are variable according to age, and they are greater in the youngest children. Newborns sleep about 16-18 hours per day, while school-age children should sleep about 10 hours per day.
- Naps are normal up to 3-4 years of age (up to 18 months of age, one morning nap and another afternoon nap).
- Nighttime awakenings are physiological: they appear in 20-40% of children under 3, in 15% at 3 years of age and in 2% of children at 5 years of age.
- Adolescents need to sleep about 9-10 hours per day, and they show a certain physiological delay in the start of sleep (they tend to go to bed and wake up in the morning later than usual).

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5.2. Classifications

5.2.1. Diagnostic classifications

Diagnostic criteria vary according to the different classifications that may be used.

The main classifications used are the following:

- International Classification of Sleep Disorders: Diagnostic and Coding Manual. 2nd edition (ICSD-2), American Academy of Sleep Medicine (AASM).
- International Statistical Classification of Diseases and related Health Problems (ICD-10).
- International Classification of Primary Care (ICPC-2).
- International Classification of the North American Nursing Diagnosis Association (NANDA-I).

The aforementioned classifications are described below:

- I**nternational Classification of Sleep Disorders: Diagnostic and Coding Manual. 2nd edition (ICSD-2),** American Academy of Sleep Medicine (AASM).

  The International Classification of Sleep Disorders, Diagnostic and Coding Manual, was proposed in 2005, and it represents the opinion of more than 100 sleep specialists from the whole world (http://www.aasmnet.org)[26]. It is a classification focused on the traditional clinical diagnosis, above all assessing the main symptom. It is focused on sleep illnesses and not on the diagnostic methods. It presents over 80 disorders, organised into eight categories. It advises against using the word 'dyssomnia', given that it is not suitable for describing a symptom that is, in reality, a combination of symptoms[86].

- **International Statistical Classification of Diseases and related Health Problems (ICD-10).** World Health Organization (WHO).

  The list of ICD-10 codes is the tenth version of the International Statistical Classification of Diseases and related Health Problems. It provides the codes for classifying diseases and a wide variety of signs, symptoms, abnormal findings, social circumstances and external causes for injury and/or disease. It gives sleep disorders their own chapter[87].

- **International Classification of Primary Care (ICPC-2),** World Organization of National Colleges, Academies and Academic Associations of General Practitioners/Family Physicians (WONCA)[88].

  In 1999, the World Organization of National Colleges, Academies and Academic Associations of General Practitioners/Family Physicians (WONCA) published the Spanish version of the International Classification of Primary Care (ICPC-2)[5], which is the classification used the most in Primary Care in our country. The code for **sleep disorders** is **P06**. This code includes nightmares, obstructive sleep apnea, sleepwalking, insomnia and sleepiness, and it excludes problems due to a change of sleep spindles/jet lag (A38).

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Table 7. Classification of sleep disorders and equivalencies between the ICPC-2 and the ICD-10

ICPC-2	ICD-10
P06 (Sleep disorders)	G47.x Organic sleep disorders
	G47.3 Sleep apnea
	G47.4 Narcolepsy
	F10.8 Sleep disorder due to alcohol
	F19.8 Sleep disorder due to multiple drug use or other psychoactive substances
	F51.0 Nonorganic insomnia
	F51.1 Nonorganic hypersomnia
	F51.2 Nonorganic disorder of the sleep-wake schedule
	F51.5 Nightmares
	F51.4 Sleep terrors (night terrors)
	F51.3 Sleepwalking
	F51.8 Other nonorganic sleep disorders
	F51.0 Nonorganic insomnia
	F51.9 Nonorganic sleep disorder, unspecified

- **International Classification of the North American Nursing Diagnosis Association (NANDA-I)[89]**

  NANDA (North American Nursing Diagnosis Association) is a scientific nursing society whose objective is to standardise nursing diagnosis, thereby developing the nomenclature, criteria and taxonomy of said diagnoses. IN 2002, NANDA became NANDA International. It establishes a taxonomy based on domains and classes. Within each class, a five-digit code is assigned to each nursing diagnosis. Each diagnosis includes a section of defining features, and another section that provides the context called related factors. Regarding sleep disorders, the approved diagnoses are those shown in Table 8:

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Table 8. Nursing diagnoses (NANDA, 2010-2011)

00095	Insomnia	Disorder of the quantity and quality of sleep, which impairs functioning.
00096	Sleep deprivation	Prolonged time periods without sleep (periodic suspension, naturally sustained, of relative unconsciousness).
00165	Readiness for enhanced sleep	Pattern of natural and periodic suspension of consciousness, which provides adequate rest, allows the desired lifestyle and can be reinforced.
00198	Disturbed sleep pattern	Interruptions, during a limited period of time, of the quantity and quality of sleep due to external factors.

- **Classification proposed by the guideline development group.**

  Of all the classifications presented, the ICSD-2 classification will be used as the reference, although the development group considered making the following grouping of disorders finally included in the guideline to facilitate practical handling in the Primary Care context. The three large groups are the following:

I. **The child who has trouble falling asleep:** insomnia due to inadequate sleep hygiene, behavioral insomnia, restless legs syndrome, delayed sleep-phase syndrome.

II. **The child who has abnormal events at night:** obstructive sleep apnea-hypopnea syndrome (OSAHS), sleepwalking, night or sleep terrors, confusional arousals, nightmares, sleep-related rhythmic movement.disorder.

III. **The child who sleeps during the day:** chronic sleep deprivation of multifactorial origin, narcolepsy.

A relationship between the International Classification of Sleep Disorders, 2nd edition (ICSD-2) (left-hand column) and the classification posed in the Guideline (right-hand column) can be established, as shown in Table 9. The disorders shown in the guideline appear shaded.

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Table 9. ICSD-2 classification (AASM) and classification of the guideline group: equivalencies

ICSD-2 Classification (AASM)		Classification of the guideline group
Insomnia		
Acute insomnia (adjustment insomnia)		'the child who has trouble falling asleep'
Psychophysiological insomnia		
Paradoxical insomnia		
Idiopathic insomnia		
Secondary insomnia due to a mental disorder		
Inadequate sleep hygiene		
Behavioral insomnia of childhood		
Insomnia due to drug or substance		
Insomnia due to medical condition		
Insomnia not due to substance or known physiological condition		
Unspecified insomnia (not secondary to a known condition)		
Unspecified physiological insomnia		
Sleep-related breathing disorders		
Central sleep apnea syndrome	Primary central sleep apnea	'the child who has abnormal events at night'
	Due to Cheyne-Stokes breathing pattern	
	Due to high-altitude periodic breathing	
	Due to medical condition not Cheyne-Stokes	
	Due to drug or substance	
	Primary sleep apnea of infancy	
Obstructive sleep apnea syndrome.	Obstructive sleep apnea, adult	
	Obstructive sleep apnea, paediatric	
Sleep-related hypoventilation syndrome:	Sleep-related nonobstructive hypoventilation, idiopathic	
	Congenital alveolar hypoventilation syndrome	
Sleep-related hypoventilation/hypoxemia due to medical condition:	Due to pulmonary parenchymal or vascular pathology	
	Due to lower airways obstruction	
	Due to neuromuscular and chest wall disorders	
Other sleep-related breathing disorders:	Sleep apnea/sleep-related breathing disorder, unspecified	

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Hypersomnias of central origin not due to a circadian rhythm sleep disorder, a sleep-related breathing disorder or other cause of disturbed nocturnal sleep		
Narcolepsy with cataplexy		'the child who falls asleep during the day'
Narcolepsy without cataplexy		
Narcolepsy due to medical condition		
Narcolepsy, unspecified		
Recurrent hypersomnia:	Kleine-Levin syndrome	
	Menstrual-related hypersomnia	
Idiopathic hypersomnia with long sleep time		
Idiopathic hypersomnia without long sleep time		
Behaviorally-induced insufficient sleep syndrome		
Hypersomnia due to medical condition		
Hypersomnia due to drug or substance		
Hypersomnia Not Due to Substance or Known Physiological Condition (Nonorganic Hypersomnia, NOS)		
Physiological (Organic) Hypersomnia, Unspecified (Organic Hypersomina, NOS)		
Circadian rhythm sleep disorders		
Circadian Rhythm Sleep Disorder, Delayed Sleep Phase Type (Delayed Sleep Phase Disorder)		'the child who has trouble falling asleep'
Circadian Rhythm Sleep Disorder, Advanced Sleep Phase Type (Advanced Sleep Phase Disorder)		
Circadian Rhythm Sleep Disorder, Irregular Sleep-Wake Type (Irregular Sleep-Wake Rhythm)		
Circadian Rhythm Sleep Disorder, Free-Running Type (Nonentrained Type)		
Circadian Rhythm Sleep Disorder, Jet Lag Type (Jet Lag Disorder)		
Circadian Rhythm Sleep Disorder, Shift Work Type (Shift Work Disorder)		
Circadian rhythm sleep disorder due to medical condition		
Other Circadian Rhythm Sleep Disorder (Circadian Rhythm Disorder, NOS)		
Other Circadian Rhythm Sleep Disorder Due to Drug or Substance		
Parasomnias		
Disorders of Arousal (From NREM Sleep)	Confusional arousals	'the child who has abnormal events at night'
	Sleepwalking	
	Sleep terrors	
Parasomnias usually associated with REM sleep:	REM sleep behaviour disorder	
	Recurrent isolated sleep paralysis	
	Nightmare disorder	
Other parasomnias	Sleep-related dissociative disorders	
	Sleep enuresis	
	Sleep-related groaning (catathrenia)	
	Exploding head syndrome	
	Sleep-related hallucinations	
	Sleep-related eating disorders	
	Parasomnia, unspecified	
	Parasomnia due to drug or substance	
	Parasomnia due to medical condition	

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Sleep-related movement disorders	
Restless legs syndrome	'the child who has trouble falling asleep'
Periodic limb movement disorder	
Sleep-related leg cramps	
Sleep related bruxism	
Sleep related rhythmic movement disorder	'the child who has abnormal events at night'
Sleep-related movement disorder, unspecified	
Sleep Related Movement Disorder Due to Drug or Substance	
Sleep Related Movement Disorder Due to Medical Condition	

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6. General assessment and preventive strategies

Questions to be answered:

- How should sleep be assessed in Primary Care Health Centers?
- Are there key questions that can help Primary Care professionals detect sleep disorders in an interview with parents/caretakers/children/adolescents?
- What evidence or tools can we use for an overall assessment of child and adolescent sleep in Primary Care Health Centers?
- What are the complementary tests to keep in mind?
- What are the differential diagnoses to keep in mind?
- Are there preventive strategies for sleep disorders?

Sleep disorders, as previously stated, constitute a complex clinical problem, in which multiple factors take part in the origin, development and maintenance thereof. It is therefore important to keep in mind the aspects described below when assessing a child in a Primary Care Health Centers

6.1. Complete medical record

6.1.1. Medical history[20,26,90-93]

The following aspects must be assessed:

- *Age of onset:* the presence of processes outside of the normal age should lead us to suspect the appearance of problems. For example, naps beyond 6 years or the appearance of parasomnias in adolescents.
- *Incorrect habits:* always assess sleep hygiene practices, the type of response from the parents, what the schedules are, what the children/adolescents do for leisure, TV, radio, SMS, mobile phones or video games.
- Observe the *behaviour* and assess *school performance*.
- *Description of sleep during 24 hours:* how, how much.

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- *Assess* what happens during the night and also during the *day* (see 'key questions', Table 10).
- *Family history of sleep disorders*. There are processes with a hereditary base, such as insomnia, RLS or delayed sleep-phase, which must be taken into account.If the disorder is occasional and transitory (birth of a sibling, new school, new babysitter) or a disorder associated with chronic problems (asthma, rhinitis, atopic dermatitis).
- *If other biological functions are affected:* eating, nighttime or daytime behaviours, type of breathing during sleep with the appearance of snoring, presence of apneas, leisure habits, etc.
- *Typical symptoms* of different sleep disorders: OSAHS, RLS, etc.
- *Use of medicines and drugs* (antihistamines, antidepressants, abstinence from tobacco and/or drugs in adolescents) that can affect sleep.
- *Presence of other pathologies:* organic (gastroesophageal reflux, asthma, obesity, atopic dermatitis, blindness, etc.) neurological (headaches, epilepsy, etc.), psychiatric (depression, ADHD, etc.) and social (family problems in the environment, mistreatment, abuse, type of parent-child relationship, relationship of the couple, etc.).
- *Cultural factors*. Emigration in our country in recent years involves peculiarities in the sleep habits of the child and adolescent population associated with different cultural and economic factors.
- *Certain pathologies:* Down syndrome and autism spectrum disorders (autism), among others that are associated with sleep disorders.

6.1.2. Key questions

For interviews with parents, relatives and patients in the event that sleep disorders are suspected, there are a series of questions that can be used as a guideline to help healthcare professionals detect sleep disorders and do a differential diagnosis of other sleep problems or other disorders (Table 10 and Appendix 10.1).

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Table 10. Key questions that may lead to the suspicion of sleep disorders

DURING THE DAY… Does the child perform poorly in school? Is the child hyperactive? • Does the child have a behaviour disorder? Is the child aggressive? • Does the child have frequent accidents? • Does the child have growth pains? • Does the child have morning headaches? • Does the child have a deficient weight-to-height ratio? • Does the child have excessive daytime sleepiness (children over 5 years)? • Does behaviour improve if the child sleeps more?
DURING THE NIGHT… Does the child have frequent awakenings (3-5 episodes/night, more than 3 nights/week) (older than 1 year)? • Does the child take longer than half an hour to fall asleep? Does the child cry? • Does the child snore at night? • Does the child have respiratory pauses? • Does the child breath through the mouth? • Does the child have difficulty waking up in the morning? • Is the child excessively irritable upon waking?

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6.1.3. Complete physical examination

Furthermore, a complete physical examination must not be forgotten, which will help to orient a child's problems.

6.1.4. Nursing nomenclature

The nomenclature used by nursing to assess sleep in children in Primary Care Health Centers has been included in Appendix 3.

6.2. Assistance tools

There are useful tools for a general assessment of children and adolescents.

6.2.1. Percentiles curves for Sleep duration (Appendix 4)

As it already been stated, every child, just like every adult, has individual sleep needs, there are no absolutes.

In 2003, Iglowstein *et al*. studied 500 children and adolescents to establish reference values and establish how naps are distributed according to age. The percentile curves help to see the evolution of sleep and see if changes occur, and they also allow a comparison with peers[85].

6.2.2. Sleep log/diary (Appendix 5)

Descriptive study 3

Knowledge of the sleep and wake time over a complete day is essential, which can be obtained using a ***sleep log/diary***, a highly useful instrument in Primary Care Health Centers. Health professionals can suggest to the patient's parents that they keep a record of the time when the child goes to sleep, the time that the child is awake in bed before falling asleep, the frequency at which the child wakes up during the night, the time when the child gets up in the morning and/or how the child feels in the morning (sleep quality). A sleep diary can also help to assess whether or not sleep routines are adequate. Using a sleep diary requires a certain amount of practice, so it is recommendable to use it for at least 15 days. This time period allows obtaining a more reliable baseline, which is therefore more representative of the features of the child's sleep. It also allows monitoring a child's progress, thereby facilitating self-evaluation of the problem and putting the parents at ease, who see the progress.

The sleep diary consists of a grid with vertical subdivisions for each day of the month and horizontal subdivisions for each hour of the day. The time when the child goes to bed and the time when the child gets up should be indicated, and the sleep hours should be shaded. It thus provides an overall view of sleep (sleep hours, latencies, nighttime awakenings and routines when going to bed and getting up). By using a sleep diary/log, parents can provide relevant information about a child's sleep and the social context. When the sleep diary is compared to an actigraphy, the conclusion is reached that they both provide similar information, although some studies find interesting discrepancies with respect to the quality and continuity of sleep. The most notable difference is the inability of the sleep diary to record all the nighttime awakenings, because parents are often unaware of many aspects of the sleep model of their child or they fail when relating them[94-100].

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6.2.3. Home video-recording

A home video-recording is a tool that can be useful in the paediatric consultation, oriented at diagnosing sleep disorders. It is basically useful for assessing sleep-related breathing disorders, parasomnias with rhythmic movements and periodic limb movements.

6.2.4. Use of scales

Studies suggest that, in general, sleep problems are not adequately examined or screened in paediatric practice, which can lead to a significant under-diagnosis of sleep disorders. According to some surveys, over 20% of the paediatricians who were asked do not, in routine paediatric visits, regularly screen for sleep problems in school-age children, and less than 40% do not directly ask adolescents about their sleep habits. In view of these data, the American Academy of Sleep Medicine (AASM) recommends that all children be regularly screened for sleep problems in clinical practice[101].

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In Primary Care Health Centers, structured questionnaires can be used to facilitate the screening of sleep disorders in children and adolescents. Questionnaires are one of the basic tools for assessing sleep disorders in a consultation, both in healthy children and in those that have any behavioral disorder, thereby helping the diagnosis. They can be applied as from the neonatal period.

There are simple and quick questionnaires to screen for sleep disorders in paediatrics, and there more extensive and specific questionnaires that require more time to be completed and that are used for guidance with specific paediatric sleep problems such as parasomnias, sleep-related breathing disorders, etc. Some quick-screening questionnaires that can be useful in Primary Care Health Centers are the following:

- **Brief Infant Sleep Questionnaire** (BISQ). A screening tool directed at detecting risk factors of sudden infant death syndrome, sleep routines and parental detection of infant sleep problems. It takes 5 to 10 minutes to complete. Developed based on the significant variables found in a review of literature: duration of nighttime sleep, duration of daytime sleep, number of nighttime awakenings, duration of nighttime awakenings, bedtime, duration of sleep latency, method for falling asleep, place of sleep, preferred body position, age of the child, sex, position of the child with respect to any siblings and the person who responds to the questionnaire. It has shown a significant relationship, according to the objective data obtained by actigraphy in infants from 5 to 29 months of age, between the number of nighttime awakenings and the duration of nighttime sleep[102, 103]. It has not been validated in Spain.

Diagnostic testing studies II/III

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• **BEARS Questionnaire** (B = Bedtime Issues, E = Excessive Daytime Sleepiness, A = Night Awakenings, R = Regularity and Duration of Sleep, S = Snoring). It assesses 5 aspects of sleep for children from 2 to 18 years age: bedtime issues, excessive daytime sleepiness, nocturnal awakenings, the regularity and duration of sleep and the presence of snoring. This questionnaire establishes three age groups: 2 to 5 years, 6 to 12 years and 13 to 18 years, with questions directed at children and parents. If any of the questions are positive, they must be investigated in greater detail[104].

After the aforementioned screening questionnaires have been used, a more extensive and specific questionnaire can be applied, which can provide guidance on more specific paediatric sleep disorders, which questionnaire is detailed below:

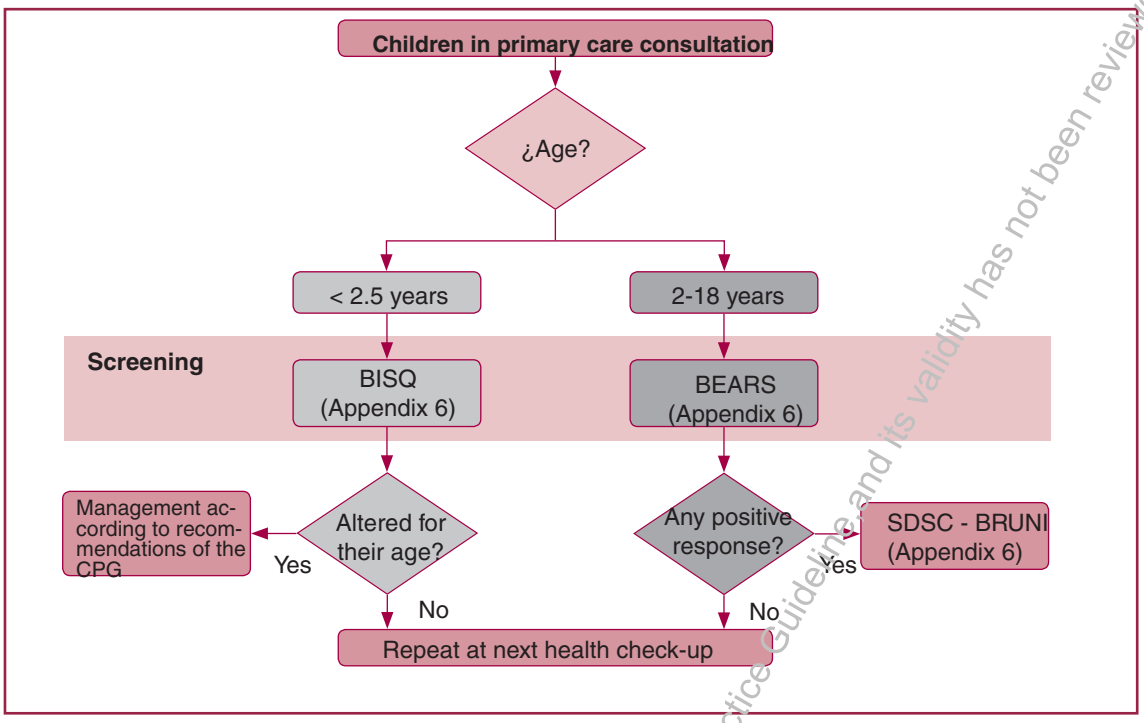
• **Bruni's Sleep Disturbance Scale for Children** (SDSC). It consists of 27 items and is designed to detect sleep disorders. It assesses the last 6 months. Its internal consistency is greater in the controls (0.79), it maintains a satisfactory level in children with sleep disorders (0.71), and the test/retest reliability is satisfactory for both the total (r = 0.71) and for the scores of each item individually[105].

Diagnostic testing studies II

The guideline development group proposes the following schematic (Figure 2), which is useful for helping to assess sleep in children and provide guidance if sleep disorders are suspected in Primary Care paediatric consultations. Appendix 6 includes the questionnaires so that they can be used.

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Figure 2. Schematic for using questionnaires to assess sleep in Primary Care Health Centers



SDSC: Sleep Disturbance Scale for Children.

Finally, there are other, specific scales to help with diagnosing some sleep disorders. **They include Chervin's Pediatric Sleep Questionnaire** (PSQ), the **Frontal Lobe Epilepsy** and Parasomnias Scale (FLEP Scale) and others, some of which will be covered in the section corresponding to each disorder[107,108].

6.2.5. Complementary examinations

When examining children with sleep alterations, in most cases it is not usually necessary to perform extensive complementary examinations[109]. However, sometimes and depending on the medical record and on the directed clinical examination, laboratory studies will be requested, such as blood counts, biochemical screening, image studies, psychological and/or psychiatric studies or sleep laboratory studies (polysomnography, actigraphy, etc.)[20]. Therefore, referral to a Paediatric Secondary care or Hospital Care should be assessed.

The initial indications for performing a polysomnographic study are the following:

1. Excessive daytime sleepiness not related to chronic sleep deprivation. For the diagnosis of hypersomnia, a Multiple Sleep Latency Test (MSLT) may be necessary.
2. Alteration of the breathing pattern during sleep.
3. Violent motor activity or anomalous sleep-related behaviours.
4. Sleep-related periodic limb movement disorder.

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6.3. Differential diagnosis[26,110]

Sleep disorders must be differentiated from other acute and chronic medical processes, as well as from psychological and social problems. The relationship between sleep disorders and problems and the attention deficit hyperactivity disorder must be kept in mind (for up to 15% of children diagnosed with ADHD, the root cause is actually a sleep disorder).

The remainder of the differential diagnoses for each one of the sleep disorders covered in the guideline are found in the corresponding diagnosis section of said disorders.

Summary of evidence about the assessment of sleep disorders

3	Sleep-wake diary/ logs provide information about sleep and wake times over the 24 hours of a day, and they can also help to assess whether or not sleep routines are suitable or not, used for at least 15 days[94-100].
4	Inadequate screening of sleep problems in the paediatric practice can result in a significant under-diagnosis of sleep disorders[101].
Diagnostic testing studies II, III	The BISQ is a screening tool directed at detecting risk factors of sudden infant death syndrome, sleep routines and parental detection of infant sleep problems. According to the objective data obtained by actigraphy in infants from 5 to 29 months of age, it has shown a significant relationship between the number of nocturnal awakenings and the duration of nighttime sleep[102,103].
Diagnostic testing studies II, III	The BEARS Questionnaire is a screening tool for children from 2 to 18 years of age. It assesses the existence of bedtime issues, excessive daytime sleepiness, nocturnal awakenings, the regularity and duration of sleep and the presence of snoring[104].
Diagnostic testing studies II, III	Bruni's Sleep Disorder Scale for Children (SDSC). It assesses the last 6 months of sleep. Its internal consistency is maintained at a satisfactory level in children with sleep disorders (0.71), and the reliability is satisfactory for the total (r = 0.71) and for each item individually[105].

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Recommendations about the assessment of sleep disorders

√	In a general assessment of children in Primary Care (PC) Health Center, a medical history that includes the following is recommended: a description of sleep over a 24-hour period, the age of onset, incorrect sleep habits (schedules), behaviour, school performance, evaluation of the day (not just the night), family medical history of sleep disorders, if this is an acute or chronic temporary disorder, other biological functions that are affected, the use of medicines and drugs and the presence of other pathologies and/or syndromes.
√	The use of key questions is recommended for detecting sleep disorders and to be able to discard other disorders (Appendix 2).
√	Percentiles curves for sleep duration can be used to help see the evolution of a child's sleep and for a comparison thereof with other children (Appendix 2).
D	The use of a sleep-wake diary /log for at least 15 days is recommended in order to know the patient's sleep and wake times and to monitor the evolution thereof (Appendix 5).
√	If sleep-related breathing disorders, parasomnias, rhythmic movements and/or periodic limb movements are suspected, a home video-recording is recommended for the assessment thereof.
D	As a screening tool for sleep problems, the BISQ (Brief Infant Sleep Questionnaire) is recommended for infants under the age of 2 and a half (Appendix 6).
D	As a screening tool of sleep problems in children from 2 to 18 years of age, the use of the BEARS questionnaire is recommended (B = Bedtime Issues, E = Excessive Daytime Sleepiness, A = Night Awakenings, R = Regularity and Duration of Sleep, S = Snoring) (Appendix 6).
D	To assess the presence of sleep disorders in school-age children, the use of Bruni's SDSC questionnaire is commended (Sleep disturbance Scale for Children) (Appendix 6).
√	The schematic presented in Appendix 7 is recommended for handling sleep problems/disorders in PC paediatric consultations using the aforementioned questionnaires.

6.4. Preventive strategies

Sleep, like human behaviour, can be modified to learn to sleep well. Thus, with adequate education from parents and caretakers starting when a child is born, most sleep disorders can be prevented. It is important that professionals ask, inform and educate about the features of sleep in childhood and adolescence. In children, the key is to establish routines in order to provide a minor with so-called 'transition objects' that facilitate associating the environment with sleep and promote a child's ability to get to sleep and stay asleep on their own. For adolescents, they must be made aware of the importance of sleep and of being disciplined about healthy sleep habits[111].

Prevention work must be based on the following essential aspects[111-114]: — Expert opinion 4

1. Despite the fact that the sleep-wake transition is above all a biological function, it is also modulated by psychosocial factors and the type of education or care that children receive, especially starting at the age of 3-4 months. — Descriptive study 3
2. Mother-child relationships during the day are important for developing situations or habits related to sleep.

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3. Due to the fact that sleep in our socio-cultural sphere traditionally involves separation of the caretaker from the child, progressive separation during the day should be assessed according to family beliefs about the care that children should be given, the education style and the type of attachment.
4. Whether or not the various models of putting children to bed (alone, shared room with siblings or with parents, sharing their parent's bed, etc.) are beneficial or harmful at a certain age not only depends on the location and how sleep develops but rather, fundamentally, on the social and psychological meaning that the model chosen by the parents (not forced because of the child's behaviour) has for inter-family relationships.
5. To educate in any area, in general, there are no good or bad systems, just different ones. The best system is the one that is the most harmonious for each family unit and that follows the dominant cultural criteria.

The following table includes the main advice that professionals can use in the task of preventing paediatric sleep problems (Table 11). Appendix 8.1 expands the information on preventive strategies designed for parents, caretakers and/or adolescents[111]:

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Table 11. Advice to include as strategies for preventing sleep problems

Under the age of 2	• Newborns sleep a lot, but they can't do it continuously. Every 3-4 hours they wake up. They need to eat, to be changed and to be spoken to. • After eating, they start what we call 'active sleep': they move their eyes, make gestures, breath irregularly, make some noise and move their limbs. Even though it may seem that they are restless, this type of sleep is completely normal and should not be interrupted at all. If the parents or people in charge of children do not know about this situation, it is very likely that they'll touch them, change them or rock them, thereby breaking a child's normal sleep and hindering the maturation of normal sleep. After 30-40 minutes in this situation, babies enter a deeper sleep, what we call 'quiet sleep'. The baby is entirely relaxed and breaths smoothly and deeply.
From 2 to 5 months	• Quality sleep during the day will improve their nighttime sleep. • Before each sleep period, it is advisable to calm a child down. • Movements for a few minutes, face-to-face contact and gentle words should be used to calm a child down (or reduce their level of activation), but not put them to sleep.
From 5 to 12 months	• During the first 8 months, it is common and normal for babies to wake up at night. • As from 5 months of age, babies capture all the sensations that adults transmit to them. If parents are calm and speak sweetly to a baby, the baby will capture this sensation and respond the same way. Conversely, if parents are doubtful, if they're restless or if they continuously change routines, a baby may become insecure and be restless.
As from 12 months	• Children can begin to understand that they are being taught to sleep on their own.

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Adolescent stage	• The typical changes of adolescence begin: physiological delay of sleep, greater sleep needs. • Importance of the role of sleep. • Importance of the example of parental sleep habits.

The importance of the role played by education centres in implementing preventive strategies of sleep disorders in childhood and adolescence must not be overlooked. In this regard, the guideline development group has prepared some recommendations so that the professionals of these centres can put them into practice according to the corresponding education cycle within the teaching-education process (see Appendix 8.2).

Summary of evidence about preventive strategies of sleep disorders

3,4	Knowledge of a series of essential aspects about sleep behaviour can prevent the appearance of sleep-related disorders[111-114].
3,4	The task of preventing paediatric sleep disorders is based on the following essential aspects[111-114]: • sleep-wake transition modulated by psychosocial factors, education or care; • mother-child relationship during the day, • progressive separation during the day according to family beliefs; • the social and psychological meaning, for intra-family relations, of the model chosen by the parents for putting children to bed (not forced due to the child's behaviour); • the best education system is the one that is the best for each family unit and that follows the dominant cultural criteria.
4	There are sleep aspects typical of children according to age, which paediatricians can use in their work to prevent sleep problems (see Table 11)[111].

Recommendations about preventive strategies for sleep disorders

D	The characteristic aspects of sleep according to age ranges should be taken into account to be able to establish preventive recommendations (see Table 11).
√	Parents, caretakers and/or adolescents should be informed about the preventive strategies of sleep problems during visits to Primary Care Health Centres, according to the corresponding age (Appendix 8.1).
√	It is recommendable that educators keep in mind a series of preventive strategies of sleep problems to be able to adequately handle and inform parents/caretakers and/or adolescents, depending on the corresponding education-learning cycle (Appendix 8.2).

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7. Definition, diagnosis and treatment of disorders

7.1. The child who has trouble falling asleep

The sleep disorders that concern children who have trouble falling asleep are presented below. The disorders covered in this chapter include the following:

- 7.1.1. Insomnia due to inadequate sleep hygiene and behavioral insomnia.
- 7.1.2. Restless legs syndrome.
- 7.1.3. Delayed sleepphase disorder.

Questions to be answered:

- What is insomnia due to inadequate sleep hygiene?
- What is behavioral insomnia?
- What is the restless legs syndrome?
- What is delayed sleep phase disorder?
- What is the most suitable definition for these specific disorders?
- What is the aetiology of these disorders?
- Are there conditioning factors of these disorders: physiological, psychophysiological, psychological, environmental (family context)?
- What are the criteria for suspecting these disorders?
- What are the diagnostic criteria for these disorders?
- How are they classified?
- What are the differential diagnoses?
- Are there key questions that can help Primary Care professionals detect these disorders in an interview with the patient/parents/caretakers??
- What are the tests or tools that we can use to diagnose these disorders in PC?
- What are the criteria for referring to HospitalCare?
- What are the effective treatments for these disorders in Primary Care Health Centers?
- What are the authorised treatments in the paediatric population?
- What are the most effective psychological interventions for these disorders?
- When are drugs indicated for these disorders?
- Are there preventive strategies of these disorders?

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7.1.1. Insomnia due to inadequate sleep hygiene and behavioral insomnia.

- ***Definitions:*** Insomnia is literally *a lack of sleep at bedtime* (from Latin, *Insomnium*)[115]. However, in this guideline the term, 'insomnia due to inadequate sleep hygiene and behavioral insomnia in childhood' (as the most frequent causes of insomnia in childhood and adolescence), refers to that which is derived from poor learning of the right sleep habits or from an inadequate attitude of the parents for establishing good sleep hygiene.

  - The most characteristic manifestations of **behavioral insomnia in childhood** are a child's inability to get to sleep if they are alone, with resistance and anxiety when it's time to go to bed, which involves delayed sleep onset or the presence of multiple awakenings and, consequently, the failure to maintain sleep once it has started. All of this has negative effects regarding daytime functioning, for both the child and their family[116]. The International Classification of Sleep Disorders (ICSD-2) of the AASM classifies this class of insomnia into two different types:

    1. *Sleep-onset Associations Type*.
    2. *Limit-setting Type*

    In Sleep-onset Associations Type, most children need certain associations – rocking them, giving them food, giving them a certain object, the parents' presence – for the onset of sleep or to get back to sleep when they wake up at night. In the absence of this condition, sleep onset is delayed significantly. Limit-setting Type includes behaviours that reflect resistance to going to bed, in the form of: verbal protesting, shouting, crying, fighting, getting out of bed, repeatedly demanding attention or food/drink or stories. In a consultation, parents usually point out that their child has never slept well, and nighttime awakenings are also very frequent. When there have been periods of normalcy, the arrival of an external stimulus (illness, change of residence) causes the problem to reappear. As a consequence of all this, the use of erroneous methods and behaviours involves associations with inappropriate stimuli, so the problem is reinforced[15, 26].

- ***Insomnia due to inadequate sleep hygiene*** is associated with daytime activities that necessarily prevent adequate sleep quality and prevent staying awake and alert during the day. A child or adolescent may carry out activities that cause an increase in awakenings or that are contrary to the principles of organised or structured sleep. These include acts that involve a state of hyper-alertness: the routine consumption, before going to bed, of chocolate, cola drinks, and alcohol or caffeine; also, before going to bed, performing intense mental, physical or emotional activities; the use of technologies such as computers, video games or mobile phones; and inappropriate conditions of light or noise. Or they could be practices that prevent the correct structuring of sleep: frequent naps during the day, large variations in bedtimes or wake times, spending a lot of time in bed. This is all related to a decrease in a minor's functioning during the day, consequently causing a decrease in their quality of life[26].

- ***Etiopathology.*** When establishing the factors that contribute to the appearance, development and continuance of these disorders, it is necessary to consider both the physical and mental development and maturity that occurs from childhood to adolescence as well as the complex inter-relationships that exist between children/adolescents and social, cultural and environmental factors, among which the influence of the family context and parent-child relationships should be highlighted[15, 116, 117].

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These factors, just like with adult insomnia, can be grouped into predisposing, precipitating and perpetuating factors; although these divisions should be used as a guide, because some aspects can overlap. Thus, the inability to sleep the whole night, problems with establishing bedtime and the failure of children to calm themselves down after their night awakenings can represent, essentially, either a delay in the appearance of or a regression to behaviours associated with the neurological processes of consolidating and regulating sleep, which respectively occur during the first years of life. These predisposing factors interact with the precipitating and perpetuating factors, which are fed more by behavioral and environmental variables[16].

In this regard, there are several prominent facts. It can be observed that, when there is a greater presence and frequency of insomnia symptoms among parents, there is a greater presence and frequency of these symptoms among their children, and vice versa[118-120]. The role played by the type of family model is also important. Examples of this would include the influence by a continuous lack of the father figure, either due to his continuous absences or because families are single-parent; cases in which mothers are very young and emotionally negative or they are depressive; or cases in which mother-child relationships, especially, are conflictive[120-124].

Within the influence of the family context, the role played by poor sleep hygiene practices or bad behavioral habits should also be pointed out. For example, attitudes that are too permissive or strict, regarding both bedtime and nocturnal awakenings, or other practices such as prolonged breastfeeding as a sleep inducer and, above all, reactive co-sleeping. Studies that compare this behaviour with sleeping alone find that reactive co-sleeping is correlated to going to bed later, to later nocturnal awakenings and to a shorter duration of sleep, which involves resistance at bedtime, anxiety and awakenings during sleep, and daytime sleepiness as a consequence[125-127].

Certain practices such as watching television alone, watching it in bed, the amount of time that the TV is turned on at home or exposure (both active and passive) to adult programmes increases the risk of problems with sleep, with sleep onset and with the duration of sleep[128].

In some studies, it has been seen how sleep problems in childhood can increase the risk of the early start of using substances such as alcohol, tobacco and marijuana in adolescence. This association occurs more with males and less so with females[129].

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Among adolescents, the factors are related to poor sleep hygiene practices, family disorganisation and situations of family stress in general. In sleep hygiene strategies, the consumption of tobacco, caffeine and alcohol are prominent among the negative effects for maintaining sleep[130]. Other influencing factors include family structure[131] problems and the parents' sleep patterns, above all the mother's, such that poor sleep by the mother has a direct impact on her style of education, which in turn affects the psychological functioning of adolescents and their sleep[132-135].

Some authors indicate that, even though more research is needed to see if these associations can be causal, sleep problems at early ages can be an indicator of an association between these problems and the existence of behavioral or attention problems in adolescence[125,136].

There are studies that show significant associations between sleep problems, depressive and anxiety symptoms and cognitive errors or cognitive distortions (bias in the form of perception and interpretation, such as catastrophic thinking and over-generalisation); although the results vary according to age. Depressive symptoms and cognitive errors show a greater association with sleep problems in the adolescent stage, and anxiety symptoms are generally associated with sleep problems in the youngest[125,137,138].

Other studies show that sleep problems in adolescents have to do with the significant association that exists between a short duration of nighttime sleep and emotional and behavioral problems (depression, anxiety, suicidal thoughts and/or the risk of suicide among adolescents without symptoms of depression and academic performance problems). A relationship has also been found between a short or long duration of sleep and poor functioning of daily life; violent tendencies and attitudes; theft; the consumption of alcohol or drugs; and physical problems (the most frequent are fatigue, headaches, stomach aches, back pains and a poor perception of state of health)[16, 51, 138-143]. The conclusion of some studies is that the relationship between substance consumption and/or abuse and sleep problems in adolescents is two-way. Not only does substance abuse cause sleep problems, but sometimes sleep problems are what lead to abusing those substances[144].

The following table (Table 12) summarises the predisposing, precipitating and perpetuating factors, as well as the problems/disorders associated with paediatric insomnia.

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Table 12. Factors associated with paediatric insomnia

Possible predisposing factors	
Neurological development	Delay in the appearance of sleep consolidation and regulation processes, which respectively occur during the first years of life.
Possible precipitating and perpetuating factors	
Family history	In view of a greater presence and frequency of insomnia symptoms among parents, there is a greater presence and frequency of these symptoms among their children, and vice versa.
Family context	Influence by: • Family models in which the mother-child relationships are conflictive. • Poor family sleep patterns have an influence on the style of education and affect the psychological functioning of adolescents and their sleep. • Family disorganisation and de-structuring. • Situations of family stress in general.
Sleep hygiene / behavioral habits	• Attitudes that are too permissive or strict, both at bedtime and during nocturnal awakenings. • Prolonged breast-feeding as a sleep inducer. • *'Reactive co-sleeping'.* • Practices such as watching TV alone, watching TV in bed, the amount of time that the TV is turned on at home or exposure (both active and passive) to adult programmes increases the risk of problems with sleep, with sleep onset and with the duration of sleep.
Associated problems/disorders	
Use of substances	• Sleep problems in childhood can increase the risk of the early start of using substances such as alcohol, tobacco and marijuana in adolescence. • The relationship between substance consumption and/or abuse and sleep problems in adolescents is two-way. Not only does substance abuse cause sleep problems, but sometimes sleep problems are what lead to abusing those substances.
Behaviour	• Sleep problems at an early age can be an indicator of the existence of behavioral or attention problems in adolescence. • Violent tendencies and attitudes, theft, consumption of alcohol or drugs.
Emotional problems	Significant associations between sleep problems and: • depressive and anxiety symptoms; • suicidal thoughts and/or risk. • cognitive errors or cognitive distortions (catastrophic thinking and over-generalisation); • poor functioning in daily life; • academic performance problems.
Physical problems	Fatigue, headaches, stomach aches, back pains and poor perception of state of health.

- ***Clinical features and other associated disorders.*** Complex cognitive functions such as cognitive flexibility and the ability to decide and think abstractly, which are regulated by the prefrontal cortex, are especially sensitive to the effects of unbalanced, insufficient and/or irregular sleep. This explains the fact that in paediatric insomnia, both sleep disorders and sleepiness can be associated with mood and behavioural changes and with a deterioration of cognitive functions[16,145].

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Children with insomnia show characteristic symptoms. They are children with a *very awake* attitude, who capture the phenomena existing around them with great intensity – anxiety, insecurity, or else calmness and security. They usually have a superficial sleep, during which they are restless, as if alert, and any small noise wakes them up. They are usually irritable children during the day and are highly dependent upon the person who cares for them, and if we add up all the minutes that they are asleep during 24 hours, the total is clearly below the normal number of hours for their age[15].

There are studies that show how children with sleep problems, above all the youngest, are characterised by exhibiting excessive physical activity, by being irritable and impulsive and by being easily distracted or distraught, which has led some clinicians to show the similarity between these manifestations and the symptoms of the attention deficit hyperactivity disorder (ADHD), although it's possible that the causal relationships between sleep problems and behavioral disturbances are reciprocal. Other symptoms concern the cognitive functioning of children and a decrease in selective attention, wakefulness and memory, and even verbal creativity[125].

Inadequate sleep also has potential harmful effects for health and can affect the cardiovascular, immunological and metabolic systems, even the metabolism of glucose and the endocrine function16. International cross-sectional studies show that there seems to be a consistent or significant association between the short duration of sleep and an increase in obesity, although it's difficult to establish causal inference due to a lack of control of some confounding factors146-148. Other studies also conclude that this association depends on the sex and that, among males, a proportionally stronger inverse association can be found than among females[149].

Reluctance at bedtime is the only sleep behaviour associated with hyperactivity or with childhood behavioral problems, and the long sleep pattern (sleeping 9 hours or more every day) appears more frequently in children with both problems[150].

Reviews of literature show that a reduction of the total sleep time, irregular bedtimes and wake times, going to be late and increasing the sleep time, as well as poor sleep quality, are associated with worse school performance, both in children and adolescents. Poor school functioning is usually associated with daytime sleepiness, falling asleep in class, attention difficulties and poor academic performance[142,146,151,152]. The increase in daytime sleepiness figures among adolescents has been prominent in various studies, even though this problem tends to be overlooked by adolescents themselves, who are not aware of its existence or importance[153].

Other studies demonstrate how the existence of sleep problems in the first year of life – difficulty with establishing sleep and frequent nocturnal awakenings – can become behavioral problems in pre-school age[154]. Sleep problems during adolescence also represent an important risk factor for having sleep problems in adulthood, even after adjusting other variables such as family, environmental and personal conditions[155].

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- ***Diagnostic criteria:*** The diagnostic criteria of insomnia according to the International Classification of Sleep Disorders (ICSD-2) of the AASM[26] are presented below.

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Diagnostic criteria of inadequate sleep hygiene

A. The patient's symptoms meet the criteria for insomnia *.

B. The insomnia is present for at least one month.

C. Inadequate sleep hygiene practices are evident, as indicated by the presence of at least one of the following:

   i. Improper sleep scheduling consisting of frequent daytime napping, selecting highly variable bedtimes or rising times, or spending excessive amounts of time in bed.

   ii. Routine use of products containing alcohol, nicotine or caffeine, especially in the period preceding bedtime.

   iii. Engagement in mentally stimulating, physically activating, or emotionally upsetting activities too close to bedtime.

   iv. Frequent use of the bed for activities other than sleep (e.g., television watching, reading, studying, snacking, thinking, planning).

   v. Failure to maintain a comfortable sleeping environment..

D. The sleep disturbance is not better explained by another sleep disorder, medical or neurological disorder, mental disorder, medication use, or substance use disorder.

Diagnostic criteria for behavioral insomnia in childhood

A. A child's symptoms meet the criteria for insomnia*, based upon reports of parents or other adult caregivers.

B. The child shows a pattern consistent with either the sleep-onset association or limit-setting type of insomnia described below:

   i. Sleep -onset association type includes each of the following:

      1. Falling asleep is an extended process that requires special conditions.
      2. Sleep-onset associations are highly problematic or demanding.
      3. In the absence of the associated conditions, sleep onset is significantly delayed or sleep is otherwise disrupted.
      4. Nighttime awakenings require caregiver intervention for the child to return to sleep.

   ii. Limit-setting type includes each of the following:

      1. The individual has difficulty initiating or maintaining sleep.
      2. The individual stalls or refuses to go to bed at an appropriate time or refuses to return to bed following a nighttime awakening.
      3. The caregiver demonstrates insufficient or inappropriate limits setting to establish appropriate sleeping behavior in the child.

C. The sleep disturbance is not explained by another sleep disorder, medical or neurological disorder, mental disorder, or medication use.

*Diagnostic criteria of insomnia
A. There is difficulty initiating sleep or achieving continuous sleep, or there is early morning awakening before the desired time. Sleep can also be described as 'non-restorative' or of poor quality. In children, the sleep problem is often described by parents or caretakers, and it consists in reluctance to go to bed or the impossibility of being able to fall asleep independently or alone.
B. The sleep problem exists, even though the circumstances and opportunity are adequate.
C. There is at least one of the following symptoms, which reflect the daytime consequences of the nighttime sleep problems:
i. Fatigue.
ii. Loss of memory, concentration or attention.
iii. Social problems or scarce academic performance.
iv. Irritability or mood disorders.
v. Daytime sleepiness.
vi. Reduction of motivation, energy or initiative.
vii. Tendency to make mistakes or have accidents at the work place or driving an automobile.
viii. Stress, headaches or gastrointestinal symptoms caused by sleep deprivation.

The diagnosis of paediatric insomnia is fundamentally clinical evaluation, given that nighttime sleep studies are useful for excluding other causes of sleep problems, such as OSAHS, but not for diagnosing insomnia. There are very few instruments expressly validated in this population regarding insomnia, although sleep logs/diaries can be used as aids for the general assessment of paediatric insomnia and assessing the evolution thereof[101,116].

Expert opinion 4

Summary of evidence about the diagnosis of insomnia

4	A diagnosis is made based fundamentally on the clinical aspect and on the information collected by the family in sleep logs/diaries[101,116].

Recommendations about the diagnosis of insomnia.

D	The diagnosis should be made basically through a medical record, and sometimes with the help of the information gathered by the family in sleep-wake diaries/logs.

Treatment

Sleep hygiene strategies

Sleep hygiene strategies include a series of behavioral habits that facilitate the onset of or maintaining sleep. They include a series of recommendations that can be adopted by parents (in the case of children) or the patients themselves (adolescents) with insomnia problems, designed to help them minimise the impact of their problem and favour normal sleep. The aim is to acquire better habits that correspond to the general lifestyle or change those that are known to interfere with sleep.

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There is little evidence about the efficacy outcomes of using sleep hygiene strategies for paediatric insomnia. In the adult population, published results coincide in indicating that sleep hygiene practices by itself is not capable of solving chronic insomnia symptoms. In fact, in published works, most of the time these practices are used as adjuvants of other therapeutic interventions[156-160].

CPG (SR and RCT) 1++, 1+ SR of RCT1++,1+

Studies of the adult population in which sleep hygiene strategies as a monotherapy is compared to a combined therapy (sleep hygiene practices plus stimulus control or relaxing or restricting time in bed to a greater extent), in terms of sleep *efficiency*, conclude that this parameter improves with combined therapy[159,161].

CPG (SR and RCT) 1+ SR 1+

In adolescents, there is one study that describes an educational intervention in a population of 15 to 18 year-olds. In addition to sleep hygiene practices, the programme includes information about the importance and need for sleep, and it has proved to be effective, above all in the youngest (under the age of 18) and more so among female adolescents[162].

RCT 1+

Sleep hygiene practices, as factors that promote optimum sleep, concern both environmental aspects (temperature, noise level, ambient light) and sleep planning or practices (sleep schedules and pre-sleep ritual, respectively), as well as physiological aspects (exercise, meal times, the use of caffeine)[101].

Expert opinion 4

The principles of an adequate sleep hygiene strategy in paediatric insomnia are included in the following table (Table 13)[101].

Expert opinion 4

Table 13. Principles of sleep hygiene strategies for insomnia

1.	Getting up and going to bed at approximately the same time every day. With a slight variation of no more than one hour between school nights and nights when there is no school the next day.
2.	For children, naps have to be adapted to their age and their developmental needs. For adolescents, naps during the day should be avoided.
3.	Establish a consistent pre-sleep routine (20-30 minutes beforehand).
4.	Maintain adequate environmental conditions for sleeping (temperature, ventilation, noise, light).
5.	Avoid heavy meals before going to bed.
6.	Avoid drinking alcohol, caffeine and tobacco.
7.	Avoid stressful activities during the hours prior to going to bed.
8.	Avoid using electronic devices (television, computers, mobile phones) in the bedroom.
9.	Do some physical exercise daily, although never right before going to bed.
10.	Spend some time outdoors every day.

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Appendix 8 provides more information about these strategies for patients.

Summary of evidence about the treatment of insomnia using sleep practices

1++, 1+	There is insufficient evidence about the efficacy outcomes of using sleep hygiene strategies for paediatric insomnia. In the adult population, the evidence indicates that sleep hygiene practices, on their own, are not capable of resolving chronic insomnia[156-160].
1++, 1+	Sleep hygiene practices tend to be used as adjuvants of other therapeutic interventions[156-160].
1+	In adolescents, educational programmes that include sleep hygiene practices, in addition to information about the importance and need for sleep, have proved to be effective[162].
4	Sleep hygiene strategies, as factors that promote the best sleep, concern both environmental aspects (temperature, noise level, ambient light) and sleep planning or practices (sleep schedules and pre-sleep ritual, respectively), as well as physiological aspects (exercise, meal times, the use of caffeine)[101].
4	The principles of an adequate sleep hygiene strategy in paediatric insomnia are included in the following Table 13[101].

Recommendations about treating insomnia with sleep hygiene practices.

C	Educational interventions that include sleep hygiene practices are recommended, in addition to information about the importance of and need for sleep (see Appendixes 8 and 9).

Psychological interventions

Psychological interventions for treating insomnia have mainly focussed on behavioral types of psychological techniques, either alone or in combination with each other.

Behavioral therapy considers the symptoms to be the learning of poorly adapted behavioral patterns, and its purpose is to correct these patterns through different intervention techniques. The main objective of *behavioral techniques* applied to treating insomnia is to modify learned behaviours and cognitions regarding sleep, which are factors that perpetuate or exacerbate sleep disturbances. Nevertheless, despite these advantages, there is still a certain unawareness about this type of treatment. Moreover, behavioral therapies for dealing with insomnia tend to be used little in PC, and in this sense they are said to be underused[163].

The following table (Table 14) describes the behavioral therapy interventions used the most for treating *behavioral insomnia in childhood*.

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Table 14. Description of behavioral techniques used for treating behavioral insomnia in childhood[101, 117]

Intervention	Description
Unmodified extinction	• Intervention targeted at eliminating undesired behaviours in a child when going to sleep, such as shouting or tantrums, thereby eliminating the reinforcement that maintains them (attention or excessive involvement by the parents in the process of sleep onset). • It involves the parents putting the child to bed at the appropriate time, having completed the pre-sleep ritual and when the child is still awake, thereby ignoring any subsequent demand for attention until the next morning, except for those situations that might involve a danger to or illness of the child.
Graduated extinction	• It is based on the same reasoning that justifies the success of unmodified extinction. Removal of the excessive involvement/participation of the parents in the process of sleep onset, but more gradually, since it allows them to intervene at predetermined intervals of time. • The parents put the child to bed when still awake, at the appropriate time, having completed the pre-sleep ritual, subsequently ignoring the child's demands for attention at gradual and progressively longer shedule (for example, considering the features of the child's age and temperament, and also of the parent, beginning to wait 1, 3 or 5 minutes before checking, after which this time interval is increased by 5 or 10 minutes in successive checking) or at fixed shedule (always every 5 or 10 minutes). • The intervention also seeks to eliminate undesired behaviours, emphasise the child's self-control and favour and facilitate the development of skills that allow the child to calm themselves.
Pre-sleep ritual	• Stimulus control is considered the main agent for behavioral change. • It seeks to reduce the arousal, both emotional and physiological, that the anticipation of sleep onset and the surrounding conditions could cause. • Appropriate behaviours are reinforced so that they tend to increase, and inappropriate behaviours are ignored so that they tend to decrease. • It involves the parents establishing a positive routines, with enjoyable and quiet activities close to bedtime that favour the child being able to initiate sleep without undesired associations.
Delaying bedtime	• It involves temporarily delaying a child's bedtime so that it coincides with the child's real sleep onset time. • It adds the requirement that the parents get the child out of bed if sleep onset is not reached within a determined time.
Scheduled awakenings	• It involves knowing the usual pattern of spontaneous awakenings of a child during the night. • Using a previous record of the times when spontaneous awakenings occur, parents preventively wake up the child between 15 and 30 minutes before each awakening, thereby carrying out the usual responses (feeding, soothing) and progressively increasing the period of time between the scheduled awakenings.
Education of the parents / prevention	• The development of education programs for parents about the basic principles of learning, thereby including information about what is normal and what they should expect and incorporating cognitive-behavioral interventions (for example, directed at improving their handling of anxiety, guilt or erroneous expectations) in order to prevent the occurrence of the development of sleep problems in their children. • The objective is to establish positive sleep habits and thus avoid the appearance of inadequate associations.

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There are several reviews that assess the efficacy of behavioral interventions as the treatment of choice for behavioral insomnia in childhood. The techniques are the following: unmodified extinction, graduated extinction, education of the parents / prevention, delayed bedtime with a pre-sleep ritual and scheduled awakenings. The conclusion is that these interventions demonstrate their efficacy at reducing resistance at bedtime and reducing nocturnal awakenings, as well as their efficacy at improving the daily functioning of children and the well-being of the parents[16, 117, 164, 165].

SR of RCT 1++

SR of RCT 1+

Reviews of different types of studies 1+,1, 2+,3

Among the various behavioral interventions, standard extinction is the one that has been shown to be the most effective, followed by parent education. They are followed by graduated extinction, delayed bedtime together with the pre-sleep ritual and scheduled awakenings[16, 117].

Reviews of different types of studies 1+, 1-, 2+, 3

Among the two indicated types of extinction, graduated extinction (often called 'sleep training') has the greatest acceptance by parents. Because unmodified extinction recommends that parents not be present despite a child's demands, it is less acceptable to parents[117, 165, 166]. The development group thinks that the parents' tolerance should be assessed before recommending the graduated extinction technique. Appendix 12 includes a series of questions that can help guide professionals when assessing if parents might be able to carry out the instructions of said technique[167].

SR of RCT 1+

Reviews of different types of studies 1+,1-, 2+,3

Before-after studies 3

The same thing happens with scheduled awakenings. Studies suggest that this technique is accepted less by parents and that it may also be less useful for children themselves[117].

Reviews of different types of studies 1+, 2+, 3

The combined intervention of delayed bedtime together with the pre-sleep ritual has proved to be effective and accepted. This combination is based on stimulus control techniques, which are directed at reducing both emotional and physiological arousal at bedtime[117].

Reviews of different types of studies 1+, 2+, 3

Programmes based on parent education / prevention include a combination of information about sleep routines (habits), sleep schedules and the acquisition of self-control skills so that the children can calm themselves, directed mainly at developing positive sleep habits.

Reviews of different types of studies 1+, 2+, 3

RCT 1+

There are education programmes for parents that have been directed at preventing sleep problems in the prenatal period or during the first 6 months of life. These strategies are more focused on prevention models than on intervention models. They are based on information and guidelines, both oral and written, about good sleep hygiene strategies, even with call-in support, directed mainly at new mothers. The children included intervention groups have less nocturnal awakenings, and the length of their sleep periods are longer than the children who were included in control groups. However, more RCTs that have a greater sample size and that assess the use of these prevention programmes are needed[16, 168].

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Models based on parent education are focused on intervention programmes themselves when the sleep problem has existed for over 6 months. The treatment format varies (depending on the study) from inclusion in individual sessions, to inclusion in group sessions, to handing out informational brochures on sleep[16, 117].

Reviews of different types of studies 1+, 2+, 3+

In any event and independently from the type of programme that is followed, there are several studies that have highlighted the benefits, in terms of cost effectiveness, of putting these types of interventions into practice. Nevertheless, additional cost effectiveness studies that assess the various parent education programmes are needed.

Despite the fact that the different behavioral interventions have proved their effectiveness at treating insomnia, there is a clear tendency by professionals to put the combination of two or more techniques into practice, in what are known as a *multicomponent intervention programme*. Furthermore, in some cases a custom programme is prepared according to the individual features of the child or of a specific family[169]. Therefore, there are very few studies that make a direct comparison between the various therapies, and those that do so have not found appreciable, long-term differences regarding efficacy. There are not a sufficient number of studies to recommend the use of one therapy versus the others. There also is insufficient evidence to recommend the superiority of a combination of techniques versus the use of just one technique. The conclusion of some reviews is that the option of a psychological intervention has to be based on the preferences and circumstances of each particular family, because it is something that will effect that family's well-being and the capacity to adhere to the chosen treatment[16, 117, 165].

Reviews of different types of studies 1+, 2+, 3

Case studies 3

Applying just one behavioral technique is not common, and it is therefore difficult to measure efficacy with respect to the different interventions. There is some proof that unmodified extinction could generate improvement more quickly than scheduled awakenings[16].

There are studies that have assessed the differences in outcomes according to the way in which interventions are presented to parents. In some cases, only written information is handed out, and in other cases, interventions are applied through direct contact between a therapist and the parents, either at the therapist's office, by phone or by both means. In all cases, the children resolved their sleep problems, and no significant differences in the outcomes were found. It seems to be that the content, more than the form of delivery, is what predicts the effectiveness of the intervention. In other words, when some differences are found, they are due to another type of factor such as chronification of the symptoms, their severity, mental health and the skills of the parents, as well as the quality and the content of the interventions[16, 165, 170].

SR of RCT 1+

Reviews of different types of studies 1+, 2+, 3

RCT 1+/1-

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There is no evidence about the optimum duration of psychological treatment, because the duration of the interventions varies considerably among the published studies, and structured treatment programmes that have different durations are not compared. Most of the interventions take place within a period that varies between 2 weeks and 2 months. The conclusions suggest that good efficacy is achieved even with relatively short interventions (one to three sessions). More studies are needed to assess the value of longer treatment programmes in terms of short-versus long-term effects[16, 117, 165].

SR of RCT 1+

Reviews of different types of studies 1+, 1-, 2+, 3

There are some authors who think that, with extinction techniques, the stress that is induced in a child as a result of not immediately taking care of their demands could cause harm to their brain development and their emotional regulation capacities. However, the evidence found highlights that these conclusions are based on studies that explore stress models in animals and not experimental studies with parents and children[171].

Expert opinion 4

In any event, in the studies that have explored this subject directly, the appearance of secondary effects through participation in behavioral programmes has not been identified. To the contrary, the children who participated in this type of intervention were found to be more self-assured and less irritable, and they had fewer tantrums after the study, with the parents even pointing out the positive effect on the child's daytime behaviour. Moreover, no effects on the daily practices or feedings of breast-fed children were found[16].

Reviews of different types of studies 1+, 2+, 3

There are very few studies that provide follow-up on the effectiveness of this type of treatment in the long term. In those that do, it is found that the good outcomes achieved with behavioral interventions are maintained in the short term (less than 6 months), medium term (6-12 months) and long term (over 12 months). This offers a considerable advantage when compared with psychological interventions that use drugs. By the numbers and according to the reviewed studies, it is concluded that approximately 82% of children obtain benefits, which are maintained for 3 to 6 months. However, there only a scarce number of studies that conduct follow-up beyond one year after completion of the intervention[16, 120, 165].

Reviews of different types of studies 1+, 2+, 3

SR 1+

Descriptive study 3

Many children who have nocturnal sleeping problems also have similar problems with daytime sleeping periods. There are studies that have researched what should be the duration and the ideal frequency of the daytime wake periods, so that both daytime and nighttime sleep can be improved. The conclusions are that if daytime sleep can be regulated, this will have a positive effect at night. It also seems that it is easier to normalise daytime sleep through behavioral interventions, given that fewer emotional disorders are caused for both the parents and their children[172].

Descriptive study 3

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Behavioral interventions in children also involve improvement of well-being for the parents. Some studies have evaluated outcome measures such as mood states, stress or matrimonial satisfaction and, in the case of mothers, symptoms of depression. After the intervention, the parents showed rapid improvement in their general state of mental health, with improvement of their mood, fatigue and the quality of their sleep and a reduction in the symptoms of depression[16, 165, 173, 174].

Reviews of different types of studies 1+,2+,3
SR 1+
Descriptive study 3
RCT 1+

There is one RCT that expands the assessment of the effectiveness of psychological treatment, to the point of analysing the cost represented by this type of intervention. The use of behavioral strategies is compared to a control group that does not use said techniques. It is observed that, in the intervention group, both the number and the average time of consultations are reduced, which is maintained even up to 4 months after the intervention, with the consequent savings of resources for the healthcare system. In monetary terms, the mean costs in the intervention group versus the control group were 96.93 pounds (DS249.37) versus 116.79 pounds (DS330.31), respectively (differences of means –19.44 pounds [95% IC –83.70 to 44.81], p = 0.55). The authors furthermore conclude that behavioral interventions can be assumed and are viable in Primary Care Health Centers and that these interventions also reduce the parents' need to access other sources of professional help[174].

RCT 1+

The studies that assess the effectiveness of behavioral therapy versus medication are fewer still. There is one RCT that compares extinction combined with either a sedative antihistamine, such as trimeprazine (alimemazine), or with placebo. There are better outcomes in the groups that receive medication, regarding the reduction of child anxiety or nocturnal awakenings, but this improvement is reduced slightly when the drug is taken away. No significant differences are found between the different interventions after follow-up. These outcomes are similar to those found in studies with adults, who show a more rapid response when drug treatments are combined with behavioral interventions[16, 165, 175].

Reviews of different types of studies 1+,2+,3
SR 1+
Descriptive study 3

Adolescence

To the extent that children grow, the aetiology of sleep problems becomes more complex, and therapeutic interventions become more similar to those used in adults. Treatment now focuses on the task of reducing excessive physiological arousal, which can have a biological component, but this arousal often occurs as a response to a process of stress or anxiety or is related to negative cognitions that are associated with sleep and that increase the fear of sleeping poorly and the fear that the insomnia will continue, which is the same thing that happens in adults[135, 176].

There are some educational interventions that are conducted with the objective of getting adolescents to improve their knowledge of the role that sleep plays in a person's health. The conclusions drawn in these types of studies are that youths show positive attitudes toward educational programmes that describe sleep, sleepiness and its influence on daytime functioning. The conclusions also point out that these interventions should be recommended to improve information and help correct erroneous ideas about the sleep cycle and the problems thereof[162].

RCT 1+

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The interventions that can be effective at treating insomnia in adolescents include stimulus control, sleep hygiene strategies and cognitive restructuring. The following table describes these behavioral techniques (Table 15)[176].

GPC (SR and RCT)
1++, 1+

Table 15. Description of behavioral techniques used for treating behavioural insomnia in adolescents[177-180]

Intervention	Description
Stimulus Control	• Based on the principles of classical conditioning, it tries to associate the use of the bed with sleep. • The main objective is to once again associate the bedroom with the rapid onset • of sleep. • If the wake time becomes set, the sleep-wake rhythm stabilises. • It is achieved by restricting those activities that serve as signals for staying awake.
Cognitive restructuring	• The objective is to replace irrational or distorted thoughts with other, more rational ones. The work is structured on a skill training model to help patients develop the capacity to identify non-adaptive thoughts (thoughts that distort reality or that reflect it partially and that tend to generate emotions that are not appropriate for the situation), compare them with reality and deactivate or change them for other, alternative ones that will help to see reality more objectively. • Used to identify the dysfunctional beliefs, attitudes, expectations and attributes that a person might have about sleep and thus be able to restructure them and replace them for others with a more adaptive value. • In the long term, it can be used to overcome all concerns referring to sleep and to eliminate the anxiety associated with poor sleep quality and quantity or the inability to fall asleep.

The technique of stimulus control is based on the principles of classical conditioning, and it tries to associate the use of the bed with sleep. The main objective is to once again associate the bedroom with the rapid onset of sleep. It is achieved by restricting those activities that serve as signals for staying awake. For many adolescents, bedtime and the bed itself can give rise to activities that are incompatible with sleeping: watching television, reading, eating, thinking about daily concerns and planning activities for the next day. The conditions for remaining an insomniac rather than for sleeping are thus present. The stimulus control consists in a series of instructions designed for the following: stabilising the sleep-wake rhythm, reinforcing the bed and the bedroom as signals for sleeping and limiting those activities that could interfere or be incompatible with sleep. The same principles are used both for difficulty getting to sleep and for nocturnal awakenings.

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Sleep hygiene practices include a series of recommendations that people with insomnia problems can adopt to help them minimise the impact of their problem and favour normal sleep.

Poor sleep hygiene habits are a common problem among adolescents. The use of substances that interfere with sleep (alcohol, caffeine, nicotine and drugs), irregular naps during the day, remaining more time than necessary in bed, irregular sleep-wake patterns, exercising or doing stressful activities before going to bed, poor environmental conditions (temperature, ventilation, noise, light) are among the most common The attempt, by using sleep hygiene practices, is to acquire better habits that correspond to the general lifestyle or to change those that are known to interfere with sleep.

Cognitive restructuring is used to identify the dysfunctional beliefs, attitudes, expectations and considerations that a person might have about sleep, so that they can be restructured and replaced with others that have a more adaptive value. Just like adults, adolescents with insomnia frequently have thoughts and beliefs that must be questioned, because they don't favour getting to sleep. Examples of these ideas include the following: considering sleep to be a waste of time, underestimating the consequences that sleep has on daily performance, thinking that if sleep is increasingly worse there is nothing that can be done to solve the it, thinking that alcohol and other substances are a good solution to eliminating sleep problems or thinking that after a bad night's sleep the best thing to do is to stay home, not go to school and cancel all planned activities181. In the long term, cognitive restructuring can be used to overcome all concerns referring to sleep and to eliminate the anxiety associated with poor sleep quality and quantity or the inability to fall asleep. The objective is to replace irrational or distorted thoughts with other, more rational ones. The work is structured on a skill training model to help patients develop the capacity to identify non-adaptive thoughts (thoughts that distort reality or that reflect it partially and that tend to generate emotions that are not appropriate for the situation), compare them with reality and deactivate or change them for other, alternative ones that will help to see reality more objectively.

There is one RCT that assesses the efficacy of these interventions in a sleep education and management programme for first-year university students. It involves a thirty-minute oral presentation and the delivery of brochures that include guidelines about sleep hygiene strategies, instruction on stimulus control and information about the consumption of substances such as caffeine, as well as a brief summary that describes the impact that sleep problems can have on mood and academic performance. The conclusions that are drawn is that, with these types of interventions, insomnia problems can be reduced considerably and sleep habits can be improved. A significant reduction in sleep latency and in the number of nocturnal awakenings is observed. Even though it might be difficult to reduce the variability existing between sleep times during the week and on the weekend, the results obtained translate into better sleep quality in general[182]. RCT 1+

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Another RCT assesses the use of a structured problem-solving procedure in students with insomnia problems because they have a tendency to think about their problems when going to bed, and they therefore can't get to sleep. In the intervention group, psychological intervention significantly reduces cognitive activation before going to sleep with respect to the control group[183]. RCT 1+

Summary of evidence about treating insomnia through psychological interventions

1++, 1+, 1-, 2+, 3	Behavioral therapy (BT) is effective at treating insomnia in childhood and adolescence, given that it reduces resistance at bedtime, reduces nocturnal awakenings, improves daytime functioning in children and improves the well-being of the parents[16,117,164,165]..
1+, 1-, 2+,3	The most effective BT interventions are unmodified extinction, followed by parent education / prevention. They are followed by graduated extinction, delayed bedtime together with the pre-sleep ritual and scheduled awakenings[16, 117].
1+,1-, 2+,3	Unmodified extinction and scheduled awakenings are those that are accepted the least by parents, and they therefore might be less useful for children themselves[117, 165, 166].
1+, 2+, 3	The combination of delaying bedtime together with the pre-sleep ritual, directed at reducing both emotional and physiological activation at bedtime, has proved to be effective and accepted[117].
1+, 2+, 3	Even though it is suggested that parent education/prevention programmes may be the most cost-effective interventions, additional cost-effectiveness studies that assess the various programmes that exist are needed[16,117].
1+, 2+, 3	Professionals tend to apply a combination of two or more techniques –multicomponent intervention programme – and occasionally use custom-made programmes according to the individual features of the child or family. There are not a sufficient number of studies to recommend the use of one therapy over others. There also is insufficient evidence to recommend the superiority of a combination of techniques versus the use of a just one technique[16, 117, 165, 169].
1+, 1- 2+, 3	No significant differences have been found with respect to the improvement of sleep according to the way that interventions are presented to parents (written or by direct contact between a therapist and the parents, or in a doctor's visit or by phone or by both). The quality and content of interventions, more than the way that they are delivered, are what can predict the effectiveness of an intervention[16,166,170].
1+, 1- 2+, 3	There is no evidence about the optimum duration of psychological treatment. Most interventions take place within a period of time that varies between 2 weeks and 2 months. The conclusions suggest that, even with relatively short interventions (from 1 to 3 sessions), good efficacy is achieved. More studies are needed to assess the value of longer treatment programmes in terms of short- versus long-term effects[16, 117,165].
1+, 2+, 3	The appearance of secondary effects from participation in behavioral programmes has not been identified. To the contrary, children who participated in this type of intervention were found to be more self-assured and less irritable, and they had fewer tantrums after the study, with the parents even pointing out the positive effect on the child's daytime behaviour[16].
1+, 2+, 3	The efficacy achieved in behavioral interventions is maintained in the short-term (less than 6 months), the medium-term (from 6 to 12 months) and the long-term (over 12 months). Approximately 82% of children obtain benefits, which are maintained for 3 to 6 months. However, follow-up studies on the long-term effectiveness of this type of treatment are needed[16, 120, 165].
3	The regulation of daytime sleep through behavioral interventions, which furthermore cause less emotional disturbance for both parents and their children, has a positive impact on nighttime sleep[172].

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1+, 2+, 3	Behavioral interventions in children also involve an improvement in the parents' well-being, in terms of mood state, stress, fatigue, sleep quality, matrimonial satisfaction and symptoms of depression[16,165,173,174].
1+	The use of behavioral strategies with respect to a control group without using said techniques reduces the number and average time of doctor visits, which is maintained even up to 4 months after the intervention, as well as the average cost, although not significantly (96.93 pounds [DS249.37] versus 116.79 pounds [DS330.31]); a differences of means of -19.44 pounds (95% IC -83.70 to 44.81; p = 0.55)[174].
1+, 2+, 3	There are few studies that assess the effectiveness of behavioral therapy versus medication. The RCTs that compare extinction combined with pharmacological treatment (trimeprazine or alimemazine) or with placebo show better outcomes in the groups that receive medication, insofar as they reduce child anxiety or nocturnal awakenings, but this improvement is reduced slightly when the drug is removed. No significant differences between the different interventions after follow-up are found[16,165,175].
1+	Youths show positive attitudes towards educational programs that describe sleep, sleepiness and the influence thereof on daytime functioning[162].
1++, 1+	Interventions that can be effective at treating insomnia in adolescents include stimulus control, sleep hygiene strategies and cognitive restructuring (see Table 15)[176].
1+	Sleep education and management programmes for first-year university students with guidelines about sleep hygiene strategies, instructions on stimulus control and information about the consumption of substances and the impact that sleep problems could have on mood and academic performance significantly reduce sleep latency and the number of nocturnal awakenings and improve sleep in general[182].
1+	A structured problem-solving procedure in students with insomnia because they have a tendency to think about their problems at bedtime significantly reduces cognitive activation before sleep[183].

Recommendations about treating insomnia with psychological interventions*

B	Techniques based on the principles of behavioral therapy (BT) for insomnia should at least include graduated extinction, after parent education. Other behavioral therapies that can be recommended are unmodified extinction, delaying bedtime in conjunction with the pre-sleep ritual and scheduled awakenings.
√	Before recommending the graduated extinction technique, it is recommendable to assess the parent's tolerance to this technique, for which a series of questions can help (Appendix 12).
B	For adolescents, sleep hygiene practices and behavioral interventions that at least include the stimulus control is recommended for treating insomnia. Another intervention that could be recommended is cognitive restructuring.
B	For adolescents, sleep education and management programmes are recommended, including guidelines on sleep hygiene practices, instructions on stimulus control and information about consuming substances and the impact that sleep problems can have on mood and academic performance.
B	To reduce cognitive activation prior to sleep in adolescents who have insomnia and a tendency to think about their problems when it's time to go to bed, a structured problem-solving procedure is recommended.

*_Appendix 11_ includes information for PC professionals and for parents, caretakers and adolescents about the main interventions.

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Pharmacological interventions

Expert opinion 4

Descriptive studies 3

SR 1+

RCT 1-

There is no unanimously approved guideline about the *ideal* pharmacological management of paediatric insomnia. According to the data from several international surveys, the use of drugs is a common practice in paediatric communities, for both the childhood population and for adolescents, despite the lack of evidence regarding efficacy and safety. These types of studies also conclude that many paediatricians perceive the need to recommend and prescribe sedatives and hypnotics for insomnia. However, they lack confidence in the currently available pharmacological options, and they express many reservations, thereby considering the absence of clinical guidelines about the use of medication in children. Despite this, pharmacological prescriptions for sleep problems are increasing, including the use of drugs that are not expressly approved by international drug agencies. This demonstrates that the use of hypnotics and psychotropics –when there are no reliable data on dosage, safety profiles and efficacy– reflects a lack of knowledge about the best pharmacological practices for correctly handling paediatric insomnia.

Some data about the use of hypnotics come from studies with small sample sizes, such as reports or case series, where the methodological deficiencies –mainly the lack of a control group and size– mean that the data obtained cannot be conclusive or be generalised.

Literature includes the use of several families of drugs such as antihistamines, benzodiazepeins, neuroleptics and others, although none of them have been systematically and comprehensively assessed for paediatric insomnia. These drugs are often prescribed based on the extrapolation of outcomes obtained through clinical experience and on empirical data from studies conducted on adults, because there is practically no information about the efficacy, safety or acceptability of hypnotics coming from RCTs conducted on paediatric patients or about the optimum dosage parameters or the duration of treatment.

The few studies published about the efficacy of using a pharmacological treatment versus placebo in paediatric sleep problems show some outcomes with statistically significant effects, but the clinical effectiveness is not clear. Therefore, none of the available sleep-inducing drugs should be considered as first-line treatment for paediatric insomnia of any aetiology, and even less for prolonged use[101, 116, 165, 184-187].

Randomised, double blind RCTs of a greater sample size, of high quality and with follow-up of a longer duration are needed to investigate the efficacy and safety of pharmacological interventions for treating insomnia.

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It has already been shown that, since many of the factors that contribute to insomnia are of the behavioral type, it is important that this disorder first be approached through hygiene-behavioural therapy. Only in some specific cases could it be justified to start therapy by combining hygiene-behavioral interventions with drugs. But the pharmacological treatment of paediatric insomnia requires a careful selection of patients, always after having made the correct diagnosis and according to the professional's judgement[16, 101].

Reviews of different types of studies 1+, 2+, 3

Experts also agree on pointing out that any discussion about the use or non-use of pharmacological interventions in treating paediatric insomnia must be preceded by stating the importance of applying sleep hygiene practices as a necessary component in every treatment package[101].

Expert opinion 4

We have already seen that there are few studies that have assessed the effectiveness of treatment that combines behavioral therapy with drug therapy. They refer to case series with a small sample size in which an antihistamine is used as the drug (trimeprazine tartrate or alimemazine) and extinction as the behavioral intervention. Combined treatment significantly reduces nocturnal awakenings, although this improvement dropped slightly after interrupting the drug. The only thing that some RCTs conclude is that, even though the use of drug treatment together with behavioral techniques such as extinction does not show long-term benefits, it can initially reduce nocturnal awakenings, which can help to increase acceptance of the extinction technique in some parents. These authors suggest that the role that can be played by the use of new combinations or ways of taking on insomnia does not necessarily have anything to do with increasing efficacy, but rather with the possibility of increasing compliance and acceptance by the parents[175, 188].

Descriptive study 3

RCT 1-

Even though it has already been seen that there is no evidence available for using specific medication in paediatric insomnia, there are efforts through experts to reach a consensus about this practice in order to try to prevent the poor use of drugs. The consensus of experts of the AASM proposes a series of general recommendations about the use of medication in paediatric insomnia, which includes the use of drugs, always preceded by the application of sleep hygiene practices and always in combination with non-pharmacological interventions such as behavioral techniques and parent education techniques, after having previously established clear treatment objectives together with the family. They also add that medication must be used only in the short term and that the drug must be selected according to the problem shown by the child (short-acting drugs for sleep onset problems and medium-long life drugs for maintenance problems), with monitoring of the benefits and adverse effects and after having previously explored the possible use of other medicines, drugs and alcohol or the possibility of pregnancy. The approach of this consensus of experts is summarised in the following table (Table 16)[101].

Expert opinion 4

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Table 16. AASM proposal about pharmacological treatment used for paediatric insomnia[101]

Potential indications for drug treatment of insomnia in a healthy child
• The safety or welfare of the child is threatened. • Parents unable to implement non-pharmacological interventions. • The insomnia occurs within the context of a medical illness, due to an acute stressor or before or during travel.
Contraindications to drug treatment
• Presence of an untreated, sleep-disordered breathing. • The insomnia is due to a developmentally based normal sleep behavior or false expectations of the parents about sleep. • The insomnia is due to a short duration, self-limited condition (e.g., teething). • There may be potential drug interactions with concurrent medications or with substance or alcohol abuse. • It is not possible to follow up on and/or monitor the treatment (parents frequently miss scheduled appointments).

Summary of evidence about pharmacological treatment for insomnia.

1+, 1-, 3, 4	There is insufficient evidence on dosage, safety profiles and efficacy about the use of hypnotics for handling paediatric insomnia[101, 116, 165, 184-187].
1+, 1-, 3, 4	The few studies published about the efficacy of using pharmacological treatment versus placebo show some results with statistically significant effects, but the clinical effectiveness is not clear[101, 116, 165, 184-187].
3	The use of pharmacological treatment (antihistamines) together with behavioral techniques such as extinction can reduce nocturnal awakenings initially, although this improvement drops slightly after interrupting the drug, which can nevertheless help to increase acceptance of the extinction technique by some parents[175, 185, 188].
4	The consensus of experts of the AASM establishes a series of recommendations, potential indications and contraindications for pharmacological treatment of paediatric insomnia in children who are otherwise healthy (Table 16)[101].

Recommendations about pharmacological treatment for insomnia.

D	The pharmacological treatment of paediatric insomnia requires a careful selection of patients, after having made the correct diagnosis according to the professional's judgement.
B	Pharmacological treatment is not recommended either as a first option or as an exclusive treatment strategy for paediatric insomnia.
D	The use of drugs must be preceded by the application of sleep hygiene practices.
D	Pharmacological treatment is always recommended in combination with non-pharmacological interventions such as behavioral techniques and parent education.
D	Medication should only be used in the short term, and the drug should be selected according to the problem –short-acting for sleep onset problems and medium-long life for maintenance problems– thereafter monitoring the benefits and adverse effects.

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D	Prior to starting the use of drugs, clear treatment objectives should be established together with the parents/ caretakers or adolescents, and the use of other medicines, alcohol, drugs and the possibility of pregnancy should be explored.
√	The pharmacological treatment of paediatric insomnia is recommended when: • The safety or welfare of the child is threatened. • The parents are unable to implement non-pharmacological interventions. • The insomnia is within the context of a medical illness or an acute stressorl situation.
D	The pharmacological treatment of paediatric insomnia is not recommended when: • There is an untreated, sleep-disorder breathing • The insomnia is due to a developmentally based normal sleep behavior or due to false expectations of the parents about sleep. • The insomnia is due to a short duration, self-limited condition (e.g., teething). • There may be potential drug interactions with the usual medication or with substance or alcohol abuse. • It is not possible to follow up on and/or monitor the treatment (parents are incapable of going to scheduled appointments).

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Melatonin

Melatonin is basically synthesised in the pineal body during the dark phase, thereby representing the chemical code of night (it is sometimes called the 'vampire hormone'), and its main function, although not the only one, is to contribute to spreading the rhythmic message generated by the central circadian clock. The secretion of melatonin reaches its maximum levels at between one and three years, with plasma values of around 250 pg/ml. The levels start to drop right before puberty, with plasma values of around 100 pg/ml in adults189. Since melatonin is also associated with a hypnotic effect and a greater propensity to sleep, it has been suggested that exogenous melatonin could act as a chronobiological substance with hypnotic properties. Its action will be more chronobiological or more hypnotic depending on the time when it is administered rather than on the administered dose, because it does not alter the total sleep time. The truth is that its use in treating paediatric sleep problems continues to be the object of controversy, basically due to the lack of long-term studies on safety. Some indications point to the fact that the therapeutic efficacy of exogenous melatonin requires the prerequisite of a reduced presence of endogenous melatonin[190, 191].

Descriptive study 3

There are several surveys of professionals and parents or caretakers regarding the use of melatonin for paediatric sleep problems. Even though melatonin was not the first treatment option, given that most clinicians preferred non-pharmacological interventions at the beginning of treatment, the opinions of professionals about using melatonin were very favourable. According to the data obtained from these surveys, melatonin holds third place regarding prescriptions for pharmacological treatment, and it is mainly used for sleep onset difficulties. However, some clinicians also used it if there were frequent nocturnal awakenings. By ages, it was prescribed more for older children and adolescents, and it was rarely recommended among pre-school age children[101, 186, 192, 193].

Regarding the opinions of the parents, all the respondents related improvement in the sleep onset of their children and in the quality of sleep. However, their responses should include some qualifications about the disorder in question, because these are parents of children with sleep problems that are comorbid with other disorders such as ADHD and autism spectrum disorders[192].

RCT 1+

Case series

There is very little evidence from primary studies about the efficacy and safety of melatonin as treatment for paediatric insomnia. One RCT with children between 6 and 12 years of age compares the use of melatonin (5 mg daily, taken at 6 in the afternoon) with placebo. It included children who had had insomnia problems for more than 1 year and who had not achieved a satisfactory response to their problem through the use sleep hygiene practices only. The study lasted 5 weeks, with 4 weeks using treatment daily. At the end of the study, the children could continue with the treatment if their parents wished. The results conclude that melatonin is safe in the short term and that it is shown to be significantly superior to placebo with respect to sleep onset and the duration of sleep. Regarding the number of nocturnal awakenings, no significant changes were noted with respect to the placebo group. Only two children had headaches during the initial days of treatment[194]. One retrospective study follows up on a series of cases of children with insomnia problems, with an average age of 9 years (9.6 + 4.5 years). Several children had a comorbidity, such as ADHD (44%), anxiety (25%), affective disorders (9%) and slight developmental delay (9%). All had been referred for this study after not having improved using conventional treatments. The children received an average dose of 2 mg of melatonin one hour before going to bed during an average time of 2 months. In 90% of the cases, from partial improvement to complete resolution of the problem was achieved with respect to sleep latency and the number of nocturnal awakenings. After an average follow-up duration of two months, no major adverse effects were found[195].

SR 1++

A systematic review subsequently conducted (which does not include the preceding studies) determines that, even though there might be some RCTs that suggest that melatonin can be effective at managing paediatric insomnia, the small sample size of the included studies and the lack of data about long-term safety mean that no conclusions about the efficacy and safety of melatonin in children with insomnia can be drawn. An RCT that includes larger samples must be conducted to reach such a conclusion[196].

Descriptive study 3

A follow-up study with an average of 3.7 years in children with ADHD and onset insomnia who received melatonin shows that suppressing the treatment causes recurrence of the initial problem after one week in over 90% of the cases. This suggests that the chronobiological effects of melatonin are only maintained while it continues to be used, and the need to maintain the phase advance only disappears in 9% of those who received treatment for 4 years[197].

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There is a recent RCT whose objective is to establish the dose-response relationship of melatonin in chronic onset insomnia with respect to the following measures: advance of dim light melatonin onset (DLMO), advance of sleep onset (OS) and reduction of sleep onset latency (SOL). The study was carried out on children between 6 and 12 years of age who received, for one week, either a dose of melatonin at 0.05 mg/kg, 0.1 mg/kg or 0.15 mg/kg or placebo. The children who received melatonin significantly advanced sleep onset and DLMO by approximately 1 hour. The conclusions reached were that there is no dose-response relationship of melatonin with respect to sleep onset and latency and advance of DLMO, and therefore melatonin is effective at a dose of 0.05 mg/kg administered at least 1 to 2 hours before the desired bedtime[198]. RCT 1+

There is very little information about the adverse effects associated with the use of melatonin in paediatrics, because the data on safety have not been assessed systematically and in the long term. In the short term, some secondary effects have been found, such as headaches, dizziness, sensation of cold and nighttime worsening of asthma. There have also been warnings about the possibility that the use of high doses of melatonin, in the long term, might inhibit ovulation and reproductive functions in puberty due to its action on the melatonin receptors distributed in the ovaries and suprarenal glands[192,196]. There have also been warnings about the variability of the quality of the preparations, given that some coming from health food stores may contain harmful contaminants of animal origin. SR 1+ Descriptive study 3

In the long term, there is one follow-up study on some of the children previously included in one of the aforementioned RCTs[198]. This cohort included children with melatonin for an average of 3 years at an average dose of 2.7 mg. The adverse effects that were found are associated with headaches, nausea, weight gain and nocturnal bed-wetting, among others, although they were infrequent and well-accepted in most cases. The authors conclude that treatment with melatonin in children with insomnia can be maintained up to an average of 2 years without observing any substantial deviation of the children's development with respect to sleep quality, pubertal development and mental health indicators, in comparison with the standards of the general population[199]. Cohort study 2+

In view of the aforementioned outcomes, the scarce studies that exist on the use of melatonin in paediatric ages suggest that melatonin can help to reduce the sleep latency of children with insomnia problems at the ages of between 6 and 12 years. The generalisation of these findings to younger children is problematic due to the small sample sizes of these studies and the short follow-up time. Clinical use for the treatment of insomnia at these ages should be preceded by conducting broad, controlled studies that determine short-, medium- and long-term safety, in addition to efficacy, especially in children under the age of 3.

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The administration of exogenous melatonin must always be indicated and supervised by a paediatrician or an expert on sleep. For treating insomnia, the hypnotic role of melatonin is of interest, more than its chronoregulation capacity, wherefore in circumstances of onset insomnia, melatonin should be administered every night at the same chronological time. If it cannot be administered at that time for any reason (forgotten, holiday, etc.), the dose for that day should be eliminated. Moreover, it is important to keep in mind that, in order to achieve the necessary conditions of safety, preparations with chemically pure melatonin must be sought.

Summary of evidence about treatment with melatonin for paediatric insomnia

3	In surveys of professionals, melatonin held the third position with respect to prescriptions for pharmacological treatment, and it is used mainly for sleep onset difficulties. By ages, it was prescribed more for older children and adolescents[101, 192, 193].
3	Surveys of parents of children with sleep problems that are comorbid with other disorders (ADHD and autism spectrum disorders) relate improvement in the sleep onset of their children and in sleep quality after treatment with melatonin[192].
1+	Daily melatonin (5 mg/day for 4 weeks at six in the evening in children from 6 to 12 with insomnia problems) proved to be safe in the short term and significantly superior to placebo regarding sleep onset and the duration of sleep. Regarding sleep latency and the number of awakenings, no significant changes appeared versus the placebo group[194].
3	In children with an average age of 9 years, some with insomnia problems in addition to other disorders (ADHD, anxiety, affective disorders, developmental delay), who received an average dose of melatonin of 2 mg/day one hour before going to bed for 2 months, from partial improvement to complete resolution of the problem was achieved with respect to sleep latency and the number of nocturnal awakenings in 90% of the cases[195].
3	In children with ADHD and onset insomnia who received melatonin in follow-up for an average of 3.7 years, the suppression of treatment caused, within one week, a return to the initial problem in over 90% of the cases[197].
1+	Melatonin, administered at least 1 to 2 hours before the desired bedtime during one week, at a dose of 0.05 mg/kg, 0.1 mg/kg or 0.15 mg/kg in children from 6 to 12 years of age with chronic onset insomnia, proved to significantly advance sleep onset and DLMO and decrease sleep latency, wherefore no dose-response relationship was observed.[198]
3	In the short term, some secondary effects have been found, such as headaches, dizziness, sensation of cold and nighttime worsening of asthma. High doses and long-term treatments with melatonin could inhibit ovulation and reproductive functions. Some preparations from health food stores can contain harmful contaminates of animal origin[192].
2+	One follow-up study on children who took melatonin for an average of 3 years at an average dose of 2.7 mg and who were included in the aforementioned RCT found that adverse effects included headaches, nausea, weight gain and nighttime bed-wetting, among others, although they were infrequent and well-accepted in most cases. The authors conclude that treatment with melatonin in children with insomnia can be maintained up to an average of 3 years without observing any substantial deviation of the children's development with respect to sleep quality, pubertal development and mental health indicators, in comparison with the standards of the general population[199].

Recommendations about treatment with melatonin for paediatric insomnia

√	There is no evidence for recommending the use of melatonin in children under 6 years of age.
√	The Spanish Agency of Medicines and Healthcare Products (AEMPS) has not authorised melatonin for paediatric insomnia. However, the outcomes obtained from trials with children between 6 and 12 years of age who have chronic sleep onset insomnia and who do not respond to educational interventions with sleep hygiene practices and psychological interventions suggest that once approved, the use of melatonin at a dose of 0.05 mg/kg, administered at least 1 to 2 hours before the desired bedtime, could be assessed.

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√	Melatonin must be chemically pure and always be administered at the same time and under adequate control by a paediatrician or a doctor specialising in sleep disorders, and the removal thereof should be assessed according to the clinical evolution If, for any reason (forgotten, holiday, etc.), it cannot be administered at that time, the dose for that day should be eliminated.
√	Professionals are advised to ask parents about any type of melatonin acquired at a store or health food shop to avoid the use of melatonin of animal origin and/or uncontrolled doses.

Other treatments

Nutritional supplements

One study evaluated if the administration of cereals enriched with nutrients that are facilitators of sleep could help improve the sleep of infants between 8 and 16 months of age who had sleep disorders at night time. The product used was a cereal that contained 225 mg of tryptophan, 5.3 mg of adenosine-5 '-p and 6.3 mg of uridine-5 '-p per 100 g. The studied parameters were total time in bed, assumed sleep, actual sleep, sleep *efficiency*, sleep latency, immobility and total activity. The sleep parameters improved in the children who received the enriched cereal. These results support the concept of chrononutrition, which confirms that the sleep-wake rhythm can be influenced by diet[200]. RCT 1+

However, more RCTs that have a greater sample size and that assess the activity of this or other combinations of nutritional substances are needed.

Summary of evidence about treatment with nutritional supplements for paediatric insomnia

1+	In children between 8 and 16 months of age who received a cereal enriched with 225 mg of tryptophan, 5.3 mg of adenosine-5 '-p and 6.3 mg of uridine-5 '-p per 100 g, there was improvement in the parameters of total time in bed, assumed sleep, actual sleep efficiency, sleep latency, immobility and total activity[200].

Recommendations about treatment with nutritional supplements for paediatric insomnia

1+	In children between 8 and 16 months of age who received a cereal enriched with 225 mg of tryptophan, 5.3 mg of adenosine-5 '-p and 6.3 mg of uridine-5 '-p per 100 g, there was improvement in the parameters of total time in bed, assumed sleep, actual sleep efficiency, sleep latency, immobility and total activity[200].

Medicinal herbs

The use of herbal remedies for treating sleep disorders, which includes insomnia, is very old. Herbal medicines are very popular, they are used globally, and they could be considered as a treatment option for paediatric insomnia if it is shown that they are effective and safe.

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There are many herbal preparations that are used by both parents and clinicians for treating paediatric insomnia. They are preparations that usually include valerian, camomile, kava-kava, lavender and sometimes even hops or melittis. But the long-term efficacy and safety of the majority of these preparations are unknown[101].

Expert opinion 4

Therefore, RCTs that assess the sedative activity of a plant or combinations of plants for children and adolescents are needed.

CPG (SR and RCT)
1++, 1+
RCT 1+

The only studies found assess the effectiveness of plants such as valerian for adult patients, with ages starting at 18 years. The combination of valerian with hops seems to have a certain effectiveness at treating light-moderate insomnia in comparison with placebo[176, 201, 202].

In the review conducted for preparing the insomnia guideline in adults, no studies were found that assess the specific efficacy of other medicinal plants or combinations thereof for insomnia[176].

RCT (SR and RCT)
1++, 1+

Many parents think that these preparations are 'safe', but the interactions between drugs and herbal shop preparations are, to a large extent, unknown. Parents have to be alert to the danger of self-medication using a combination of drugs and herbal products, because the effects can be duplicated if they both have similar ingredients. Health professionals have to know how to recognise both the benefits and the risks that these preparations have. This would avoid attitudes of rejection in view of parents' demands, which can lead the patient to hiding the use of such preparations, thereby concealing possible adverse effects[101, 203, 204].

Descriptive studies, 3

Expert opinion, 4

More than 5 years have passed since the publication of this Clinical Practice Guideline, and its validity has not been reviewed

Summary of evidence about treatment with medicinal herbs for paediatric insomnia

4	There are an insufficient number of studies that have assessed the sedative activity of a plant or combinations of plants for children and adolescents[101].
1++, 1+	In studies of the adult population, the combination of valerian and hops has shown a certain efficacy in comparison with placebo for the treatment of light-moderate insomnia, but RCTs with a greater sample size are needed to confirm the outcomes[201,202].
4	Many parents think that these preparations are 'safe', but the interactions between drugs and herbal shop preparations are, to a large extent, unknown.[101]

Recommendations about treatment with herbal medicines for paediatric insomnia

B	There is insufficient evidence to recommend the use of valerian or using valerian in combination with hops for treating paediatric insomnia.
D	Professionals are advised to ask parents/adolescents about any health store product that is being taken or that may have been taken in order to alert them about the danger of self-medication in combination with drugs and herbal products.

White noise

White noise is the noise that is produced as a result of the combination of sounds of the different frequencies that are audible by human beings (which go from 20 to 20,000 hertz). It is random noise that has the same power spectrum density throughout the entire frequency band. There are several explanations about the utility of white noise as a technique for calming babies and also for putting them to sleep. One of them is that white noise can mask all other sounds, and a baby thus ceases to hear himself if he starts to cry, and he therefore stops crying. Another argument is that it is a noise that makes it difficult for a baby to wake up upon hearing other, sudden sounds. Other theories propose that this sound reminds babies of their time in the uterus, and that's why they are calmed.

There is very little information about the effectiveness of using low-intensity white noise to favour relaxation and sleep. Some studies have concluded that white noise can be useful at reducing resistance when it is time to go to bed and at reducing nocturnal awakenings, although disturbances usually return when the white noise ceases to be emitted[205, 206].

RCT 1+/1-
Descriptive study 3

Current trials on the use of white noise are still not rigorous enough to allow conclusions to be drawn about the extensive application of any form of this type of noise for treating paediatric insomnia of any aetiology and in any age group. The long-term effect of white noise and/or the variations thereof also are unknown, and its potential adverse effects are not completely clear[205,206].

Randomised, double blind RCTs of a greater sample size and of high quality are needed, with follow-up of a longer duration, to investigate the efficacy and safety of using white noise for treating paediatric insomnia.

Summary of evidence about using white noise to treat paediatric insomnia

1+/ 1-, 3	Some studies seem to demonstrate that white noise can be useful at reducing resistance when it is time to go to bed and at reducing nocturnal awakenings, although disturbances usually return when the noise ceases to be emitted[205, 206].
1+/1, 3	Randomised, double-blind RCTs of a greater sample size and of high quality are needed, with follow-up of a longer duration, to investigate the efficacy and safety of using white noise for treating paediatric insomnia[205, 206].

Recommendations about using white noise to treat paediatric insomnia

B	There is insufficient evidence about efficacy and safety to recommend the use of white noise for treating paediatric insomnia.

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7.1.2. Restless Legs Syndrome (RLS)

- ***Definition***: Restless legs syndrome (RLS) is a chronic, sensorimotor neurological disorder characterised by the urgent need to move the legs in idle situations, and it is generally associated with an unpleasant situation. These symptoms appear or worsen at the end of the day and are alleviated with movement[26].

  It has a major impact on the quality of life of a child, given that it causes insomnia (sleep cannot be initiated), daytime fatigue, a decrease in attention and paradoxical hyperactivity in children and adolescents and, in serious cases, excessive daytime sleepiness (EDS).

  Two forms of presentation have been described:

  - Early-onset RLS, which appears before 30-40 years of age, with a slowly progresive evolution and a family medical history of RLS.
  - Late-onset RLS, which progresses rapidly, in which there is usually an underlying cause.

- ***Etiopathology:*** it is complex and is not fully known, although several hypotheses are considered:

  - *Genetic hypothesis*. It has been observed that 70% of children and adolescents with RLS have a first-degree relative who is affected. If there is a family medical history of RLS, the clinical manifestations appear several years before, what it is common. A bimodal pattern of inheritance according to the age of presentation has been suggested, with a dominant autosomal pattern in early-onset RLS and the participation of various genes. It currently seems that there is evidence of the bimodal hypothesis according to the age when symptoms appear, with genetic variations that, in combination with environmental factors, determine the clinical expression of the illness[207, 208].

  - *The dopamine hypothesis*. In patients with RLS, there is a positive response to dopaminergic treatment and a worsening of symptoms with dopamine antagonists. The dysfunction seems to be located at the postsynaptic level, on the dopamine D2 receptor[209].

  - *Iron deficiency*. There is an evident relationship between dopamine and iron, which is a cofactor of tyrosine hydroxylase, an enzyme that participates in converting tyrosine into L-DOPA (precursor of dopamine). Moreover, iron facilitates the fastening of D2 receptors and favours infant neurological development (myelination). On the other hand, there is a close relationship between iron, RLS and periodic limb movements (PLM), and it has been demonstrated that ferritin levels below 35 jig/l or 50 jig/l, according to different authors, are related to the appearance of the symptoms and severity of RLS[210-213]. The serum concentration of ferritin constitutes the best iron deficiency marker in its natural deposits (kidneys, spleen and bone marrow), although at the onset of the illness, this may be the only finding, even with serum iron within normal limits. In children, up to 89% of patients with RLS have levels below 50 jig/l, and 75% show ferritin values that are below age-adjusted average values[214, 215].

  - *Others*. Symptoms of RLS have also been described in renal failure and hepatic insufficiency, peripheral neuropathies, diabetes mellitus, early on-set hereditary ataxias, spinal injuries and with some drugs (for example, antihistamines, etc.).

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- ***Clinical manifestations:***

  - *Sensory-motor symptoms*. In adults, there is an urgent need to move the extremities, caused by an uncomfortable, 'almost painful' sensation, more in the legs and above all the calves, and less in the arms. There is motor nervousness that worsens in situations of physical and mental rest, and also at the end of the day (it tends to be more intense between 12 and 4 in the morning, regardless of the person's schedule). This circadian pattern is related to the secretion curve of endogenous melatonin, which inhibits the release of dopamine.

    In children, the sensory-motor symptoms are more imprecise and can appear at any time of day (sometimes more during the day than at night, in class or watching TV), and it can affect different parts of the body. Irritations usually appear below the knees, either symmetrically or asymmetrically. Relief is obtained by moving, and efforts at stopping those movements are effective during a short period of time (similar to muscle tics).

    In children and adolescents with RLS, the symptoms that are observed most frequently are the following: evening restlessness (60%), irritability (55%), *lack of energy* (45%), concentration difficulty (40%) and difficulty at performing school tasks (35%)[31].

  - *Periodic limb movements* (PLM). In 63-74% of paediatric patients and 12% of the general population, RLS is accompanied by periodic movements in the extremities, which include abrupt, pseudo-rhythmic and stereotyped shaking, which appears during sleep and, occasionally, while awake. More common in the legs, they appear with an extension of the big toe, dorsiflexion of the ankle and, occasionally, dorsiflexion of the knee and hip. The diagnosis of PLM requires a polysomnography (PSG), which allows documenting movements in the legs. The periodic limb movements disorder (PLMD) is characterised by the presence of a significant number of PLMs (≥ 5 per hour of sleep) and a sleep or daytime fatigue disorder, in the absence of another cause that might explain these symptoms. Although it is a non-specific finding, PLMD supports the diagnosis of RLS[26]. PLMD has an aetiology that is very similar to RLS regarding iron deficiency, dopaminergic blocking and neurological disorders (including narcolepsy).

    RLS and PLM are associated with the obstructive sleep apnea-hypopnea syndrome (OSAHS). Half of all children with PLMD have apneas (treating the apneas eliminates the PLMs in half of the cases), and conversely, many children with OSAHS describe restlessness in their legs and growth pains.

  - *Sleep alterations*. There are usually sleep alterations in the form of insomnia at the beginning of the night, caused by sensory and motor symptoms. If associated with PLM, there is fragmented and unstable nighttime sleep caused by the movements in the limbs, which repeat periodically and stereotypically, thereby causing micro-awakenings or arousals that interrupt sleep. Therefore, children with PLM sleep less and worse than their friends. It is difficult to wake them in the morning, and they show excessive daytime sleepiness, which conditions the presence of academic problems.

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- *Psychiatric disorders*

  Depressive symptoms have been observed in up to 14.4% of patients and signs of anxiety in almost 8% of them[31]. On the other hand, RLS-PLM and the Attention Deficit Hyperactivity Disorder (ADHD) can often coexist in the same patient or are confused with each other, given that patients with RLS sleep poorly, and the chronic deprivation of sleep causes symptoms of paradoxical hyperactivity and attention deficit. It has been observed that 12-35% of children with ADHD have symptoms of RLS[216-218], and 10.2% have PLMD[219]. In addition, the diagnosis of ADHD is much more frequent in children with RLS and appears in 25% of these children[30]. ADHD and RLS share common aetio-pathogenic mechanisms: low levels of ferritin (related directly to the severity of the symptoms, the normalisation of which improves both disorders[210]) and the participation of cerebral dopaminergic systems, although genetic studies fail to contribute conclusive data that link RLS and ADHD[30]. From a clinical point of view, RLS can aggravate the symptoms of ADHD and vice versa, wherefore it is highly recommendable to screen in both directions and conduct specific therapeutic treatment, because treating RLS improves the symptoms of ADHD and the treatment of ADHD does not worsen RLS[210, 220].

Diagnosis

The diagnosis of RLS is clinical evaluation, and the diagnostic criteria that should be applied to children from 2 to 12 years of age are shown in Table 17. In adolescents over 13 years of age, the criteria for adults should be followed[26, 221].

Reviews of different types of studies 1+, 2+, 3+.

Expert opinion 4.

There are 3 categories: *Definitive RLS* (with clinical purposes regarding level of care and prevalence studies), *probable RLS* and *possible RLS* (the latter 2 reserved for research studies).

Table 17. Diagnostic criteria of RLS

Essential RLS criteria in adults or adolescents over 13 (A + B + C + D)
A. The patient reports an urge to move the legs, usually accompanied or caused by uncomfortable and unpleasant sensations in the legs.
B. The urge to move or the unpleasant sensations begin or worsen during periods of rest or inactivity such as lying or sitting.
C. The urge to move or the unpleasant sensations are partially or totally relieved by movement, such as walking or stretching, at least as long as the activity continues.
D. The urge to move or the unpleasant sensations are worse, or only occur, in the evening or night.
Diagnostic criteria of definitive RLS in children from 2-12 years (A + B) or (A + C)
A. The child meets four of the essential criteria of RLS in adults and
B. The child relates a description, in his or her own words, a situation consisting of unpleasantness in the legs (the child may use terms such as 'wanting to run', 'tingling', 'tickling', 'kicking', or 'too much energy in my legs' when describing the symptoms).
C. The child has at least two of the following three findings: a. A sleep disturbance for age. b. A biological parent or sibling with definite RLS. c. A polysomnographically documented periodic limb movement index of five or more movements per hour of sleep.
Other categories (reserved for clinical research on minors under 18 or patients who cannot express the symptoms).

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Diagnostic criteria of probable RLS
• *Probable type 1 RLS:* A. The child meets all the essential criteria of RLS in adults, except for criteria D (circadian component with worsening in the evening) and B. The child has a parent or twin sibling with definitive RLS. • *Probable type 2 RLS:* A. It is observed that the child has behavioral manifestations of unpleasantness in the lower extremities when seated or lying down, accompanied by movements of the affected extremity. The unpleasantness has characteristics of criteria B, C and D of adults (meaning that it worsens during rest and inactivity, it is alleviated with movement, and it worsens in the evening-night) and B. The child has a parent or twin sibling with definitive RLS.
Diagnostic criteria of possible RLS
The patient does not meet the criteria of 'definitive' RLS or 'probable' RLS but presents a PLM disorder and has relatives (parents, twin siblings) with definitive RLS.

In paediatric RLS, the diagnosis is never easy. Children do not comprehend the meaning of 'urgent need to move their legs', and they describe what they feel as an 'unpleasant feeling'. Some children relate worsening during the day, without worsening in the evening, wherefore they are not identified as patients with *definitive* RLS. In these cases, it is very possible that the daytime worsening is caused by the obligation to remain seated in class, where they are not allowed to move.

Supporting symptoms are very useful at increasing the clinical certainty of the diagnosis of RLS: family medical history (biological parents or twin siblings with a diagnosis of RLS), a sleep disorder (sleep onset or maintenance insomnia, in which RLS is identified as a 'sleep thief') and a pathological PLM index in the PSG.

The diagnosis is made using a complete medical record that records the personal and family medical history and a comprehensive physical examination. Moreover, a haematological study is performed (blood count, blood sugar, transaminases, kidney function, iron metabolism and ferritin). Other diagnostic tools that are simple and very useful for this disorder are sleep logs/diaries, questionnaires and home videos.

The frequency and severity of the symptoms of RLS are fundamental for determining the clinical impact of the illness and the need for the type of treatment. An RLS severity scale in the paediatric population was recently produced, but it has not been validated[222].

Differential diagnosis

Other pathologies whose clinical manifestations are similar to RLS and which can confuse the diagnosis must be investigated and discarded (Table 18).

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Table 18. Differential diagnosis of RLS

1. ADHD: The daytime manifestations of RLS are confused with the symptoms of ADHD, because some children with RLS are incapable of remaining seated in class, they appear to be hyperactive, and they don't pay attention, wherefore they are diagnosed as ADHD.
2. Position discomfort.
3. Growth pains (GP). Recurring, poorly defined irritation, sometimes painful, which appears in the legs and at bedtime, without functional imitation or inflammation. They appear more frequently when there is a family medical history, and while they are not alleviated by movement, they are alleviated by massage and analgesics. GPs appear in up to 85% of children with RLS (64% in children without RLS), and there is a greater proportion of RLS in adults who have suffered from GP in their childhood.
4. Muscle tics: Rapid, abrupt and repeated, non-painful involuntary movements that appear during the day.
5. Muscle pains: Pain related to exercise, without a circadian pattern, and it is not alleviated with movement.
6. Muscle cramps: Abrupt, brief and involuntary muscle contractions, palpable and located in a calf. Usually nocturnal, they are resolved spontaneously or with massage.
7. Bone pathology.
   - Osgood-Schlatter disease: Painful to the touch in the anterior region of the tibia in adolescent males. Improves with rest and analgesics.
   - Chondromalacia patellae: Degeneration of the cartilage under the knee cap, which causes pain when going up or down stairs.
8. Acathisia: Sensation of unease (hyperkinesia) in the lower extremities, which appears while seated (not lying down) and is alleviated with movement. It can appear after the administration of narcoleptics.
9. Others: Dermatological and rheumatic illnesses, peripheral polyneuropathy, radiculopathy or muscular dystrophy. Occasionally, PLMs must be differentiated from hypnic myoclonus (sudden shakes at the start of sleep), myclonic crises or parasomnias.

On the other hand, it is possible to confuse RLS and PLM, two entities that appear together in the majority of cases. Table 19 shows the differences between them.

Table 19. Differences between RLS and PLM

	RLS	**PLM**
Type of sensation	Sensory-motor	Motor
Manifestations	Before going to bed	While asleep
Reluctance to go to bed	Yes	No
Insomnia	Onset (increases sleep latency)	Onset and maintenance, with nocturnal awakenings (affects sleep quality).
Excessive Daytime Sleepiness (EDS)	Yes	Yes
Is the subject aware?	Yes	No
Family history	Yes	Yes
Diagnosis	Clinical	Polysomnogram (> 5 PLM/hour of sleep).

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Summary of evidence about the diagnosis of RLS

4	The diagnosis is based on the medical record.[26, 221]

Recommendations about the diagnosis of RLS

√	RLS should fundamentally be diagnosed through a complete medical record that includes personal and family medical history, a comprehensive physical examination and a haematological study (blood count, blood sugar, transaminases, kidney function, iron metabolism). The information gathered by families in sleep logs/diaries can be useful.
√	It is advisable to keep the following pathologies in mind when posing a differential diagnosis: Attention Deficit Hyperactivity Disorder (ADHD), positional discomfort, growth pains, muscle tics, muscle pains, muscle cramps, bone pathology, acathisia and other illnesses such as skin diseases, rheumatic illnesses, peripheral polyneuropathy, radiculopathy or muscular dystrophy, hypnic myoclonus, myoclonic crises and parasomnias.

Treatment

Sleep hygiene practices / General strategies

No studies have been found that formally investigate the effectiveness of general sleep hygiene strategies and practices in patients with RLS[221].

Reviews of different types of studies 3

Experts state that the therapeutic recommendations for the paediatric population with RLS should begin by establishing a series of general, non-pharmacological strategies, which in less severe cases may be sufficient by themselves. It consists in reducing or eliminating those factors that precipitate RLS, such as limiting the consumption of beverages with caffeine, chocolate, nicotine, alcohol and drugs and applying rules based above all on the principles of a sleep hygiene strategy. These practices mainly include family recommendations about adequate sleep schedules for children, according to the age.

Along this same line, family and school support should be pointed out, which should be offered to a child or adolescent with RLS when in class. At school, it must be understood that the child moves because he needs to move and not because of a behavioral problem and that practices as simple as allowing the child to leave to take a walk during a class, some physical exercise during breaks or frequently changing positions, if needed, are sufficient for reducing irritation in the legs.

Some authors seem to encourage physical exercise, but no evidence has been found about the use of physical exercise for children with RLS. In children with an average age of 13 years and with sleep problems, high-intensity physical exercise for 30 minutes, about 3-4 hours before going to bed, did show that it can increase deep sleep[223].

Before-after/descriptive study 3

RCT 1+

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In adult patients with RLS, there is one RCT in which a physical exercise programme is compared with a control group. The study lasted 12 weeks, with aerobic exercises and leg strength exercises three times per week. The results conclude that physical exercise significantly reduces the symptoms of RLS[224]. Randomised RCTs of a greater sample size and of high quality in the paediatric population are needed, with follow-up of a longer duration, to investigate the efficacy of conducting physical exercise programmes for treating RLS in the paediatric population.

Oral iron supplements

In the adult population there are studies that show the role played by iron in the physiopathology of RLS and therefore the improvement of this disorder in patients with base levels of ferritin below 50 jig/l and treatments based on iron supplements[221, 225].

In the paediatric population there are a few studies that have assessed the effectiveness of treatment with oral iron, which are case series with a small sample size or are isolated case reports. These studies show improvement of RLS symptoms after treatment with iron for approximately 4 months, thereby considering that the majority of cases respond with a mean basal ferritin of 17.2 jig/l, some of them without anaemia or with moderate anaemia. There is no case greater than 35 jig/l at a basal level. Serum ferritin levels below 50 jig/l are more common in paediatric populations than in adult populations, wherefore it is possible that having low iron deposits might play a more relevant role in paediatric RLS than in adults, although more data are needed to determine the efficacy of oral iron supplements in paediatric RLS[226-229]. Case series, 3

The high predominance of children with ADHD who have RLS symptoms and the possibility of a common dopaminergic mechanism as the base of both disorders was previously pointed out. There are several research studies on the administration of iron to children with ADHD, which could be revealing for advances in the treatment of paediatric RLS. Two case series, one isolated case and one RCT show improvement of RLS symptoms in children with ADHD and with ferritin levels below 50 µg/l using therapy with oral iron[210, 211, 230, 231]. RCT 1+,

Case series/ case report, 3

More RCTs are needed in the paediatric population with RLS to determine the effectiveness and optimum duration of therapy with iron.

Other pharmacological treatments

The decision to use medication for RLS in the paediatric population is difficult, because in minors under the age of 18 there are no authorised treatments and there are no controlled studies. If a patient does not improve with the preceding treatments, they have to be referred to a Sleep Unit for assessment.

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There are a wide variety of drugs that are being used to treat RLS: L-DOPA/carbidopa, non-ergoline dopamine agonists (ropinirole, pramipexole and rotigotine), benzodiazepins (clonazepam), anti-epileptic drugs (gabapentin) and adrenergics (clonidine). It is therefore important that the PC paediatrician consider the possible interactions that the aforementioned drugs could have with other drugs. Table 20 summarises these main interactions.

Table 20. Table of interactions of drugs used for RLS[232]

	Interactions, warnings/precautions	Contraindications	Consequences of the interaction	
			Drugs that reduce plasmatic levels	Decreases the action / concentration of
Ferrous sulphate			Antacids, quinolones, tetracyclines	Levothyroxine, L-DOPA, penicillamine Tetracyclines
L-DOPA	Anti-depressants (TCAD, SSRI, SNRI), antiemetics, antihypertensives, neuroleptics, warfarin	MAOI.		
Ropinirole	Ciprofloxacin, estrogens, fluvoxamine			
Rotigotine	Alcohol, CNS depressants			
Pramipexole	Alcohol, amantidine, cimetidine, cisplatin, CNS depressants, mexiletine, procainamide, quinine, zidovudine	Neuroleptics	Metoclopramide, neuroleptics	

ASA: Acetylsalicylic acid.

TCAD: Tricyclic antidepressants.

NSAIDs: Non-steroidal anti-inflammatories.

SNRI: Serotonin and norepinephrine reuptake inhibitor.

SSRI: Selective serotonin reuptake inhibitor.

Summary of evidence about treatment for paediatric RLS

3	No evidence has been found about the effectiveness of general sleep hygiene strategies and practices in patients with RLS[221].
3, 1+	No evidence has been found about the effectiveness of exercise in children with RLS. In children with an average age of 13 years and with sleep problems, high-intensity physical exercise for 30 minutes, about 3-4 hours before going to bed, did show that it can increase deep sleep. In adult patients with RLS, a 12-week programme of physical exercise, including aerobic exercises and leg strength exercises three times a week significantly reduced the symptoms of RLS[223, 224].
3	Case series with mean basal ferritin below 35 µg/l show improvement in the symptoms of RLS after treatment with iron for approximately 4 months; but more data are required to determine its efficacy in paediatric RLS[226-229].
3, 1+	Two case series, one isolated case and one RCT show improvement of RLS symptoms in children with ADHD and with ferritin levels below 50 µg/l using therapy with oral iron[210, 211, 230, 231].

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Recommendations about treatment for paediatric RLS

√	In less serious cases of RLS, a series of general, non-pharmacological interventions are recommended, which include reducing or eliminating those factors that bring on RLS (limiting the consumption of caffeine, chocolate, nicotine, alcohol and drugs) and applying rules based mainly on the principles of sleep hygiene practices and recommendations to relatives about adequate sleep schedules for their children, according to the age.
√	To reduce discomfort in legs in class at school, family and school support is recommended, which can translate into practices such as allowing the child to leave to take a walk during class, some physical activity during breaks or frequently changing positions.
D	More evidence is needed to make a general recommendation about physical exercise programmes for treating paediatric RLS.
D	The measurement of iron and ferritin levels in the blood is recommended if RLS symptoms are present, even when there is no anaemia or there is moderate anaemia.
√	In the event that the serum ferritin levels are below 35 µg/l, oral treatment with iron is recommended, in a therapeutic dose of iron-deficiency anaemia, followed by subsequent analytical control.
√	It is advisable that children with RLS who do not respond to the general strategies, to sleep hygiene practices or to the oral intake of iron be referred to secondary care or Hospital Care.

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7.1.3. Delayed sleep-phase syndrome (DSPS)

- ***Definitions:*** The delayed sleep phase syndrome (DSPS) is an alteration of the circadian rhythm of sleep that usually begins to appear more clearly in the second decade of life. It is characterised by insomnia when going to bed and difficulty waking up in the morning at the desired time, which consequently involves daytime sleepiness. In general, the onset and end of sleep is delayed by more than two hours with respect to conventionally accepted sleep schedules. Affected children have difficulty initiating sleep at socially accepted times, but once asleep, the sleep has normal characteristics. What happens is that, in the child's daily life and in order to be able to continue with their social and school obligations, chronic sleep deprivation occurs, which appears with EDS, fatigue, poor academic performance and attention deficit, and the child is very frequently accused of being 'lazy and unmotivated'. If the child is left to sleep freely, sleep has a normal duration, and the child wakes up refreshed, which is what happens on weekends[26,233]. To understand the process that modulates the delayed sleep-phase syndrome, Appendix 12 presents more detailed information about circadian rhythms and the existing disorders.

- ***Etiopathology***: The origin of the factors that contribute to the appearance, development and maintenance of DSPS are not well known. Those indicated the most are the following:

  - *Genetic*. Usually, this problem has a genetic conditioning factor, and a series of mutations in various circadian genes could be involved. There is also usually a family medical history[26, 233, 234].

  - *Circadian rhythm*. Some researchers have suggested that the physiopathology could involve an intrinsic circadian rhythm period that is longer than normal, and other explanations are based on anomalies in the phase response curve to light. Thus (for example), retinal hypersensitivity to both evening light or to morning light that delays or advances the circadian rhythm could be one of these factors[26, 233, 234].

- *Sex and age*. Some of the associated risk factors concern age and sex. The tendency to go to bed late and sleep later on the weekends is common among adolescents, and more so among young males than among females. Some studies have shown that the appearance of DSPS is rare among older people and that patients diagnosed with DSPS indicated that their symptoms started during childhood or adolescence[26, 233]. In this regard, there is a physiological phase delay tendency that even precedes the start of puberty[235].

  However, more research is needed to learn the weight that these factors have in the etiopathology of DSPS.

- ***Clinical features:*** The most frequent symptoms of children with DSPS are the following:
  - Persistently late onset of sleep, generally after midnight, usually in adolescents.
  - Scarce difficulty at maintaining the continuity of sleep.
  - Great difficulty at waking up at the required time to perform social and/or academic activities, with a decrease in the level of alertness in the morning.
  - Persistent difficulty at initiating sleep at an earlier time. Even though it may be sporadically possible to get to sleep at an earlier hour, the phase delay tendency remains.
  - Insomnia symptomatology if forced to go to bed earlier.
  - Excessive daytime sleepiness due to chronic sleep deficit.

  On weekends, these patients adjust the sleep episode to their preferences, and they usually recover part of their sleep lost during the week. During the first few days of holidays, an increase in sleep time is observed. They usually have more school problems than children without DSPS, because they are conditioned by many social activities at nighttime hours, when they can't sleep (use of technologies when going to bed, such as the mobile phone or Internet). Their optimum functioning occurs in the final hours of the day and the initial hours of the night. Moreover, there are often psychiatric problems, and symptoms of the following are very frequent: inattention, hyperactivity, behaviour disorders, oppositional disorder, aggressiveness and/or depression. An adolescent with DSPS has a sleep deficit, which consequently involves poor academic performance, with frequent problems of punctuality in the morning and a tendency to be absent from school[26, 236, 237].

- ***Diagnostic criteria:*** The diagnostic criteria of the delayed sleep-phase syndrome according to the International Classification of Sleep Disorders (ICSD-2) of the AASM[26] are presented below.

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Diagnostic criteria of the Delayed Sleep-Phase Syndrome
A. There is a delay in the phase of the major sleep period in relation to the desired sleep time and wake-up time, as evidenced by a chronic or recurrent complaint of inability to fall asleep at a desired conventional clock time together with the inability to awaken at a desired an socially acceptable time.
B. When allowed to choose their preferred schedule, patients will exhibit normal sleep quality and duration for age and maintain a delayed, but stable, phase of entrainment to the 24-hour sleep-wake pattern.
C. Sleep log or actigraphy monitoring (including sleep diary) for at least seven days demonstrates a stable delay in the timing of the habitual sleep period. *Note: In addition, a delay in the timing of other circadian rhythms, such as the nadir of the core body temperature rhythm or DLMO, is useful for confirmation of the delayed phase.*
D. The sleep disturbance is not better explained by another current sleep disorder, medical or neurological disorder, mental disorder, medication use, or substance use disorder.

The diagnosis of paediatric DSPS is basically clinical evaluation. Sleep logs/diaries can be used as a method for evaluating the sleep schedules in patients with DSPS, because they can provide information about both the quantitative and qualitative aspects of sleep. However, even though sleep logs/diaries are used in many studies that exist, there are no studies that have specifically evaluated their reliability and validity for clinically assessing this disorder[26, 233, 237].

SR of different types of studies 1+, 2+, 3

Expert opinion 4

From other trials conducted at sleep units, only actigraphy is recommended as a useful tool for evaluating the sleep schedule of patients with DSPS. Polysomnography is not indicated for the routine evaluation of this disorder[233, 237].

SR of different types of studies 1+, 2+, 3

Differential diagnosis

The delayed sleep-phase syndrome must be distinguished from other causes that make it difficult to maintain sleep, such as both primary and secondary insomnia, inadequate sleep hygiene strategies and some mood or anxiety disorders[26, 234].

Summary of evidence about the diagnosis of DSPS

1+, 2+, 3, 4	The diagnosis of DSPS is basically clinical evaluation, and it can be helped with the information collected by the family in sleep agendas/diaries, although the reliability and validity of the latter have not been studied[26, 233, 237].

Recommendations about the diagnosis of DSPS

D	DSPS must be diagnosed by clinical evaluation, for which sleep diaries/logs with information collected by families can be used if DSPS is suspected.
√	It is advisable to take into account the following for a differential diagnosis: both primary and secondary insomnia, inadequate sleep hygiene practices and some mood or anxiety disorders.

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Treatment

Sleep hygiene strategies

No studies have been found that formally investigate the effectiveness of sleep hygiene practices in patients with DSPS. However, experts pose that therapeutic recommendations for the paediatric population with DSPS should begin by establishing a series of basic sleep hygiene practices for reducing those factors that precipitate DSPS. The recommendation is based on the strategies included in Appendix 8, including some more specific recommendations such as the following:

1. Avoid naps.
2. Understand that the bed is used for sleeping (and not for eating, studying, listening to music, talking on the phone, etc.).
3. At the end of the day, exercise little and avoid excessive exposure to light (from the TV or computer).
4. Increase exposure to natural light in the morning.

Phototherapy

The only studies found on the effectiveness of phototherapy or bright light therapy as treatment for DSPS are on adult patients or patients in which the age is not specified.

SR of different types of studies 1+, 2+, 3

A systematic review includes two studies in which the use of phototherapy or bright light therapy for DSPS is evaluated, and it concludes that, with exposure to bright light in the morning, a phase advance of the sleep onset time and of the circadian rhythms is achieved, and daytime alertness is objectively increased. The light intensity evaluated in the studies is 2500 lux (1 lux is the quantity of light emitted by a candle at a distance of 1 metre, and the light emitted by a computer is 200 lux, for example) during two to three weeks of treatment, administered 2 to 3 hours before or during wake time. The treatment was generally well tolerated. The review concludes that, despite the limited evidence, phototherapy seems to be a rational and effective intervention for DSPS, although in the clinical context, compliance with the treatment could be a major problem[233, 237].

There is no evidence regarding the effects of lower doses, other types of light, exposure time and optimum duration of the therapy, and there is no information about tolerance or loss of benefits over time[233, 237, 238].

Melatonin

There is very little evidence from primary studies on the efficacy and safety of melatonin, due to its role in the change of circadian rhythms, as treatment for paediatric DSPS. One systematic review that includes three studies (in which only the minority of patients are adolescents or young adults) concludes that, in comparison with placebo, melatonin reduces sleep onset latency, but it does not cause any change in the total sleep time or the subjective state of daytime alertness. The review also determines that the dose and optimum administration time are not definitively established, because doses that range from 0.3 mg to 3 mg or 5 mg administered between 1.5 and 6 hours before the usual bedtime are used[233, 237].

SR of different types of studies 1+, 2+, 3

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One meta-analysis subsequently conducted includes, in addition to primary studies on adults, studies on children between 6 years and adolescence, in which melatonin doses in the range of 0.3-6 mg are used three to four hours before the usual bedtime, with an average treatment duration of 4 weeks. The meta-analysis concludes that, respecting an adequate administration time, the administration of exogenous melatonin is effective in paediatric DSPS because it advances dim light melatonin onset (DLMO) and sleep onset, it decreases latency and it increases the duration of sleep. However, the wake time does not show statistically significant improvements[239].

Meta-analysis (RCT 1++)

Chronotherapy

The treatment consists in establishing a prescribed sleep schedule that allows adjusting the wake-sleep cycle to the day-night biological rhythm (it attempts to initialise the circadian clock by going to bed several hours 'before' or 'after' each day for a period of time). There is no evidence for using this therapy in the paediatric population. There is one systematic review in the adult population, which determines that, even though there are reports of positive cases on the use of chronotherapy for DSPS, there are no RCTs about its efficacy and safety. Moreover, it has been reported that the possibility of relapse after treatment was common in patients who had long-term follow-up. The review concludes that chronotherapy could be useful but completing treatment is also complicated. More studies are needed about long-term efficacy and safety[233, 237].

SR of different types of studies 1+, 2+, 3

Vitamin B12

The treatment consists in establishing a prescribed sleep schedule that allows adjusting the wake-sleep cycle to the day-night biological rhythm (it attempts to initialise the circadian clock by going to bed several hours 'before' or 'after' each day for a period of time). There is no evidence for using this therapy in the paediatric population. There is one systematic review in the adult population, which determines that, even though there are reports of positive cases on the use of chronotherapy for DSPS, there are no RCTs about its efficacy and safety. Moreover, it has been reported that the possibility of relapse after treatment was common in patients who had long-term follow-up. The review concludes that chronotherapy could be useful but completing treatment is also complicated. More studies are needed about long-term efficacy and safety[233, 237].

RCT 1+

SR of different types of studies 1+, 2+, 3

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Summary of evidence about treatment for paediatric DSPS

4	No evidence has been found about the effectiveness of sleep hygiene practices in patients with DSPS. However, experts pose that therapeutic recommendations should begin by establishing a series of basic sleep hygiene practices for reducing those factors that precipitate DSPS.
1+, 2+, 3	No evidence has been found about the effectiveness of phototherapy or bright light therapy in children with DSPS. In adult patients, exposure to bright light (2500 lux) in the morning achieves a phase advance of the sleep onset time and of the circadian rhythms, and it objectively increases daytime alertness[233, 237].
1+, 2+, 3	In comparison with placebo, melatonin in adolescents or young adults reduces sleep onset latency, but it does not cause any change in the total sleep time or the subjective state of daytime alertness. The dose and optimum administration time are not definitively established, because doses that go from 0.3 mg to 3 mg or 5 mg are used, administered between 1.5 and 6 hours before the usual bedtime[233, 237].
1++	Respecting an adequate administration time, in treatment for children between 6 years and adolescence in which melatonin doses in the range of 0.3-6 mg is used three to four hours before the usual bedtime, with an average duration of 4 weeks of treatment, exogenous melatonin advances dim light melatonin onset (DLMO) and sleep onset, it decreases latency and it increase sleep duration. However, the wake time does not show statistically significant improvements[239].
1+, 2+, 3	No evidence has been found about the effectiveness of chronotherapy in children with DSPS. In adult patients, there are some reports of positive cases that indicate that chronotherapy could be useful for DSPS, but they also indicate that completing treatment is complicated and that more studies are needed about long-term efficacy and safety[233, 237].
1+, 2+, 3	The administration of vitamin B12 shows no effectiveness in the treatment of DSPS[233, 237, 240].

Recommendations about treatment for paediatric DSPS

√	Basic sleep hygiene strategies are recommended for reducing factors that precipitate DSPS (Appendix 8), with emphasis on the following: avoiding naps, understanding that the bed is for sleeping (and not for eating, studying, listening to music, talking on the phone, etc.), avoiding physical activity close to bedtime and avoiding excessive exposure to light (from the TV, computer, video games or other devices) at the end of the day and increasing exposure to natural light in the morning.
D	More evidence is needed to make a general recommendation for phototherapy or bright light therapy for the treatment of DSPS in children.
√	The Spanish Agency of Medicines and Healthcare Products (AEMPS) has not authorised melatonin for DSPS in children, although the outcomes of trials with children over 6 years of age who have the delayed sleep-phase syndrome and who do not respond to sleep hygiene interventions suggest that, once approved, the use thereof could be assessed at a dose in the 0.3-6 mg range, up to 6 hours before the usual bedtime.
√	Melatonin must always be administered under adequate control by a paediatrician or a doctor specialising in sleep disorders, and the removal thereof should be assessed according to the clinical evolution.
B,C	More evidence is needed to recommend chronotherapy for the treatment of DSPS in children.
B	The administration of vitamin B12 for the treatment of DSPS in children is not recommended.

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7.2. The child who has abnormal events at night

Questions to be answered:

- What is the obstructive sleep apnea-hypopnea syndrome?
- What is sleepwalking?
- What are night or sleep terrors?
- What are confusional arousals?
- What are nightmares?
- What are sleep-related rhythmic movement disorders?
- What is the most suitable definition for these specific disorders?
- What is the aetiology of these disorders?
- Are there conditioning factors of these disorders: physiological, psychophysiological, psychological, environmental (family context)?
- What are the criteria for suspecting these disorders?
- What are the diagnostic criteria for these disorders?
- How are they classified?
- What are the differential diagnoses?
- Are there key questions that can help Primary Care professionals detect these disorders in an interview with the patient/parents/caretakers?
- What are the tests or tools that we can use to diagnose these disorders in PC?
- What are the criteria for referring to HospitalCare?
- What are the effective treatments for these disorders in Primary Care Health Centers?
- What are the authorised treatments in the paediatric population?
- What are the most effective psychological interventions for these disorders?
- When are drugs indicated for these disorders?
- What are the most effective drugs for treating these disorders?
- Are there preventive strategies of these disorders?

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7.2.1. Sleep Apnea-Hypopnea Syndrome (OSAHS)

- ***Definition:*** The obstructive sleep apnea-hypopnea syndrome (OSAHS) in childhood is a sleep-related breathing disorder (SRBD). It is characterised by the total or partial, intermittent obstruction of the upper airway, which alters normal ventilation during sleep and normal sleep patterns. It is usually associated with symptoms that include snoring and other sleep disorders. OSAHS in childhood has a clear entity with highly differentiated profiles with respect to that of adults regarding aetiology, clinical presentation and treatment. This is why the American Academy of Sleep Medicine clearly separates both entities and includes them in different sections of its classification[241, 242].

- ***Physiopathology and etiopathogeny:*** Before establishing the factors that contribute to the appearance of this type of disorder, it must be taken into account that negative pressure is generated during inhalation, which favours the collapse of tissues towards the interior of the airway and which is counteracted by the action of the dilating muscles of the pharynx. During childhood there are a series of predisposing factors that alter this function of the pharynx musculature, which we could classify as follows[242]:

  - *Anatomical:* they cause an increase in the resistance of the airway, such as tonsillar and adenoidal hypertrophy and craniofacial malformations.

  - *Neurological:* due to alteration of the muscle tone of the upper airway, highlights of which include neuromuscular diseases, childhood cerebral palsy, Down syndrome, etc.

  - *Others:* obesity, gastroesophageal reflux.

- ***Clinical features:***

  We can distinguish three types of OSAHS:

  - Type I OSAHS: children with tonsillar or adenoidal hypertrophy.

  - Type II OSAHS: obese children.

  - Type III OSAHS: children with craniofacial anomalies.

The most frequent symptom described in children with an SRBD is snoring, although not all children who snore develop OSAHS and not all patients with OSAHS snore in a manner that is recognisable to the parents. They are children who show restless sleep, with frequent movements and with eventually strange postures, such as cervical hyperextension, whose purpose is to increase the diameter of the upper airway. As a consequence of all this, there is an increase in respiratory effort, for which the accessory respiration musculature is used. Therefore, there is greater energy expenditure and profuse sweating. Multiple cortical activations are also caused (which are only evident in the nocturnal polysomnography), with eventual, subsequent awakenings. Fragmented sleep prevents restorative rest, wherefore a child with OSAHS can show greater tiredness, morning headaches (due to hyperventilation), irritability, paradoxical hyperactivity and worse academic performance. Tonsillar or adenoidal hypertrophy also results in nasal obstruction and nighttime mouth breathing. When this hypertrophy is also considerable, daytime mouth breathing, nasal voice and even dysphagia can also be found[242].

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OSAHS is also a *comorbid* process of various chronic disorders in childhood, some of them very prevalent. Up to 50% of children with Down syndrome can have OSAHS[26, 243-245]. 27% of children with a mental disability meet the criteria for being formally assessed in search of OSAHS[246]. Up to 50% of children referred for assessment due to the suspicion of OSAHS suffer from obesity[242, 247].

Moreover, the existence of OSAHS worsens the course of various entities with which it is associated, such as in epileptic children, in which OSAHS can have an impact on the refractoriness to the treatment of said epilepsy[248]. If it coexists with parasomnias, the course of the latter worsens.

As in adults, sleep-related breathing disorders in the paediatric population are also associated with cardiovascular risk, specifically in relation to autonomic dysfunction, with cardiac arrhythmias and HTA, remodelling of the ventricular wall and endothelial impairment. The magnitude of the damage to the target organs is determined, basically, by the severity of the OSAHS, and it is possible that this disorder, with onset in childhood, is the trigger for a cascade of events that determine an earlier onset of some phenomena that would normally appear in adult age[249-256].

Even though a clear relationship has not been established between non-obese children with OSAHS and metabolic alterations, it seems clear that the presence of OSAHS in an obese child could amplify their metabolic alterations and that the interrelationship between OSAHS and obesity is more complex than just the sum of the two[242, 257].

While in adults both obesity and OSAHS have been identified as important risk factors of suffering from metabolic syndrome (a combination of insulin resistance, dyslipidemia, hypertension and obesity)[258], among the child population this syndrome seems to be determined more by the degree of obesity, and the OSAHS does not seem to contribute so significantly[259].

A vicious circle seems to be created between obesity and apnea, in which they favour each other mutually: obesity increases obstructive sleep apnea, and the latter causes sleepiness and reduces a child's activity, thereby favouring weight gain[242]. However, individual susceptibility as well as environmental conditions and life style (physical and intellectual activity, diet) play an important role in the phenotypic variability. Despite the growing development of research in this field, the need for greater knowledge about the interactions between SRBDs, the metabolic consequences thereof and obesity is evident.

There are studies that suggest high comorbidity (23%) between SRBDs and the attention deficit disorder, with or without hyperactivity (ADHD)[260], although the mechanism whereby the breathing problem might contribute to attention deficit is still unknown. What is known is that in children with sleep-related breathing problems, the frequency of behavioral alterations and attention problems is multiplied by a factor of 3[261].

Academic performance is affected in children with an SRBD[262]. Children with low academic performance are more likely to have snored during early childhood and to have required a tonsillectomy due to an SRBD in comparison with their companions with better academic performance, such that the neurocognitive morbidity associated with SRBDs may be only partially reversible, meaning that a 'learning debt' could develop in these disorders when they occur in early childhood, which could then jeopardise subsequent academic performance[263].

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Likewise, it has been observed that almost half of the children with OSAHS (47%) have had behavioral problems[264], and the correlation increases if OSAHS is added to another sleep disorder. However, it must be taken into account that other factors such as obesity, lost sleep time and having other sleep-related disorders also determine the behaviour of these children[260]. There are several studies that have shown the correlation between SRBD in children and deficits in social behaviour, emotional regulation, academic performance, selective attention, sustained attention and maintaining alertness. There is also evidence that the breathing disorder has a minimal association with mood, linguistic expression, visual perception and working memory. There are scarce results to be able to draw conclusions about intelligence, memory and some aspects of the executive function[262, 265].

Another study warns of the negative impact by chronic or intermittent hypoxia on development, behaviour and academic performance. All situations that could expose children to hypoxia must be taken into account, given that harmful effects have been observed even when desaturations are low[266].

Some authors have demonstrated that children who were snorers, without taking into account the severity of the apnea-hypopnea index (AHI) or the presence of obesity, had worse quality of life and more depressive symptoms than children who were not snorers[267]. The poor quality of sleep due to OSAHS could translate into fatigue during the day, with greater problems of concentration, irritability, depressive mood and a decrease of interest in daily activities. These daytime symptoms can cause difficulties in other aspects of a child's life, such as their relationships with family and friends or participation in physical and sports activities.

Children who are evaluated for behavioral or emotional problems frequently show excessive daytime sleepiness. The aetiology of this sleepiness is diverse, but it includes inadequate sleep hygiene strategies, OSAHS and the delayed sleep phase syndrome, among others[268].

In tests that measure auditory attention and verbal comprehension (VCI), snorers answered worse than non-snorers[269]. When OSAHS is adequately treated in these children, it improves their quality of life[270-272].

While not all studies are conclusive about the presence of sleepiness in children with an SRBD, it seems that there are daytime symptoms of excessive daytime sleepiness in children who regularly snore, such as difficulty at waking up, morning fatigue or daytime sleepiness (Or = 6.3; IC 95%: 2.2. to 17.8) or a greater likelihood of falling asleep while watching television and in public places. Moreover, the likelihood that sleepiness night exist is greater in obese children than in non-obese children, regardless of the level of the OSAHS[271-273].

Diagnosis

- ***Diagnostic criteria:*** The diagnostic criteria of paediatric OSAHS according to the International Classification of Sleep Disorders (ICSD-2) are presented below[26].

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Paediatric obstructive sleep apnea-hypopnea syndrome (OSAHS)
A. The caregiver reports snoring, labored or obstructed breathing, or both snoring and labored or obstructed breathing during the child's sleep.
B. The caregiver of the child reports observing at least one of the following:
i. Paradoxical inward rib-cage motion during inspiration.
ii. Movement arousals.
iii. Diaphoresis.
iv. Neck hyperextension during sleep.
v. Excessive daytime sleepiness, hyperactivity or aggressive behavior.
vi. A slow rate of growth.
vii. Morning headaches.
viii. Secondary enuresis.
C. Polysomnographic recording demonstrates one or more scoreable respiratory event per hour (i.e., apnea or hypopnea of at least two respiration cycles of duration).
D. Polysomnographic recording demonstrates either i or ii:
i. At least one of the following is observed:
a. Frequent arousal from sleep associated with increased respiratory effort.
b. Arterial oxygen desaturation in association with the apneic episodes.
c. Hypercapnia during sleep.
d. Markedly negative esophageal pressure swings.
ii. Periods of hypercarbia, desaturation, or hypercapnia and desaturation during sleep associated with snoring, paradoxical inward rib-cage motion during inspiration, and at least one of the following:
a. Frequent arousals from sleep.
b. Markedly negative esophageal pressure swings.
E. The disorder is not better explained by another current sleep disorder, medical or neurological disorder, mental disorder, medication use, or substance use disorder.

Medical History

The prevalence of OSAHS and the consequences thereof on the quality of life of a child and their environment mean that diagnosis and treatment have to take place as early as possible, as it is shown in the latest document from the National Consensus on OSAHS[242]. Therefore, one of the short-term objectives of the diagnosis of OSAHS should be to increase the suspected diagnosis ability in PC by facilitating the diagnostic approach within this context, such that the highest possible percentage of the population at risk can be identified.

From a clinical point of view, the evaluation of a child clinically suspected of OSAHS in PC should include the medical record and a complete examination[242, 276]. Expert opinion 4

The diagnostic suspicion of SRBDs should begin with the very first health check-ups. Thus, the American Academy of Pediatrics recommends that sleep be investigated in all children during health checkups[277]. If a child snores and shows signs of symptoms or clinical findings that suggest OSAHS, the specific diagnostic escalation of SRBD will be initiated[242]. Expert opinion

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The reference test for the diagnosis of OSAHS is the all-night polysomnogram (PSG)[82,277,278], but we must be aware of the fact that within our environment, it is not reasonable to run an all-night PSG if there is simply minimal suspicion of OSAHS242. Therefore, there is growing interest in the perfection of screening techniques or tests for paediatric OSAHS, as well as in developing simpler tools that allow reliable diagnoses to be obtained, thereby reserving more complex and/or costly techniques (polysomnogram, respiratory polygraph) for those children in which the simple tests do not provide a certain diagnosis or for children for whom the result of the complex techniques might condition therapy (for example, non-invasive ventilation versus surgical treatment)[242]. Expert opinion 4

To establish the **clinical suspicion** of paediatric OSAHS, there are three key questions that can initially help to guide such a suspicion (Table 21).

Table 21. Key initial questions for establishing the clinical suspicion of OSAHS

Does the child snore?
Does the child show increased respiratory effort when sleeping?
Have the parents observed prolonged respiratory pauses (apneas)?

*Habitual snoring is defined as snoring that exists three nights per week for more than three weeks, without an upper respiratory infection.

Once the clinical suspicion is established, the medical history of sleep must be completed, in which there are a series of warning signs and symptoms that can help with the suspicion (Table 22)[242]: Expert opinion 4

Table 22. Warning signs/symptoms in the event of the clinical suspicion of OSAHS

- The parents are worried about how their child sleeps.
- If sleep is restless.
- The child moves a lot.
- The child adopts strange postures (hyperextension of the neck, prone position with the knees underneath the thorax, semi-seated or needing several pillows).
- Frequent awakenings.
- Profuse sweating during the night.
- Excessive daytime sleepiness (infrequent in small children).
- Nighttime and/or daytime mouth breathing.
- Nasal voice.
- Secondary enuresis.
- Morning headaches.
- The child wakes up tired.
- ADHD-like behaviours, behavioral problems, learning problems and poor academic performance.

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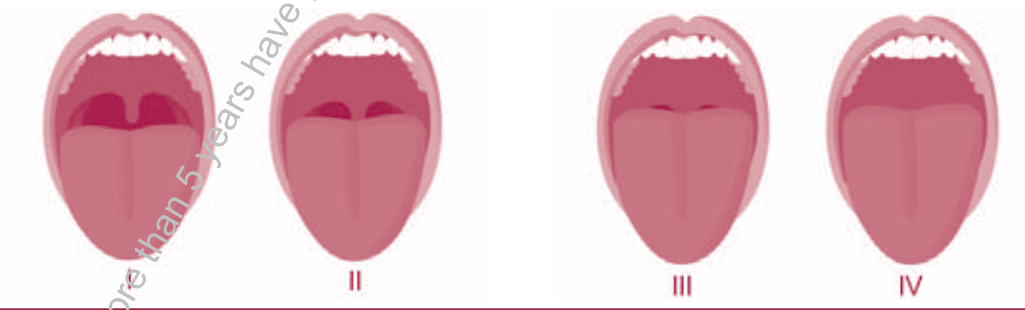
Questions about the following aspects also have to be asked:

- Antecedents of pre-maturity.
- Repeated otitis media and/or upper airway infections.
- Bronchiolitis due to RSV.
- Asthma/allergic rhinitis.
- Vomiting.
- Family history (snorers, apneas, use of CPAP, cardiovascular diseases, etc.).
- Associated comorbidities (parasomnias that can worsen or refractoriness in the treatment of epilepsy).

Clinical examination

Table 23 includes the aspects to which special attention must be paid in the clinical examination of children with OSAHS[242]: Expert opinion 4

Table 23. Aspects to be included in the clinical examination of children with OSAHS

1. Weight and height
2. Blood Pressure (BP)
3. Craniofacial anatomy • Adenoid facies. • Alterations of the craniofacial bone. • Retrognothia/micrognathia. • Ogival palate.
4. Dental malocclusion
5. Basic otolaryngology examination: • Size of the tonsils. • Assessment of the free space between tonsils according to the Mallampati score or classification. This score analyses the anatomy of the oral cavity to predict the ease of intubation. The score is done through the manifestation or not of phonation (see Graph 2). • Class I: full visibility of the tonsils, uvula and soft palate. • Class II: visibility of the hard and soft palate, the upper portion of the tonsils and the uvula • Class III: the hard and soft palates and the base of the uvula are visible. • Class IV: only the hard palate is visible. A high score (Class IV) is associated with difficult intubation, as well as a high incidence of obstructive sleep apnea. Graphic 2. Modified Mallampati score. 

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6. Macroglossia/relative macroglossia
7. Muscle tone
8. Megalias (storage diseases)

Questionnaires

A routine clinical examination and an isolated medical record are not sufficient and reliable methods for diagnosing OSAHS in a child who snores, in comparison with the PSG. Its positive predictive value is 55.8%. In general, a clinical evaluation *per se* has high sensitivity, but low specificity, which would generate the presence of many false positives. Adding a specific questionnaire about obstructive sleep apnea increases the diagnostic possibilities (from 26% for a medical record without an examination to 53% using a specific questionnaire)[90]. Diagnostic testing studies II

With respect to OSAHS, some questionnaires that could be useful in PC are the following:

1) Pediatric Sleep Questionnaire (PSQ). Targeted at children from 2 to 18 years of age. This questionnaire has two versions. The reduced version of 22 items, validated in its original version, is oriented towards sleep-related breathing disorders, and it is the benchmark for the suspicion of the obstructive sleep apnea-hypopnea syndrome (OSAHS), as it was resolved in the National OSAHS Consensus[106, 242]. The figures for validity, reliability and sensitivity are greater than 80%. It compares the symptoms of non-attention and hyperactivity, and it also correlates the findings of the polysomnogram. More than 8 positive responses can suggest sleep-related breathing problems. It must be kept in mind that the diagnosis of sleep-related breathing disorders solely based on questionnaires is neither sensitive nor specific, and it is necessary to do a polysomnographic study to establish the definitive diagnosis. In addition to sleep-related breathing disorders, the complete version of the PSQ questionnaire investigates a broader range of sleep disorders such as parasomnias and excessive daytime sleepiness[107, 108]. Diagnostic testing studies II

Expert opinion 4

2) OSD-6 Quality of Life Questionnaire in paediatric OSAHS. The questionnaire has 18 questions grouped into six domains: physical discomfort, sleep problems, difficulties speaking or swallowing, emotional problems, limitations for doing activities and parental concern. This tool can be used to evaluate the patient's evolution[279]. Diagnostic testing studies II

3) OSA-18 Quality of Life Questionnaire. A validated quality-of-life investigation tool, specific for sleep-related breathing disorders[26]. Diagnostic testing studies II

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Of the aforementioned questionnaires, Appendix 6 includes **Chervin's Paediatric Sleep Questionnaire (PSQ)**, because it is the benchmark in the suspicion of the obstructive sleep apnea-hypopnea syndrome (OSAHS) for children between 2 and 18 years of age, as it was resolved in the National Consensus of the Sleep Apnea Syndrome[106, 242]. The guideline development group thinks that it is easy to manage and interpret in the PC environment.

Complementary tests

1. Analysis

Basic biochemistry that includes cholesterol.

2. Home video- recording

Diagnostic testing studies II

The observation of nighttime breathing effort can contribute much data. Sivan et. al. developed a test to assess a half-hour home video-recording taken by parents in children from 2 to 6 years of age, and they obtained a sensitivity and specificity of 89% and 77 %, respectively. Their cut-off point predicts 55% of the cases of SRBDs[280].

The family is asked to record a sleep video lasting 30 minutes, in which seven parameters are assessed. The parents must be instructed to make the recording with the thorax and abdomen of the child uncovered, with a sound register, and without correcting the postures that occur (hyperextension of the neck to improve the diameter of the upper airway is common), preferably in the later hours of the night –between 05:00 and 05:30 in the morning, because breathing obstruction events are more frequent in REM phases– or when parents observe that breathing noises are more intense.

Sivan scores of less than or equal to 5 are compatible with normal, between 6 and 10 are doubtful for OSAHS and above 10 they are highly suggestive of OSAHS (see Appendix 6).

Referral indications

The guideline development group considered that the referral criteria proposed in the National Consensus document on OSAHS should prevail in the management of this disorder in PC242. If no Sleep Unit is available where a patient can be referred, it must be taken into account that these patients require a multidisciplinary approach (otolaryngology, respiratory specialist/neurophysiologist, dentist-orthodontist), and they should be referred to their secondary care or Hospital Care.

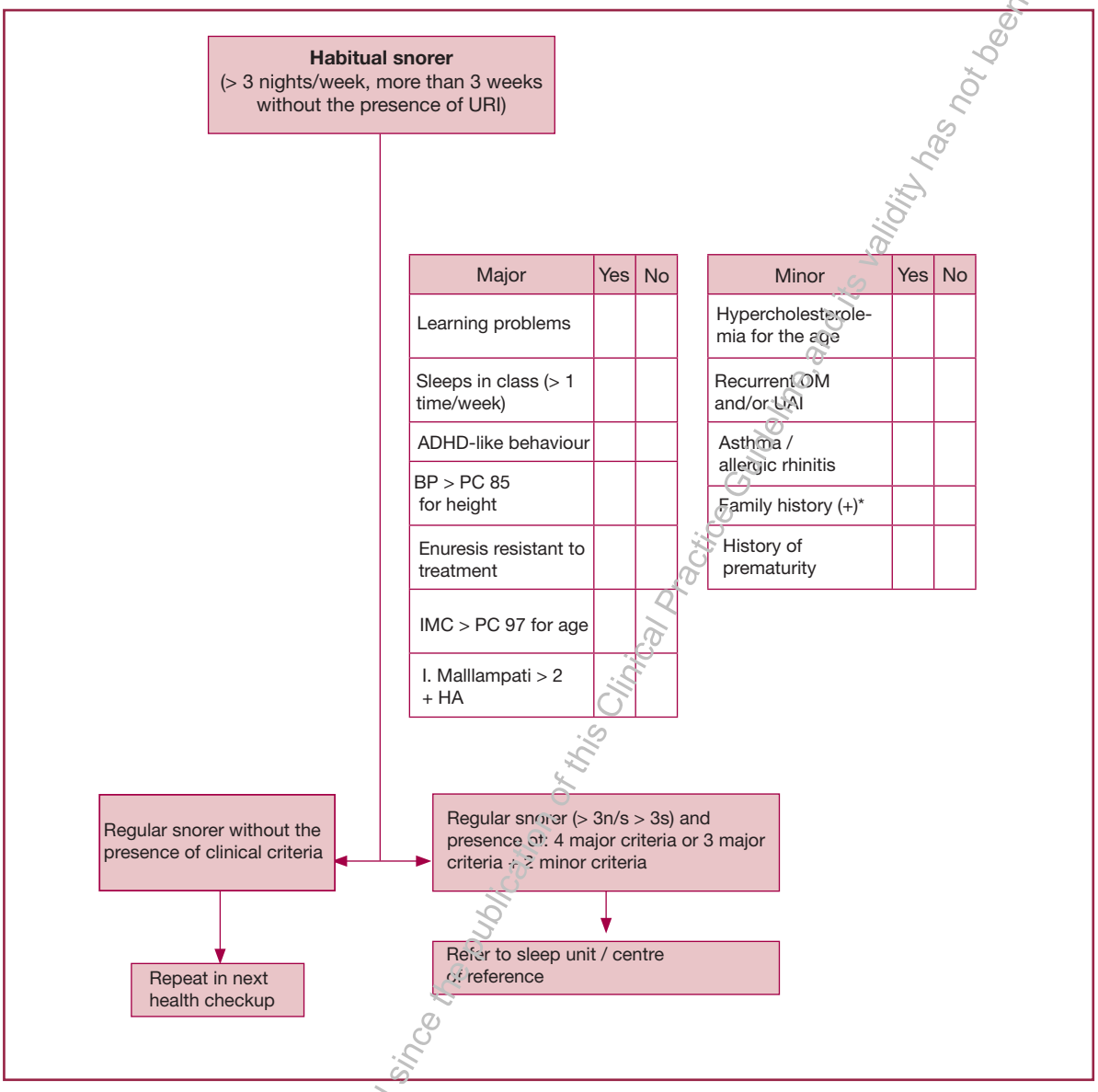
They will be referred in the event of the following:

1. Clinical suspicion based on medical history, examination, Chervin's test and a home video, if possible.
2. There are some major and minor diagnostic criteria that can serve to help with establishing a diagnostic scheme in Primary Care Health Centers (see Figure 3).

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Based on the recommendations presented below, as well as on the latest National Consensus on OSAHS[242], a diagnostic algorithm is presented in Chapter 9 (Algorithm Nº 4).

Figure 3. Diagnostic scheme of OSAHS in Primary Care Health Centers[242]



TH: Tonsillar hypertrophy.

UAI: Upper airway infection:

OM: Otitis media;

BP: Blood pressure;

PC: Percentile;

ADHD: Attention deficit hyperactivity disorder.

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Summary of evidence about the diagnosis of OSAHS

4	The reference test for the diagnosis of OSAHS is the all-night polysomnogram (PSG), but in our environment, it is not reasonable to run an all-night PSG if OSAHS is only minimally suspected[82,242, 277, 278].
4	The clinical suspicion of OSAHS in PC is reached through a medical record and a complete examination, beginning with the first health checkups[242, 276, 277].
4	Once the clinical suspicion is established, the medical sleep history must be completed, in which there are a series of warning signs/symptoms that help with the suspicion (Table 22)[242]:
4	Certain aspects to be included in the physical examination are revealing in the event that OSAHS is suspected (Table 23)[242].
Diagnostic testing studies II	For diagnosing OSAHS in a child snorer, the predictive value of a routine clinical examination and the medical record used separately is 55.8%. Adding a specific questionnaire about obstructive sleep apnea increases the diagnostic possibilities (from 26% for a medical record to 53% using a specific questionnaire)[90].
Diagnostic testing studies II	Chervin's Pediatric Sleep Questionnaire, targeted at children from 2 to 18 years of age and validated in its original, reduced version, is the benchmark in the suspicion of OSAHS. The figures of validity, reliability and sensitivity are greater than 80% (Appendix 6)[106-108].
Diagnostic testing studies II	The observation of nighttime breathing effort using a home video-recording (Sivan's home videotape recording) for half an hour by parents in children from 2 to 6 years of age resulted in a sensitivity and specificity of 89% and 77%, respectively. Its cut-off point predicts 55% of the cases of SRBDs (Appendix 6)[280].
4	OSAHS is diagnostically confirmed at a secondary care or Hospital Care.

Recommendations about the diagnosis of OSAHS

√	The diagnosis of suspected OSAHS in Primary Care Health Centers must be initiated according to adequate medical history and a physical examination (Table 23), initially including three key questions (Table 21) and paying attention to warning signs and symptoms (Table 22).
D	Chervin's Pediatric Sleep Questionnaire (reduced PSQ) is recommended for helping to establish the diagnosis of suspected obstructive sleep apnea-hypopnea syndrome (OSAHS) (Appendix 6).
D	In addition, a home video-recording could be requested, which can be assessed using Sivan's videotape recording score to help with the diagnostic suspicion (Appendix 6).
D	In the event of the confirmed clinical suspicion of OSAHS, it is advisable to refer the patient to secondary care or Hospital Care (see Chapter 9, algorithm 4).

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Treatment

The therapeutic approach to OSAHS takes place basically at Sleep Units and/or by the corresponding specialists. In Primary Care Health Centers health centers, conservative treatment is crucial, in addition to follow-up after treatment once patients return to this area of care.

The following are included among the proposed treatments for OSAHS in the National Consensus document[242]:

1. Surgery. Tonsillectomy as the treatment of choice. Septoplasty, uvula palatoplasty, epiglotoplasty, tongue-lip adhesion and maxillomandibular surgery may be indicated in certain cases.

2. Nasal CPAP (Continuous Positive Airway Pressure). This is not curative treatment, which means that it must be continuously applied, and adequately following the treatment is essential.

3. Conservative treatment. It is important to follow some sleep hygiene practices: always going to bed at the same time; a dark bedroom, without noise, with an adequate temperature and comfortable bed; small amount of food at dinner and not going to bed immediately thereafter; avoiding stimulating drinks; restriction of liquids before going to bed; avoiding naps during the day.

In obese children with OSAHS, dietetic treatment and weight loss must be indicated, although even with obese children who have tonsillar hypertrophy, the first treatment option is a tonsillectomy.

4. Pharmacological treatment. The receptor antagonists of leukotrienes and topical nasal corticoids are among the drugs used.

5. Orthodontic treatment. Today, this is another alternative for the treatment of paediatric OSAHS.

Follow-up after treatment

All children must be clinically re-evaluated in PC after treatment. After this re-evaluation, the following patients must be sent back to a secondary care or Hospital Care:

- Those who have had serious OSAHS (obstructive AHI > 10, nursing babies, obstructive hypoventilation, etc.) during the pre-operative stage, 3-6 months after surgery.
- Those whose OSAHS symptoms persist, despite surgical treatment, regardless of the severity of the OSAHS.

A management algorithm is presented in Chapter 9 (algorithm 4).

Summary of evidence about the treatment of OSAHS

4	The following are included among the proposed treatments for OSAHS in the National Consensus document: 1. *Surgery*. Tonsillectomy as the treatment of choice. Septoplasty, uvula palatoplasty, epiglotoplasty, tongue-lip adhesion, and maxillomandibular surgery may be indicated in certain cases. 2. *Nasal CPAP (Continuous Positive Airway Pressure).* This is not curative treatment, which means that it must be continuously applied, and adequately following the treatment is essential. 3. *Conservative treatment.* It is important to follow some sleep hygiene practices: always going to bed at the same time, dark bedroom, without noise, with an adequate temperature and a comfortable bed; small amount of food at dinner and not going to bed immediately thereafter; avoiding stimulating drinks; restriction of liquids before going to bed; avoiding naps during the day. In obese children with OSAHS, dietetic treatment and weight loss must be indicated, although even with obese children who have tonsillar hypertrophy, the first treatment option is a tonsillectomy. 4. *Pharmacological treatment.* The receptor antagonists of leukotrienes and topical nasal corticosteroids are among the drugs used. 5. *Orthodontic treatment.* Today, this is another alternative for the treatment of paediatric OSAHS.
4	The clinical re-evaluation of children with OSAHS in PC, after surgery, is important for assessing their evolution.

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Recommendations about the treatment of OSAHS

√	As treatment for OSAHS in Primary Care Health Centers, a conservative treatment is recommended (sleep hygiene strategies, Appendix 8) until definitive treatment is established at a secondary care or Hospital Care and after the treatment.
√	Clinical re-assessment and follow-up after treatment of children with OSAHS are recommended upon return to the Primary Care Health Centers after having been treated in HospitalCare (HC). Children should be sent back to HospitalCare under certain circumstances (see Chapter 9, algorithm 4).

7.2.2. Parasomnias: sleepwalking, night or sleep terrors, confusional arousals and nightmares

- ***Definitions:*** Parasomnias are sleep disorders that do not involve an alteration of the processes that are responsible for the wake and sleep states per se, but rather they involve the appearance of undesirable or bothersome physical or behavioral phenomena that occur predominantly or exclusively during sleep. Many of them are manifestations of CNS activity, and the most noteworthy characteristics are the appearance of musculoskeletal activity and changes in the autonomic nervous system[26].

According to the International Classification of Sleep Disorders (ICSD-2), parasomnias can be divided into three subgroups: *arousal disorders, parasomnias associated with REM sleep and other parasomnias* (Table 9)[26].

Arousal disorders include *sleepwalking, sleep terrors or night terrors, and confusional arousals*. These disorders appear during the N3 phase of NREM sleep in the first half of the night. They occur when the person is incapable of waking up completely from the NREM phase, and they lead to a partial arousal or wakeful behaviour without full consciousness. It has been hypothesised that there is a dissociation between the activity of the brain centres and the spinal cord that are responsible for movement and the centres that regulate sleep and wakefulness, which causes the loss of inhibition of motor activity during sleep. Electroencephalographic studies have shown that in individuals with sleepwalking or sleep terrors, the N3 phase of sleep shows small interruptions that are indicative of instability during sleep[281-283].

Parasomnias associated with REM sleep are grouped together because they are typically associated with REM sleep, and it's possible that they have a common physiopathological mechanism. This chapter of the guideline will cover *nightmares*, which are included in this type of parasomnia.

Finally, the ***other parasomnias*** subgroup encompasses all others not classified in the preceding groups, and they will not be covered in this guideline.

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Clinical features

Sleepwalking

Sleepwalking is a common parasomnia in children, and it is generally benign and self-limited. During sleepwalking episodes, a child gets up from bed and walks without being completely aware of their surroundings. The actions that children might take vary from sitting up in bed asleep to walking and running around very chaotically. A sleepwalking child can also perform complex tasks, such as opening locked doors, taking food out of the refrigerator and eating, going down stairs and even going outside the home or onto a balcony or the roof. During episodes, the child usually has their eyes open and can even mumble or give unintelligible responses or responses with no meaning. It is difficult to wake them, and the next day the child rarely remembers what has happened[283, 284].

Sleep terrors (night terrors)

Sleep terrors are characterised by an abrupt arousal in the N3 phase (deep sleep) during the first third of the night, accompanied by an autonomic and behavioral response of intense fear. The child is very agitated, afraid and confused and shouts or cries, with autonomic symptoms (hyperventilation, tachycardia, sweating and mydriasis), and there could be a behavioral disorder and wandering, and they can even injure themselves. The episode lasts a few minutes and ends spontaneously, with the child going back to sleep. As with sleepwalking, the child does not respond to external stimuli and does not usually remember the episode[283, 284].

Confusional arousal

Confusional arousal, also known as 'sleep drunkenness', 'awakening confusion' or 'sleep inertia', is a frequent disorder in children under the age five. The child wakes up in stage N3 of sleep during the first third of the night and appears confused. The child also shows time-space disorientation, slow ideation and speech and, occasionally, alteration of retrograde and anteretrograde memory. Behaviour can be inappropriate, above all when it occurs due to forced awakening. The child may scream or cry, and the episode is often described by parents as a tantrum, occasionally even showing aggressive behaviour. However, when the attempt is made to soothe the child, the symptoms become worse and the episode lengthens. Unlike sleepwalking and sleep terrors, which usually have a sudden start and end, confusional arousals start and end more progressively. The episodes can last from a few minutes to several hours, although they most frequently last between five and fifteen minutes. The phenomenon is usually self-limited and does not require treatment[26, 284].

A table with the factors associated with arousal disorders is presented below (Table 24):

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Table 24. Factors associated with arousal disorders

Hereditary factors	
Family medical history	There is a 10 times greater probability of suffering from sleepwalking if there is a first-degree family medical history. Up to 80% of those individuals with sleepwalking and 96% of those with sleep terrors could have one or more family members affected by sleepwalking and/or sleep terrors285. Other studies indicate that specific DQB1 genes are involved in the appearance of sleepwalking[286, 287].
Trigger factors	
Sleep deprivation	In patients with sleepwalking, sleep deprivation increases the frequency and complexity of the episodes[288].
Pre-menstrual syndrome	Cases of sleepwalking and sleep terrors that only appear during the pre-menstrual period have been observed[289].
Infectious diseases or fever	Episodes of sleepwalking, sleep terrors or confusional arousals that start during or immediately after a febrile illness have been described290,291. Episodes of sleepwalking in children infected with B. Pertussis have also been stated, which ceased when the infection cleared[292].
Anxiety	In one case-control study, a greater probability of having anxiety was observed in cases of sleepwalking and/or sleep terrors[293]. On the other hand, in another study the presence of anxiety has been associated with persistent parasomnias[27].
Drugs	Episodes of sleepwalking and sleep terrors in children and adolescents, included by hypnotic drugs (zolpidem, zaleplon), antibiotics (ciprofloxacin), psychotropic drugs (quetiapine, lithium) and others (clonidine, levetiracetam) have been reported.[294-300]
Associated disorders	
Other sleep disorders	Up to 58.3% of children with sleep terrors or sleepwalking could have an OSAHS. It has also been suggested that other sleep disorders, such as periodic limb movements, bruxism or nocturnal enuresis, are more frequent in children with arousal disorders.[46]
Migraines	Some studies have shown a strong association between sleepwalking and migraines but not with other headaches. Certain authors have even posed the possibility of including sleepwalking as a minor diagnostic criteria of migraines[301, 302].
Attention deficit hyperactivity disorder (ADHD)	Several studies state that the prevalence of sleep terrors and sleepwalking is significantly higher in children with ADHD[27,303-306].
Tourette's syndrome	The prevalence of sleepwalking and sleep terrors in children with Tourette's syndrome is significantly higher[307].

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Diagnosis

The diagnostic criteria of arousal disorders according to the International Classification of Sleep Disorders (ICSD-2) are presented below[26].

Diagnostic criteria of sleepwalking
A. Ambulation occurs during sleep.
B. Persistence of sleep, an altered state of consciousness, or impaired judgment during ambulation us demonstrated by at least one of the following: 1. Difficulty in arousing the person. 2. Mental confusion when awakened from an episode. 3. Amnesia (complete or partial) for the episode. 4. Routine behaviors that occur at inappropriate times. 5. Inappropriate or nonsensical behaviors. 6. Dangerous or potentially dangerous behaviors.
C. The disturbance is not better explained by another sleep disorder, medical or neurological disorder, mental disorder, medication use, or substance use disorder.

Diagnostic criteria of sleep terrors
A. A sudden episode of terror occurs during sleep, usually initiated by a cry or loud scream that is accompanied by automatic nervous system an behavioral manifestations of intense fear.
B. At least one of the following associated features is present:: 1. Difficulty at arousing the person. 2. Mental confusion when awakened from an episode. 3. Amnesia (complete or partial) for the episode. 4. Dangerous or potentially dangerous behaviors.
C. The disturbance is not better explained by another sleep disorder, medical or neurological disorder, the mental disorder, medication use, or substance use disorder.

Diagnostic criteria of confusional arousal
A. Recurrent mental confusion or confused behavior upon waking from nighttime sleep or a daytime nap.
B. The disorder is not better explained by another current sleep disorder, medical or neurological disorder, mental disorder, medication use, or substance use disorder..

Medical record

According to the American Academy of Sleep Medicine (AASM), a clinical evaluation is sufficient for diagnosing common and non-complicated parasomnias that have not caused injuries. The evaluation must include a detailed description of the episode, with special emphasis on the age of onset, the time when it occurs, the frequency, the regularity and the duration of the episodes[308]. Expert opinion 4 I

Questions must also be asked about any family medical history of sleep disorders and factors that might predispose or precipitate episodes (see Table 34), as well as the impact that the disorder is causing to the patient's daily life[27, 46, 284, 307, 309, 310]. Appendix 2.2 provides a list of questions that can be consulted, which may be useful for orienting the clinical interview. Descriptive studies / case-control studies 3, 2+

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Physical examination

The physical examination regarding arousal disorders is generally normal[284]. Descriptive studies / case-control studies 3, 2+

Differential diagnosis

There are different episodes that can be confused with arousal disorders, and they must be taken into account when making a differential diagnosis:

- **REM sleep behaviour disorder:** it is characterised by violent or vigorous behaviours during REM sleep. It mainly affects adults over the age of 50, although it has also been described in children with narcolepsy, Tourette's syndrome and autism spectrum disorders. It can coexist with sleepwalking[26, 311, 312]. Expert opinion 4
- **Nocturnal panic attacks:** the patient typically has similar episodes also during the day and is capable of remembering the episode the next day[26, 284, 312].
- **Nightmares:** sleep terrors and nightmares are often confused with each other. Nightmares, unlike sleep terrors, usually occur in the last half of sleep, during the REM phase. Children do not usually have a family medical history of arousal disorders, they wake up easily from the episode, and they remember what happened, which in turn makes it difficult to go back to sleep[313].
- **Nocturnal frontal lobe epilepsy (NFLE):** it has an abrupt onset, often explosive, which wakes the patient up and is accompanied by asymmetrical, tonic and dystonic postures, violent hypermotor behaviours and agitated movements of the limbs[314]. It can become very difficult to differentiate NFLE from arousal disorders, even for the most experienced clinicians[315]. Table 25 includes some clinical featuresthat can help to distinguish both conditions[316-318].

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Table 25. Clinical features of arousal disorders and of nocturnal frontal lobe epilepsy

Clinical features	Arousal disorders	Nocturnal frontal lobe epilepsy
Age of onset:	Generally < 10 years	Variable, generally in childhood or adolescence
Family medical history of parasomnias	62%-96%	39%
Moment when they start after falling asleep	First third of the night	Any
Number of episodes in one night	It is unusual that more than one per night occurs.	Several episodes in the same night.
Frequency of episodes per month.	1-4, although they can occur daily	20-40
Evolution	Tends to disappear	The frequency increases.
Duration of the episode	They tend to be prolonged. From 15 seconds to 30 minutes.	The majority of episodes last less than two minutes.
Movements	They can be stereotyped, but variability in behaviours is commonly observed.	Even though movements of certain complexity can be seen, they are mainly stereotyped.
Recall of the episode	No recall or vague memories.	The presence of clear recall points to the diagnosis of NFLE.

Diagnostic testing studies II

The FLEP (Frontal Lobe Epilepsy and Parasomnias) scale has been designed to distinguish epilepsies of the frontal lobe from parasomnias. It is based on a series of questions related to the clinical features of both entities, designed by a panel of experts after a review of literature. The scale has been validated in a sample of 62 subjects with nocturnal episodes of dubious cause, referred to a neurologist or an expert on sleep disorders. 31 of the patients (with an average age of 27.9 years) were diagnosed with frontal lobe epilepsy; 29 (average age of 13.2 years) had an arousal disorder (sleepwalking, sleep terrors, confusional arousals); and 2 patients (average age 69.1 years) showed an REM sleep behaviour disorder. In these subjects, the scale showed a sensitivity of 100%, specificity of 90%, a positive predictive value of 91% and a negative predictive value of 100% in the diagnosis of frontal lobe epilepsies when it was applied by untrained physicians. The coefficient of interobserver agreement was 0.97[319].

The scale, even though it is used mainly on adults, can also be useful for differentiating arousal disorders from frontal-lobe epilepsy in children and adolescents. The FLEP scale can be consulted in Appendix 6.

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Complementary tests

Video-polysomnography (which includes polysomnography with classic variables and audio-visual monitoring of the patient in a sleep laboratory) is considered the gold standard for diagnosing motor or behavioral disorders during sleep[315], although it is not usually necessary for establishing the diagnosis of arousal disorders.

Expert opinion 4

According to the American Academy of Sleep Medicine (AASM), polysomnography is indicated in those cases in which the patient shows symptoms that suggest parasomnias, but they are unusual or atypical, either due to the onset age of the episodes, the moment during sleep when they occur, the duration or the frequency, or due to the very characteristics of the motor pattern (stereotypical, repetitive or focal)[308].

It could also be indicated in cases that might require forensic considerations (for example, when associated with injuries), when there is no response to conventional treatment or to evaluate sleep-related behaviours that are violent or potentially violent for the patient or others. In cases in which a sleep disorder related to epileptic crises may be suspected, polysomnography –together with additional EEG derivations– would be indicated if the evaluation using a conventional EEG is insufficient for establishing the diagnosis[308].

When an intrinsic sleep disorder may be suspected (OSAHS, PLM) as the trigger of the disorder, a polysomnographic study is also indicated[308].

In cases of typical, uncomplicated parasomnias that have not caused injuries, or in cases of patients with epileptic crises without symptoms that might suggest a sleep disorder, polysomnography would not be routinely indicated[308].

Summary of evidence about the diagnosis of arousal disorders.

4	The clinical evaluation is sufficient for diagnosing common, uncomplicated parasomnias that have not caused injuries[308].
2+, 3, 4	A sufficient evaluation includes the following: a detailed description of the episode, with special emphasis on the age of onset, the time when it occurs, the frequency, the regularity and duration of the episodes, any family medical history of sleep disorders and factors associated with the predisposition or precipitation of episodes (Table 24), as well as the impact that the disorder is causing to the patient's daily life[27, 46, 284-307, 309, 310].
2-, 4	The physical examination is usually normal. One study shows that the frequency of fatigue during the day, difficulties at school and sleepiness appears higher in children with sleepwalking and/or sleep terrors compared with healthy controls[27, 46].
4	Among those pathologies that can be confused with arousal disorders are REM sleep behavioral disorder, nightmares, nocturnal panic attacks and nocturnal epilepsies (nocturnal frontal lobe epilepsy)[26, 284].
Diagnostic testing studies II	The FLEP (Frontal Lobe Epilepsy and Parasomnias) scale shows a sensitivity of 100%, specificity of 90%, a positive predictive value of 91% and a negative predictive value of 100% in the diagnosis of frontal lobe epilepsies when it is applied by untrained physicians[319].

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4	Polysomnography is useful in those patients that show symptoms suggesting unusual or atypical parasomnias because of the age of onset, the time when they occur, the frequency, the regularity and duration of the episodes and due to the motor patterns (stereotypical, repetitive or focal). It could also be useful in cases that may require forensic considerations or when there is no response to conventional treatment[308].
4	In cases in which a sleep-related disorder believed to be related to epileptic crises may be suspected, polysomnography –together with additional EEG derivations– could be useful if the evaluation using a conventional EEG is insufficient for establishing the diagnosis. Also for evaluating sleep-related, violent or potentially dangerous behaviours for the patient or others.
4	Polysomnography is indicated when an intrinsic sleep disorder is suspected (OSAHS, PLM) as the trigger of the parasomnia.[308]
4	Polysomnography is not routinely indicated in cases of typical, uncomplicated parasomnias that have not caused injuries, or in cases of patients with epileptic crises without symptoms that might suggest a sleep disorder[308].

Recommendations about the diagnosis of arousal disorders.

D	A complete medical record should be drawn up, including a detailed description of the episodes, with special emphasis on the age of onset, the time when it occurs, the frequency, the regularity and duration of the episodes, any family medical history of sleep disorders and factors associated with the predisposition or precipitation of episodes, as well as the impact that the disorder is causing to the patient's daily life.
√	In addition to a physical examination, it is recommendable to complete the medicall history with an assessment of development and an assessment of behaviour in the social, family and school environments
D	It is advisable to keep the following pathologies in mind when posing a differential diagnosis: REM sleep behaviour disorder, nightmares, nocturnal panic attacks and nocturnal epilepsies (nocturnal frontal lobe epilepsy).
C	It is advisable to use the FLEP scale (Frontal Lobe Epilepsy and Parasomnias scale) in the event that there might be diagnostic doubts between frontal lobe epilepsy and parasomnias (Appendix 6).
D	It is recommendable to refer patients to a unit specialising in sleep disorders or to centres of reference if the patients show symptoms suggesting unusual or atypical parasomnias (due to the age of onset, the time when it occurs, the frequency, the regularity and duration of the episodes and due to the motor patterns), if another sleep disorder is suspected as the trigger (obstructive sleep apnea syndrome or periodic leg movements), in cases when legal considerations may require it or when there is no response to conventional treatment.
D	Those cases in which it is suspected that a sleep disorder may be related to epileptic crises should be referred to a unit specialising in sleep disorders or to a secondary care or Hospital Care. This is also true for assessing sleep-related behaviours that are violent or potentially dangerous to the patient or others.
D	It is not recommendable to refer cases of typical parasomnias that are uncomplicated or that have not caused injuries to a unit specialising in sleep disorders or to a secondary care or Hospital Care.

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Treatment

Both sleepwalking as well as sleep terrors and confusional arousals are commonly benign and self-limited phenomena that tend to disappear over time, and they do not require specific treatment.

Sleep hygiene strategies / child safety

It is important that a child sleep enough hours, that naps not be eliminated if they are usually taken, that a regular sleep schedule be maintained and that possible triggers that may have been identified in the clinical interview be avoided. Expert opinion 4

During episodes, parents must lead the child back to bed and avoid waking them and interfering, given that this could increase agitation and prolong the episode. It is more advisable to remain at the child's side quietly to ensure the child' safety, but without interacting with the child. It is also advisable to avoid discussing the episode the next day, given that this could concern the child and cause resistance to going to bed[284].

On the other hand, given that children could hurt themselves or injure others during episodes, parents should take practices designed to improve safety, such as those stated below:

- Lock doors and windows with mechanisms that children don't usually use.
- Remove furniture or other dangerous objects from the room.
- Use unbreakable glass windows.
- Use alarms so that the child is confined inside the home, for example a bell on the handle of the child's bedroom door.
- Avoid sleeping in bunk beds or high beds.

Psychological interventions

In serious cases or when there are frequent episodes or episodes that may cause a serious alteration in the family and that are not resolved by instituting adequate sleep hygiene strategies, it may be necessary to use other practices.

Scheduled awakenings

This technique consists of waking the child approximately 15 to 30 minutes before the time when the episode typically occurs and then letting them go back to sleep.

In several cases, sleepwalking episodes have successfully been stopped using scheduled awakenings. In one uncontrolled study, three children between 6 and 12 years of age with serious sleepwalking episodes were treated with this procedure for one month. As soon as the treatment started, the episodes ceased in the three children. After six months, two of the three children continued to be free of the parasomnia. However, the third child still had occasional episodes[320]. Before-after studies 3

The frequent episodes of sleepwalking and nocturnal enuresis that another eight-year-old child suffered for several years disappeared after five nights of treatment with scheduled awakenings. No other episode occurred during the twelve following months[321]. Case series 3

In another two series of three cases each, one on children with autism spectrum disorders, scheduled awakenings were also effective at eliminating episodes of sleepwalking that were frequent and that had lasted several years. The awakenings were maintained until the child remained seven nights without showing any episode, and then the intervention was progressively removed. At twelve months of follow-up, no episode had re-appeared, the sleep time of all the children increased, except for one (whose sleep time remained stable), and the parents reported that they were very satisfied with the intervention[322, 323]. Case series 3

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Scheduled awakenings have also been used to treat cases of sleep terrors. In one study, 19 children between 5 and 13 years of age who had had frequent sleep terrors for at least 37 months were treated using this technique. The parents were asked to maintain the awakenings until the episodes ceased. In all cases, the sleep terrors ended within the first week of treatment, and even though the episodes reappeared in three children, they were once again eliminated after treatment was started again. One year later, no recurrence appeared in any of the children[324]. Case series 3

Hypnosis

Several studies about the use of hypnosis in the treatment of parasomnias in adults can be found in literature[325, 326].

Several reports of isolated cases referring to children over eight years of age and adolescents have been published, in which the episodes of sleepwalking and/or sleep terrors were eliminated or reduced using hypnosis or self-hypnosis techniques[289,327-330]. Hypnosis has been used satisfactorily and concomitantly with pharmacological treatment after a lack of effectiveness by other treatments or after the withdrawal thereof due to the secondary effects[289,327], thereby maintaining hypnosis after pharmacological treatment was removed330. It has also been used as the only treatment, without prior or concomitant pharmacological treatment. In this latter case, not all the episodes were eliminated, but their frequency did decrease[330]. Case series 3

The effect of hypnosis seems to be maintained over time, and no relapses are observed at 2-3 years of follow-up[289, 330]. Case series 3

Others

Other psychological interventions (self-control, conditioning, behavioral therapy and autogenic training) have also shown the occasional beneficial effect at controlling episodes of sleepwalking and/or sleep terrors[331-334]. Case series 3

Pharmacological interventions

Pharmacological treatments should be reserved for more serious or intense cases or cases that have consequences in the wake state. Currently, there is no drug whose product characteristics are authorised for the treatment of arousal disorders. Moreover, the bibliography on the use of drugs in children with parasomnias is scarce, and there are no randomised controlled studies for the drugs used up to now: benzodiazepines, tricyclic antidepressants, seratonin reuptake inhibitors and melatonin.

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Midazolam administered at a dose of 15 mg during two nights to 15 hospitalised children between 6 and 15 who suffered from sleep terrors suppressed the episodes in 14 of the 15 children. The subjective assessment of the patients was favourable. No adverse effects associated with the use of midazolam were observed[335]. Before-after studies 3

Imipramine is one of the other drugs that has been used in the treatment of children with arousal disorders. In one study, imipramine was administered (10-50 mg) at bedtime to seven children between 1 and 10 years of age who suffered from sleepwalking and/or sleep terrors. The treatment lasted at least eight weeks in each child. Complete disappearance of the episodes was demonstrated during the treatment. However, in one of the cases, removal of the treatment due to another clinical problem caused reappearance of the disorder, which once again ceased when the medication was once again administered[336]. Other case reports corroborate the efficacy of imipramine in the treatment of arousal disorders[337, 338]. Case series 3

Isolated cases have also been published regarding children who had serious episodes of sleep terrors and/or sleepwalking or episodes that are associated with developmental disorders or other pathologies and who responded satisfactorily to the use of diazepam[339,340], paroxetine[341], alprazolam[342], trazodone[343] or melatonin[344]. Case series 3

Others

A seratonin precursor, L-5 hydroxytryptophan (L-5-HTP), has also been used to treat sleep terrors. In one open RCT, 45 children of between 3 and 10 years of age were randomised to receive 2 mg/kg daily of L-5-HTP at bedtime for 20 days or were assigned to a control group that received no treatment. After six months, 77.42% of the children treated with L-5-HTP showed no episodes of sleep terrors, and 6.45% showed over a 50% reduction in the frequency of episodes. In untreated patients, only 28.5% showed no episodes of sleep terrors at six months[345]. RCT 1-

On the other hand, in cases in which the parasomnia is associated with other illnesses such as OSAHS (obstructive sleep apnea syndrome), ADHD (attention deficit hyperactivity disorder) or PLM (periodic limb movements), correction of the associated disorder can eliminate the parasomnia episodes.

The surgical correction of OSAHS or the pharmacological treatment of RLS-PLM in 45 children, in which these disorders coexisted with sleep terrors or sleepwalking, completely eliminated the episodes of parasomnias in all the children. At six months of follow-up, none of the treated children showed episodes of sleepwalking or sleep terrors. Conversely, there was no change in six children with obstructive sleep apnea syndrome and arousal disorders on whom surgery could not be performed[346]. Before and after studies 3

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Likewise, the administration of methylphenidate to 114 children between 4 and 15 years of age affected by the attention deficit hyperactivity disorder caused improvement in some of the parasomnias that the children experienced. The results, measured through a survey taken of the parents before and after treatment, showed a significant decrease in the frequency of sleepwalking (10.5% before treatment versus 1.8% after treatment), as well as sleep talking and enuresis. The reduction of the frequency of other parasomnias was not significant[346].

Before and after studies 3

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Summary of evidence about the treatment of arousal disorders

4	Sleepwalking, sleep terrors and confusional arousals are usually benign and self-limited phenomena that tend to disappear over time, and they do not require specific treatment[284].
4	In cases of sleepwalking and sleep terrors, it is useful to improve sleep hygiene strategies so that a child sleeps enough hours, naps are not eliminated if they are normally taken, a regular sleep schedule is maintained and possible triggers that have been identified in a clinical interview are avoided[284].
4	Practices designed to improve safety can be taken so that children do not hurt themselves or injure others during episodes[284].
4	During episodes, it is important to lead a child back to bed, avoid waking them or interfering and remain by their side quietly, thereby assuring their safety but not interacting with the child, and discussion of the episode the next day should be avoided[284].
3	Scheduled awakenings (Appendix 11) eliminate episodes of sleepwalking and sleep terrors in children who have episodes that are frequent and that have evolved over a long period[320-324].
3	There are some cases of patients with serious arousals disorders, or which are refractory to other treatments, for whom the frequency and the severity of the episodes have been reduced through hypnosis techniques[289, 327-330].
3	Some psychological interventions seem to show some beneficial effect (self-control, conditioning, behavioral therapy, autogenic training)[331-334].
4	Currently, there is no drug whose product characteristics are authorised for treating arousal disorders in children.
3	In some cases, beneficial effects have been found with respect to the decrease or disappearance of episodes of sleepwalking and sleep terrors in children, through the use of benzodiazepeins, tricyclic antidepressants, SSRIs and melatonin[335, 337-344].
1-	The seratonin precursor L-5-hydroxytryptophan (L-5-HTP) eliminated episodes of sleep terrors in 77.42% of treated patients, versus 28.5% of those who received no treatment[345].
3	Treating primary sleep disorders (OSAHS, RLS-PLM) or other comorbid disorders (Attention Deficit Hyperactivity Disorder) that fragment sleep seems to improve episodes of parasomnias[46, 346].

Recommendations about the treatment of arousal disorders

√	It is recommendable to discuss the generally benign and self-limiting nature of the episodes with the parents of an affected child.
D	The first measure that should be taken is to improve sleep hygiene strategies: the child must sleep enough hours, naps should not be eliminated if they are usually taken, a regular sleep schedule should be maintained and possible triggers should be avoided.
D	Parents should be advised about how to act when an episode occurs: lead the child back to bed, avoid waking them up and interfering and avoid discussing the episode the following day.

D	It is recommendable to advise parents about the appropriate safety practices that should be taken at home.
D	When episodes are not successfully managed using sleep hygiene practices, the attempt can be made to control them by scheduled awakenings if the episodes usually occur at approximately the same time.
√	In more serious or intense cases, or cases that have consequences for wakefulness or that have not responded to the preceding practices, the patient should be referred to a secondary care or Hospital Care.
D	If there is evidence of a primary sleep disorder (OSAHS, RLS-PLM) or other comorbid disorders (ADHD), these disorders should be treated to correct the parasomnias.

More than 5 years have passed since the publication of this Clinical Practice Guideline, and its validity has not been reviewed

Nightmares

Nightmares are terrifying dreams that occur during REM sleep and that generally cause a child to wake up. The episodes usually start between three and six years of age, and the maximum prevalence is observed between six and ten years of age. As from then, the proportion of children who suffer from nightmares decreases progressively[26].

Some authors distinguish between nightmares and 'bad dreams'. The latter are referred to when the dream does not cause a child to wake up. This distinction is merely arbitrary[347].

Nightmares are included in parasomnias associated with REM sleep, and they therefore occur mainly in the second half of nocturnal sleep, when this stage of sleep predominates[347].

Etiopathology

The mechanism that causes nightmares is unknown, although some hypotheses have been proposed. Models in which predisposing factors (genetic factors, personal traits) and precipitating factors (stress, trauma, drugs or medicines) take part have been proposed, in addition to maintenance factors (cognitive avoidance)[348]. Nielsen and Levin describe a neurocognitive model according to which some specific areas of the brain (amygdala, hippocampus, medial prefrontal cortex, anterior cingulate cortex) play a role in the interaction between predisposing and precipitating factors in the appearance of nightmares[349]. In turn, Hartmann *et al*. describe a model in which nightmares would reflect hypersensitivity to negative stimulation due to a low tolerance threshold to emotional activation[350].

Table 26 points out some of the factors that have been associated with nightmares:

SR / Observational studies

2++/2+/3

Table 26. Factors associated with nightmares

Genetic factors	
Family medical history	The results of a broad observational study on twins demonstrated that there are genetic factors involved in the aetiology of nightmares[351].
Sex	According to a recent meta-analysis of observational studies, there do not seem to be differences in the prevalence of nightmares between boys and girls. On the other hand, in adolescents, nightmares are more frequent in women[352].

Trigger factors	
Sleep deprivation	Some authors think that sleep deprivation can cause nightmares due to a rebound effect of the REM phase of sleep[347].
Stress and/or traumatic episodes	The psychological stress caused by emotional conflicts that take place during the day, such as tests, insecurity, the separation of one of the parents, the death of a close relative, or traumatic episodes such as traffic accidents, surgeries, abuse or serious burns can lead to suffering from nightmares[347]. At least 75% of the people with post-traumatic stress disorder suffer from nightmares[353].
Drugs	Episodes of nightmares in children that are secondary to several drugs such as ciprofloxacin[354], ketamina[355-357], nitrous oxide[357,358] and leukotriene inhibitors (Montelukast)[359] have been described. Also other drugs that affect the neurotransmitters of norepinephrine, serotonin and dopamine, drugs that affect the immunological response to infectious diseases and probably others, such as those that affect the neurotransmitters of acetylcholine, GAPA, histamine and other anaesthetic, anti-psychotic and anti-epileptic drugs may be related to the appearance of nightmares360.
Associated pathology	
Suicidal thoughts	Several authors have studied the possible relationship between suicidal ideas and nightmares, reaching contradictory results. While some studies have found a statistically significant relationship between suffering from frequent nightmares and suicidal thoughts[361,362], this association has not been demonstrated in other studies[363].
Headaches	According to one descriptive study based on 887 surveys of children and adolescents in school, 20.5% of the children who suffered from frequent headaches also had nightmares, versus 8.5% of those without frequent headaches[364].
Bipolar disorder / Attention deficit hyperactivity disorder (ADHD)	The outcomes of two case-control studies seem to indicate that both children with bipolar disorder and those with ADHD suffer from nightmares in greater proportion than healthy children of the same age[365, 366].

Clinical features

The dreams are long, elaborate and complicated, with a progressive increase of the sensation of terror, fear or anxiety. Typically, a child wakes up very afraid and entirely alert and describes in detail that they have had a very anguishing and terrifying dream. The child does not always wake up, but they do at least have a late recall of suffering during sleep[347, 367].

The content varies with age, with a tendency to be increasingly more complex. The description of the dream is simple and short in pre-school age children, including monsters and other terrifying, imaginary creatures, while older children tend to describe more complex arguments related to a film, a television programme or some disturbing experience that they have had during the day[347, 368].

The vegetative response is minimum; there could be sweating or slight tachychardia[368].

The episodes tend to be short duration, although after waking, the child continues to be afraid, with difficulty getting back to sleep, although it is generally possible to calm them easily. In some cases, children develop an aversion to bedtime due to the fact that they associate sleeping with nightmares[369, 370].

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Diagnosis

The diagnostic criteria of nightmares according to the International Classification of Sleep Disorders are the following[26].

Diagnostic criteria of nightmares	
A.	Recurrent episodes of awakenings from sleep with recall of intensely disturbing dream mentation, usually involving fear or anxiety, but also anger, sadness, disgust, and other dysphoric emotions.
B.	Full altertness awakening, with little confusion or disorientation; recall of sleep mentation is immediate and clear.
C.	At least one of the following associated features is present:
	1. Delayed return to sleep after the episodes.
	2. Ocurrence of episodes in the latter half of the habitual sleep period.

The diagnosis is basically clinical evaluation[347]: Expert opinion 4

- **Evaluation of nightmares:** both the severity and the chronicity must be assessed. In serious cases, nightmares can be related to a psychopathological disorder.
- **Personal medical history:** generally of no interest.
- **Assessment of development:** children who have some type of developmental delay may experience difficulties when verbalising their experiences and concerns with respect to nightmares.
- **Family medical history:** given that nightmares are very frequent in the general population, a positive family medical history is not considered to be a very specific factor.
- **Assessment of the behaviour:** when nightmares are accompanied by a history of generalised anxiety or of behavioral regression, the possibility of traumas or abuse in children should be considered.
- **Physical examination:** it is not usually revealing in the diagnosis.
- **Sleep log/diary:** a sleep log can be useful, in which both the frequency and the duration of subsequent awakenings is documented for several weeks.

A polysomnography is not routinely indicated, although it can be useful in some circumstances: for discarding other sleep-related parasomnias or epileptic crises in those cases in which the patient relates nightmare episodes accompanied by repetitive or stereotyped nocturnal behaviours, or when potentially injurious behaviours for the patient or others are observed[26]. Expert opinion 4

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Differential diagnosis

Nightmares should be differentiated from other, similar episodes that can confuse the diagnosis, and it should be determined if nightmares constitute an isolated entity or form a part of the symptomatology of another disorder[26, 347, 348].

Expert opinion 4

- **Convulsions:** in some isolated cases, nocturnal epilepsy appears only as *nightmares*; however, typical motor and sensory patterns are usually observed, with stereotyped movements.
- **Sleep terrors:** as it was previously mentioned, sleep terrors and nightmares are often confused. The main differences between them stem from the fact that nightmares usually occur in the last half of sleep, children wake up easily from the episode, they are not confused or disoriented, they remember what happened, and it is hard for them to get back to sleep.
- **REM sleep behaviour disorders:** although they are typical of other ages, they are increasingly diagnosed in children. They are characterised by violent dreams and by vigorous and explosive movements during sleep, which can even cause injury to the patient or others. This disorder is also known as oneirism or 'acted-out or vivid dreams'.
- **Sleep paralysis:** the subject feels conscious but incapable of speaking, moving and even breathing adequately on occasions. Nightmares, although they also involve a certain degree of apparent consciousness and motor inhibition, are not accompanied by that sensation of being completely awake and totally paralysed.
- **Narcolepsy:** patients with narcolepsy often relate nightmares, although both entities are clearly distinguishable, given the clinical symptoms presented by subjects with narcolepsy.
- **Nocturnal panic attacks:** nocturnal panic attacks can be triggered by a nightmare, but the peak of the attack occurs once the subject is awake, generally accompanied by great anxiety and somatic symptoms of panic attacks. In nightmares, the anxiety decreases once a child wakes up.
- **Sleep related dissociative disorder:** it is one variation of dissociative disorders. Patients suffer from a multiple personality disorder and dissociative fugue, and they experience the recall of physical or emotional traumas as if they had been a dream.
- **Post-traumatic stress or acute stress disorder:** subjects who suffer from the post-traumatic stress disorder or acute stress disorder can be expected to suffer intermittently from nightmares as part of the usual course of the pathology. When the frequency or severity of the nightmares is such that it requires independent clinical attention or when the remainder of the symptoms are resolved but the nightmares persist, according to the AASM a diagnosis of nightmares must be applied in addition.

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Summary of evidence about the diagnosis of nightmares

2++, 2+, 3	There are a series of factors that could be related to nightmares (Table 26)[347, 351-366].
4	The diagnosis is based fundamentally on the medical record, with the help of sleep logs/diaries[347].
4	A polysomnography is not routinely indicated. It could be useful for discarding other parasomnias or epileptic crises associated with sleep when the patient relates episodes of nightmares accompanied by repetitive or stereotyped behaviours or when potentially harmful behaviours are observed[26].
4	Nightmares can be confused with other, similar episodes or can form a part of other disorders, including the following: convulsions, sleep terrors, REM sleep behaviour disorders, sleep paralysis, narcolepsy, nocturnal panic attacks, sleep-related dissociative disorder, post-traumatic stress disorder or acute stress disorder[26,347,348].

Recommendations about the diagnosis of nightmares.

D	The diagnosis should be made fundamentally through the medical record, with the help of sleep logs/diaries.
D	A polysomnography is not recommended routinely for diagnosing nightmares.

Treatment

Sleep hygiene strategies

The main practice for reducing the appearance of nightmares is to maintain an adequate sleep hygiene strategy. More specifically, the following strategies should be followed[347, 371]: Expert opinion 4

- Bedtime should be preceded by a calm and relaxing period.
- Watching horror films or television series or listening to frightening stories should be avoided before going to bed.
- It is important to reduce those factors that might be stressful to a child.
- Drinking liquids after dinner should be restricted, and children should urinate before going to bed.

Advice about how parents must act in the event of a nightmare.

After a nightmare, parents can follow any of the following strategies so that the child calms down and goes back to sleep[347]. Expert opinion 4

- Calm the child, emphasising that it has only been a nightmare. It is important for parents to remain calm and to put the child at ease, but without paying excessive attention to the child. Any discussion about the nightmare should be postponed until the next day.

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- Objects that provide the child with security. Some objects may provide a child with comfort and security and help them get back to sleep. In some cases, children tend to relax in the presence of the family pet.
- Leaving a soft light on at night could be useful.

Psychological interventions

The various psychological techniques proposed for treating nightmares are grouped under behavioral techniques, cognitive techniques and deactivation techniques372.

- Behavioral techniques: systematic desensitisation, exposure techniques.
- Cognitive techniques: dream content modification techniques, techniques for confronting the nightmare while it is occurring.
- Deactivation techniques: relaxation strategies and hypnosis.

Most of the research on the psychological treatment of nightmares consists of reports on a single case or case series with a small sample size. SR Case series 3

According to several case reports, after one or several sessions of systematic desensitisation and other variants, the episodes of nightmares in children and episodes in adolescents with frequent and recurring nightmares were eliminated completely. Another case in which a child of eleven was subjected to exposure techniques (flooding therapy) has been reported, whereby the frequent nightmares that the child suffered from were resolved[372].

Among behaviour modification techniques, so-called *imagery rehearsal therapy* has been researched the most with respect to the treatment of nightmares. This intervention is based mainly on changing the nightmare to however it may be desired by describing it in writing or drawing it in detail. This intervention has been used in children and adolescents, with and without the post-traumatic stress disorder. The conclusions that are drawn from these studies indicate that the introduction of a triumphant ending in a nightmare is more effective than imagery rehearsal. In youths with nightmares but without post-traumatic stress, this intervention manages to reduce the frequency of nightmares. In adolescents with nightmares and post-traumatic stress, imagery rehearsal therapy manages to reduce the associated unease, and it perhaps might also reduce the frequency of the nightmares[372]. SR various types of study 1-/3

Regarding imagery rehearsal therapy, some authors think that a useful strategy in Primary Care Health Centers could be to ask the child, depending on their age, to draw or describe the nightmare with the help of their parents, thereby changing the ending of the same so that the child feels secure with the new ending. This strategy should be tried in Primary Care Health Centers before trying other treatments[373]. Expert opinion 4

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Isolated cases have been reported in which children with nightmares, with fear of going to sleep and with fear of the dark have responded satisfactorily to hypnosis techniques[372, 374]. SR Case series 3

Pharmacological interventions

Pharmacological treatment is not usually necessary[369]. Expert opinion 4

No evidence has been found about the pharmacological treatment of nightmares in children and adolescents when they are not associated with other disorders.

Summary of evidence about the treatment of nightmares

4	Maintaining an adequate sleep hygiene strategy can reduce the appearance of nightmares, emphasising the following actions: bedtime should be preceded by a calm and relaxing period; horror films, television series or stories should be avoided before going to bed; factors that may be stressful to children should be reduced; drinking liquids should be restricted after dinner; and it is advisable that children urinate before going to bed[347,371].
4	Some of the following strategies can be useful in the event of a nightmare: soothing and calming the child, emphasising that it has only been a nightmare, using objects that transmit security to the child to help them go back to sleep and leaving a soft light on during the night[347].
3	For treating nightmares, several psychological interventions based on behavioral techniques (systematic desensitisation, exposure techniques), cognitive techniques (dream content modification techniques, techniques for confronting a nightmare as it occurs) and deactivation techniques (relaxation and hypnosis) have been used with satisfactory results[372].
4	Some authors think that a useful strategy in Primary Care Health Centers could be to ask the child, depending on their age, to draw or describe the nightmare with the help of the parents, thereby changing the ending of the same so that the child feels secure with the new ending[373].
4	No evidence has been found about the pharmacological treatment of nightmares in children and adolescents when they are not associated with other disorders.

Recommendations about the treatment of nightmares

√	It is recommendable to put the family at ease, thereby insisting on the benign and limited nature of the symptoms.
D	The following actions are recommended to prevent the appearance of nightmares: maintaining good sleep hygiene strategies (see Appendix 8); maintaining a calm and relaxed period before going to bed; avoiding watching horror films or television series or listening to horror stories before going to bed; reducing those factors that can be stressful to the child; restricting the intake of liquids after dinner; and having the child urinate before going to bed.
D	When a child has a nightmare, it is recommendable that the parents use any or several of the following strategies: soothing and calming the child, emphasising that it has only been a nightmare or using objects that transmit security to the child to help them go back to sleep.
D	It is recommendable to ask the child, depending on their age, to draw or describe the nightmare with the help of the parents, thereby changing the ending of the same so that the child feels secure with this new ending.
√	Whenever nightmares occur almost every night or there are several episodes in the same night, or there is a risk that the subject might become injured or injure others or when the nightmares affect the activities of daily life, the child should be referred to a Secondary care or Hospital Care.

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7.2.3. Sleep-related rhythmic movements.

The sleep-related rhythmic movement disorder is characterised by rhythmic, recurring, stereotyped and repetitive motor behaviours, with a typical frequency of between 0.5 to 2 cycles per second. Movements are made with the head, neck, trunk, limbs or with the whole body, and they fundamentally occur in the transition from wake to sleep, mainly at bedtime. They can also occur at nap time, after waking up during the night and even while a child is sleeping, in stages N1 and N2, sometimes during stage N3 and rarely during REM sleep. They are occasionally observed while a child is awake during calm activities such as listening to music or on a trip[26, 375, 376].

In most cases, these movements start before the age of one, and they are very frequent up to nine months (59%). Subsequently, the prevalence decreases gradually, and at five years of age the movements are only present in 5% of children. Very rarely do they persist in adult age[26].

In general, these behaviours are benign, and they are not considered a disorder unless there is evidence of significant clinical consequences: the rhythmic movements interfere with and alter sleep quality, they affect daily activities, or the child injures himself due to the rhythmic movements[26, 348].

In older children and adults, stereotyped movements can be associated with autism spectrum disorders (ASD) or mental retardation. In these cases, the movements do not occur predominantly in relation to sleep, and the patients are therefore not considered to be suffering from a sleep-related movement disorder[26].

Etiopathology

Even though the cause of these behaviours is not known for certain, some theories have been proposed[26, 375, 377]:

- **Vestibular stimulation:** it has been posed as the initiating factor in nursing babies and very young children. An increase in the need for kinaesthetic stimulation would be related to these behaviours, given that the rhythmic movements are made by the child as a way to relax.
- **Nocturnal awakenings:** whenever a child wakes up at night, there is an opportunity for rhythmic movements to occur, and therefore any factor that increases nocturnal awakenings (OSAHS, pain, gastroesophageal reflux) could be related to these behaviours.
- **Environmental stress or a lack of stimulation from the environment.**
- **Self-stimulation** has also been proposed as another possible factor, in particular in children with autism spectrum disorders (ASD) or emotional alterations.
- In certain cases, it can also be considered to an **attention-getting behaviour** or a form of passive-aggressive behaviour. Parents or caretakers could reinforce the behaviour by paying the attention that a child is demanding.

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- Some authors consider rhythmic movements to be part of a **learned behaviour,** in which the child reproduces rocking movements that parents provide when rocking them in a cradle.

The following table presents some factors that could be associated with these behaviours (Table 27)[375, 378-385]:

Case-control study, Descriptive studies, 2+/3

Table 27: Associated factors

Genetic factors	
Family pattern	Some authors point out the existence of a possible family predisposition[375, 378, 385].
Sex	In some studies, one type of rhythmic movement (head banging) has been observed with a greater frequency in boys than in girls, in a proportion of 3 to 1, with the proportion of boys to girls being similar in all other movements[384, 385]. No differences are found in other studies[379].
Possible trigger factors	
Otitis media	Some cases have been described in which head banging appears in children after having previously suffered from otitis media[380, 381].
Associated disorders	
Attention deficit hyperactivity disorder (ADHD)	Children with ADHD show a greater frequency of head banging in comparison with the general population[382].
Anxiety	According to data from a survey of parents, those children with a certain rhythmic movement called body rocking showed higher levels of anxiety[379].
Restless legs syndrome (RLS)	While in general sleep-related rhythmic movements are not considered to be associated with other sleep disorders, some cases associated with RLS have been described[383].

Clinical features

Several types of rhythmic movements have been described according to the pattern of movements that is observed. The most frequent are described below[348, 375].

- *Head banging (jactatio capitis):* forward and backward rhythmic movements of the head. A child, lying face down, lifts their head or entire torso and then lowers it down again, hard against the pillow or mattress. It can also happen with the child seated. Their head rests against the wall or headboard, and they repeatedly bang their head. These movements usually start at nine months of age.
- *Head rolling:* rhythmic, rolling movements of the head, from side to side, generally with the child laying face up. The age of onset of these movements is commonly around 10 months.
- *Body rocking:* it is the most frequent movement of all. It consists in rocking movements of the entire body, with the child resting on hands and knees, although the movement can also be limited to the torso while the child is seated. They appear around six months of age.
- *Body rolling:* movements of the entire body towards the sides.

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Sometimes a child presents combinations of two or more types of movements.

The movements can be accompanied by inarticulate sounds, which occasionally even disturb the rest of the family.

The duration of the episode varies between a few minutes and several hours, although they most frequently do not last longer than fifteen minutes, and just like it occurs with arousal disorders, typically the children don't recall the episode the next day[375, 376].

Diagnosis

The diagnostic criteria of the sleep-related rhythmic movement disorder according to the International Classification of Sleep Disorders (ICSD-2) are presented below[26]:

Diagnostic criteria of sleep-related rhythmic movements
A. The patient exhibits repetitive, stereotyped and rhythmic motor behaviors.
B. The movements involve large muscle groups.
C. The movements are predominantly sleep related, occurring near nap or bedtime, or when the individual appears drowsy or asleep.
D. The behaviors result in a significant complaint as manifest by at least one of the following:
1. Interference with normal sleep.
2. Significant impairment in daytime function.
3. Self-inflicted bodily injury that requires medical treatment (or would result in injury if preventable measures were not used).
E. The rhythmic movements are not better explained by another current sleep disorder, medical or neurological disorder, mental disorder, medication use, or substance use disorder.

The diagnosis is made fundamentally through the medical record, a physical examination, sleep diaries and sometimes with the help of home videos recorded by the family. A polysomnography is rarely necessary. An assessment of the child's development may be useful, given that rhythmic movements can be a behaviour in children with mental retardation or developmental disorders[348, 377]. Expert opinion 4

A video-polysomnography would be reserved for those cases in which the diagnosis is dubious, when the movements coexist with other sleep disorders such as obstructive sleep apnea and in those cases in which it is required to determine the extent to which the movements affect sleep quality or the performance of daily activities[348, 386]. Descriptive studies, Expert opinion 3/4

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Differential diagnosis

When doing the differential diagnosis, the following pathologies must be taken into account:

Expert opinion 4

- **Developmental disorder:** children with developmental disorders often show stereotyped movements, which are commonly seen during the day also[26, 375].
- **Medical disorders:** neurological disorders, pain, gastrointestinal reflux, ear infection or blindness[26, 375].
- **Self-stimulating behaviours:** some rhythmic movements, especially *body rocking*, can be confused with masturbatory behaviours[26].
- **Convulsions:** they are easily distinguished from the sleep-related rhythmic movement disorder through the medical record. One aspect that can help to differentiate them is that rhythmic movements can be controlled voluntarily by children[26, 375].
- **Other parasomnias and movement disorders:** bruxism, sleep spasms, periodic leg movement disorder, tics, spasmus nutans, REM sleep behaviour disorder or restless legs syndrome (rhythmic movements would represent a conscious strategy for suppressing the movement of the legs)[26, 348, 375].

Summary of evidence about the diagnosis of rhythmic movements

2+,3	There are a series of factors that can be associated with the sleep-related rhythmic movements disorder (Table 27)[375, 378-385].
4	The diagnosis is made based fundamentally on the medical record and a physical examination, and sometimes based on home videos made by the family[348, 377].
3,4	A video-polysomnography is useful for those cases in which the diagnosis is dubious, when the movements coexist with other sleep disorders such as OSAHS and in those cases in which it is required to determine the extent to which the movements affect sleep quality or the performance of daily activities[348, 386].
4	Some medical disorders (neurological, pain, gastroesophageal reflux, ear infection or blindness), self-stimulating behaviours, convulsions and other parasomnias and movement disorders (bruxism, sleep spasms, tics, spasmus nutans, REM sleep behaviour disorder or restless legs syndrome with the periodic limb movement disorder or RLS-PLMD) could be confused with sleep-related rhythmic movement disorders[26, 348, 375].

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Recommendations about the diagnosis of rhythmic movements

√	The diagnosis must be made fundamentally through the medical record, a physical examination, sleep logs/ diaries and sometimes with the help of home videos- recordingby the family.
D	Video-polysomnography must be reserved for cases in which the diagnosis is doubtful, when other sleep disorders coexist, (such as OSAHS), and when it is necessary to determine how the movements affect the quality of the sleep or daily activities.
D	The differential diagnosis of sleep-related rhythmic movement disorders should include developmental disorders, medical disorders (neurological, pain, gastroesophageal reflux, ear infection, blindness or others), self-stimulating behaviours, convulsions and other parasomnias and movement disorders (bruxism, sleep spasms, tics, spasmus nutans, REM sleep behaviour disorder or restless legs syndrome with periodic limb movement disorder or RLS-PLMD).

Treatment

The child's safety

Most commonly, these children do not require any type of treatment. The most important aspect is to put the family at ease, thereby insisting on the benign and limited nature of the symptoms. Moreover, parents must be instructed on useful safety strategies to prevent a child from hurting himself (tightening the bolts of the crib, placing cushions in cribs, placing protective bars on beds)[348, 375].

Expert opinion 4

Psychological interventions

To date, no RCT that evaluates the efficacy of certain psychological interventions in the control of sleep-related rhythmic movements has been published. There also are no studies or reports of cases in which the same techniques are evaluated, wherefore it is difficult to recommend an intervention for the treatment of rhythmic movements.

However, some interventions based on behaviour modification techniques share certain strategies, even though they may not coincide entirely. In some cases, immediate feedback is used when the episode occurs, using alarm systems to detect when it does occur[387,388]. At that moment, interventions to correct the movements or to create rejection of the same are applied by introducing negative reinforcement[387-391]: for example, in one of the studies, whenever an episode occurred, the child was prevented from sleeping immediately and was forced to get up and take a short walk around the house[389]; in another case, a bright light was focussed on the child when the movement occurred[391]. Finally, almost all interventions included a reward system for rewarding nights when the rhythmic movements didn't occur[381,387-390]. In all the aforesaid cases, the intervention was effective to a greater or lesser extent, thereby managing to reduce the symptoms or completely eliminate the disorder[387-392].

In another study, six children between 3 and 12 years of age with sleep-related rhythmic movements were satisfactorily treated through controlled restriction of sleep.

Before and after study 3

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The intervention consisted in the following: during the first week of the study, the parents recorded the sleep times, which at the same time were also recorded by an actigraphy. The parents also recorded the appearance of rhythmic movements, which they rated from 0 to 4. The next week, sleep was restricted by one hour less than usual, and a hypnotic was also administered. The following week, the sleep restriction was maintained without the hypnotic, and in the last week the total sleep time was restored by increasing it at the rate of 10 minutes each day. With the controlled restriction of sleep, both sleep latency and rhythmic movements improved. Only in one child did the rhythmic movements persist at the one-year follow-up. The adverse effects were infrequent and minor; some parents reported sleepiness, nervousness and/or agitation[393]. However, the methodology described in this work does not allow conclusions to be drawn.

More than 6 years have passed since the publication of this Clinical Practice Guideline, and its validity has not been reviewed

Pharmacological interventions

Pharmacological treatment for controlling sleep-related rhythmic movements also has not been rigorously studied. We only have anecdotal reports of cases in which low doses of clonazepam were successfully used to treat this disorder in adolescents in which these behaviours persisted or in children in which the movements caused injuries or consequences during the day. After treatment with clonazepam, in all cases the frequency and symptoms were reduced or the movements were completely eliminated,[394-399] although there are also reports of some cases in which clonazepam was not effective[393, 400]. Case series 3

Imipramine was successfully used on an adolescent who suffered from *head banging* after a closed head injury[401]. Case series 3

Another article describes the use of oxazepam for treating a girl with *body rocking*. The oxazepam caused an improvement that was not maintained over time[402]. Case series 3

Summary of evidence about the treatment of rhythmic movements

4	The symptoms of sleep-related rhythmic movement disorders are usually benign and limited[348, 375].
4	There are useful safety strategies to prevent a child from injuring himself: tightening the screws on a crib, placing bumpers in cribs and installing protective bars on beds[348,375].
3	Some cases have been described in which, through interventions based on behaviour modification, the symptoms have been reduced or the disorder has been eliminated completely. These techniques included one or several of the following strategies: immediate feedback after the episode, practices for correcting the movements, or negative reinforcement and a reward system[81,3 87-392].
3	The controlled restriction of sleep seems to improve both sleep latency and rhythmic movements. The observed adverse effects were infrequent and minor; some parents reported sleepiness, nervousness and/or agitation[393].
3	Clonazepam in adolescents in which sleep-related rhythmic movements persisted or in children in which the movements caused injuries or consequences during the day reduces the frequency and the symptoms or it completely eliminates the movements[394-399], although in some cases it was ineffective[393,400].
3	Imipramine and oxazepam are some of the other drugs used for treating sleep-related rhythmic movmeents[401, 402].

Recommendations about the treatment of rhythmic movements

D	As the first measure, it is recommendable to put the family at ease, thereby insisting on the benign and limited nature of the symptoms.
D	Parents should be instructed about the safety practices for preventing a child from injuring himself: tightening the screws on a crib, placing bumpers in cribs and installing protective bars on beds.
√	In more serious or intense cases, or cases that have consequences on wake times or that persist beyond six years of age, the patient should be referred to a secondary care or Hospital Care.

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7.3. The child who sleeps during the day: excessive daytime sleepiness (EDS) or hypersomnia

Questions to be answered:

- What is excessive daytime sleepiness or hypersomnia?
- How are hypersomnias classified?
- What is the most frequent cause of excessive daytime sleepiness?
- What is narcolepsy?
- What are the diagnostic criteria for narcolepsy?
- What are the differential diagnoses?
- Are there key questions that can help Primary Care professionals detect these disorders in an interview with the patient/parents/caretakers?
- What are the tests or tools that we can use to diagnose these disorders in PC?
- What are the criteria for referring to HospitalCare?
- What are the effective treatments for narcolepsy authorised in the paediatric population?
- What are the most effective psychological interventions for these disorders?
- Are there preventive strategies of these disorders?
- Are there effective strategies for preventing these disorders from becoming chronic?

Excessive daytime sleepiness (EDS) or hypersomnia is the impossibility of remaining awake and alert during most of the daytime wake episode, and it is present in 11% of children10 and in 52.8% of adolescents[22]. Hypersomnias are a group of disorders characterised by excessive daytime sleepiness, a decrease in alertness and/or excessive duration of the nocturnal sleep episode, and they interfere with normal daily activities. It is necessary to differentiate between *primary* or *idiopathic hypersomnias*, characterised by an excessive need for sleep, and *secondary hypersomnias*, which are all situations or pathologies that are present with insufficient sleep and cause EDS.

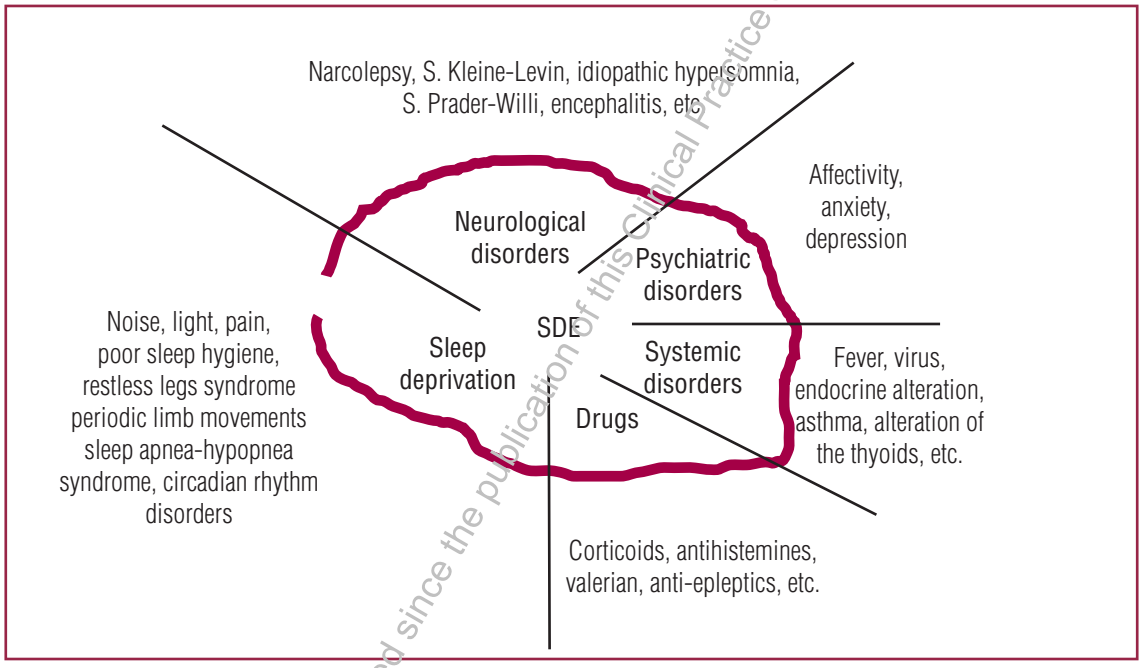
Primary hypersomnias, or those originating in the central nervous system (narcolepsy, Kleine-Levin syndrome and idiopathic hypersomnia), are less frequent. However, **narcolepsy**, as the most relevant disorder and due its serious repercussions on a patient's quality of life, will be discussed in this chapter so that Primary Care paediatricians can learn the characteristics of the illness, given that it can first appear in children.

The most frequent kind of *secondary hypersomnia* is **chronic sleep deprivation,** which is the main cause of EDS in children and adolescents.

EDS can be caused by environmental and social factors (such as inadequate sleep schedules and the use of new technologies before going to bed) or by an illness that affects sleep, such as those included in medical disorders (such as diabetes mellitus, fever or hyperthyroidism), neurological disorders (such as tumours, head trauma), psychiatric disorders (such as anxiety, depression) or primary sleep disorders (obstructive sleep apnea hypopnea syndrome, restless legs syndrome-periodic limb movements, circadian rhythm disorders, parasomnias).

Figure 4 shows the causes of EDS in the paediatric population, which are manifested by spontaneous sleep episodes during the day, even during school hours.

Figure 4. Causes of excessive daytime sleepiness (EDS)



Source: modified from G. Pin Arboledas[403].

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In general, the manifestations of EDS are different according to the age. Table 28 includes the main manifestations or alarm signals according to various age groups:

Table 28. Manifestations of EDS with respect to age

a) *Nursing and pre-school:*
Sleeping several hours more than their parents.
Needing naps after having started school at 5 years of age.
Being sleepy while companions are active and alert.
Abruptly starting to sleep much more. Attention and hyperactivity symptoms.
b) *School*
Tendency towards a lower level of alertness at the end of the day, which disappears in adolescence.
Decrease in academic performance. Hyperactivity and alteration of behaviour.
c) *Adolescents*
Clinical similarity to adults (sleepiness). Change in character.
Hyperactivity and/or alteration of behaviour. Decrease in academic performance.

In the event of EDS symptoms, a complete **medical record** should be drawn up, thereby specifying the medical background, medicines or drugs that are taken, and the patient's habits. The daytime consequences of EDS should be recorded, which can affect academic performance and appear to be behavioral problems, but they shouldn't be confused with behavioral or psychiatric problems.

It must be established whether or not there is subjective EDS. The tools that cam help to orient the diagnosis in Primary Care Health Centers are the following:

- Sleep log/diary (shows the sleep episodes), scales that evaluate EDS in the paediatric population, such as the Pediatric Daytime Sleepiness Scale-PDSS[404], and the adapted Epworth Sleepiness Scale (ESS) for older adolescents[405] or the Cleveland Adolescent Sleepiness Questionnaire-CASQ)[406].
- If a medical disorder is suspected, the pertinent test must be requested.

Recommendations about the diagnosis of EDS

√	EDS should be fundamentally diagnosed through a complete medical record that includes the medical background, any medicines or drugs that are taken and the patient's habits, in addition to any daily consequences, using the help of information gathered by families in sleep logs/diaries and the Paediatric Daytime Sleepiness Scale (PDSS).

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7.3.1. Chronic sleep deprivation

Sleep deprivation in relation to the environment and lifestyle is the main cause of EDS in the paediatric population. In these patients, it is necessary to evaluate academic performance and analyse the behavioral problems (for example, hyperactivity) that reflect the daytime consequences of EDS.

We refer to section 7.1.1. regarding insomnia for adequately handling EDS due to *chronic sleep deprivation in relation to the environment and lifestyle*. The remaining causes of sleep deprivation due to primary sleep disorders (RLS, PLM, OSAHS, circadian rhythm disorders) have already been covered in the corresponding chapters.

7.3.2. Narcolepsy

- ***Definition:*** narcolepsy is a REM sleep regulation disorder that is characterised by excessive daytime sleepiness (EDS), episodes of cataplexy, hypnagogic or hypnopomic hallucinations, episodes of sleep paralysis and interrupted nocturnal sleep[26].

- ***Etiopathology:*** studies conducted on humans and animals have related the neurobiology of narcolepsy to a deficit of the hypothalamic neurotransmitter, hypocretin-1, and a deficit of the hypothalamic neurons that secrete this neurotransmitter, whose concentration is either reduced or undetectable in the cerebrospinal fluid (CSF) in most patients with narcolepsy and cataplexy[407] and in other pathologies[408]. Up to 70% of children and adolescents with narcolepsy show positive to the histocompatibility antigen HLA DQA1* 0102 or DQB* 0602 if there is cataplexy (90% in adults), but there isn't usually concordance in homozygous twins. This HLA DQB* 0602, present in 12%-38% of non-narcoleptic subjects, is not sufficient for triggering narcolepsy, and the participation of external factors[409-411] and of autoimmune phenomena (with the participation of T cell receptors)[412] is necessary to trigger the disease in genetically predisposed subjects[413].

  In the majority of cases, narcolepsy is idiopathic, but some medical and neurological disorders that affect the CNS can cause secondary or *symptomatic* narcolepsy with early onset symptoms: neurological disorders (Prader-Willi syndrome, type 1 myotonic dystrophy, Down syndrome), trauma, intracranial tumours, disorders of vascular origin or infections. Isolated cataplexy has been described in children with Niemann-Pick disease type C or with Coffin-Lowry syndrome[414].

- ***Clinical features:*** the characteristic symptoms of narcolepsy are excessive daytime sleepiness (EDS) and other symptoms that represent an intrusion of REM sleep phenomena during the wake state (cataplexy, hypnagogic and hypnopompic hallucinations, sleep paralysis). In most cases, there is also fragmented nocturnal sleep.

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- ***Excessive daytime sleepiness (EDS):*** it is the universal symptom. It interferes significantly with the quality of life and it is often the initial manifestation. It usually appears in the form of brief, unstoppable naps that appear abruptly or with the reappearance of naps in children over 5 years of age, which temporarily improve the EDS. Moreover, there could be episodes of micro-sleep that go unperceived by the patient and that are accompanied by automatic behaviours. Many children, especially the youngest, develop paradoxical hyperactivity to compensate for the EDS, similar to the attention deficit hyperactivity disorder (ADHD)[62].

- ***Cataplexy:*** it is the second most important symptom in narcolepsy and is pathognomonic of this illness, although with some atypical characteristics in the child-adolescent population. It appears in over 60% of adult patients and in 80% of paediatric cases, although rarely is it the initial symptom. It is characterised by an abrupt loss of muscle tone, usually triggered by an intense positive emotion (for example, laughter or surprise), fear, anguish, intense exercise or fatigue, although in some cases it is not possible to identify a clear trigger. The frequency of episodes is variable, and they tend to be brief, with complete recovery of the muscle tone after the episode ends, in which there is no loss of consciousness. The manifestations can be subtle (facial weakness, blinking, dropped jaw, stilted language) or more noticeable, such as a dropped head or bent knees, even dropping to the ground in some cases[415]. In a third of children with narcolepsy, there is a form of status cataplecticus that is localised in the facial muscles (*facies cataplexica*), not induced by ceasing treatment with antidepressants and without a clear emotional trigger, characterised by protrusion of the tongue (see Appendix 14).

- ***Hypnagogic and hypnopompic hallucinations (HH):*** they are described as vivid dreams (experiences that are difficult to differentiate from reality), with disagreeable content and visual, auditory and tactile symptoms that appear during the wake-sleep (hypnagogic) and sleep-wake (hypnopompic) transitions. These manifestations can also appear during daytime naps. For many children, the hallucinations involve a significant psychological morbidity load[416].

- ***Sleep paralysis (SP):*** it is the sensation of immobility for a few seconds or minutes, which appears at the onset of sleep or at the end of the same, whether or not associated with HH, and it is sometimes accompanied by blinking, groaning or autonomic symptoms. HHs and SPs are sometimes described together, and they appear in 40-80% of adult narcoleptic patients and also in non-narcoleptic subjects, triggered by stress or sleep deprivation.

- ***Nocturnal sleep disorders:*** it is a very frequent manifestation in narcolepsy (90% of patients). Sleep disorders include the following: an alteration of REM sleep (the absence of muscular atonia, an increase of phase muscular activity in the form of a *twitch*, parasomnias in REM sleep) or events during sleep. obstructive sleep apnea-hypopnea syndrome (OSAHS), periodic limb movements (PLM) or parasomnias.

- ***Other symptoms:***

  – Automatic behaviours: during *microsleep*, a child performs a *senseless* activity that he is unaware of, and he remembers nothing.

  – Obesity, over-weight: 90% of children with narcolepsy are over weight or obese[417], with a weighted increase that appears as from the onset of the narcolepsy symptoms.

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– Depression: children and adolescents with narcolepsy experience the illness with a sense of failure, and they show behavioral problems, demotivation, depression, emotional weakness, difficulty relating with their friends and a marked reduction in quality of life. Because of unawareness of the illness, before reaching the diagnosis of narcolepsy, they are accused of being 'lazy', 'idle' and even 'drug addicts'.

– School problems: during school hours, the child suffers the consequences of EDS, with attention problems and the appearance of spontaneous sleep episodes that delay learning.

– Dysarthria, blurry vision, ptosis, headaches and precocious puberty have also been described[62, 420].

Diagnosis

The diagnostic criteria of narcolepsy, with and without cataplexy, are presented below according to the International Classification of Sleep Disorders[26]:

Narcolepsy with cataplexy
A. The patient has a complaint of excessive daytime sleepiness occurring almost daily for a least three months.
B. A definite history of actaplexy, defined as sudden and transient episodes of loss of muscle tone triggered by emotions, is present.
C. The diagnosis of narcolepsy with cataplexy should, whenever possible, be confirmed by nocturnal polysomnography followed by an MSLT; the mean sleep latency on MSLT is less than or equal to eight minutes and two or more SOREMPs are observed following sufficient nocturnal sleep (minimum six hours) during the night prior to the test. Alternatively, hypocretin -1 levels in the CSF are less than or equal to 110 pg/mL or one third of mean normal control values.
D. The hypersomnia is not better explained by another sleep disorder, medical or neurological disorder, mental disorder, medication use, or substance use disorder.
Narcolepsy without cataplexy
A. The patient has a complaint of excessive daytime sleepiness occurring almost daily for a least three months.
B. Typical cataplexy is not present, although doubtful or atypical cataplexy-like episodes may be reported.
C. The diagnosis of narcolepsy without cataplexy must be confirmed by nocturnal polysomnography followed by an MSLT. In narcolepsy without cataplexy, the mean sleep latency on MSLT is less than or equal to eight minutes an two or more SOREMPs are observed following sufficient nocturnal sleep (minimum six hours) during the night prior to the test.
D. The hypersomnia is not better explained by another sleep disorder, medical or neurological disorder, mental disorder, medication use, or substance use disorder.

To help with the diagnosis of narcolepsy, it is necessary to investigate if there is a family medical history of other causes of EDS or of narcolepsy, although family narcolepsy is very rare. A physical examination (including a neurological examination) usually reveals the existence of being overweight, without other significant findings, unless the patient falls asleep spontaneously or there are cataplexy episodes during the examination.

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Diagnostic tests targeted at confirming or discarding this disorder must be performed at a hospital, preferably at a Sleep Unit. These tests are the following: nocturnal polysomnogram (PSG) and a multiple sleep latency test (MSLT)[421,422], HLA DQB* 0602 typing, a concentration of hypcretin-1 in the CSF423 and neuro-imaging tests[62,424].

Recommendations about the diagnosis of narcolepsy

√	To help with the diagnosis of narcolepsy, it is necessary to investigate if there is a family medical history of other causes of EDS or of narcolepsy.
√	Diagnostic tests targeted at confirming or discarding this disorder must be performed at a hospital, preferably at a secondary care or Hospital Care.

Treatment

Narcolepsy is a chronic disorder that always requires treatment so that the patients can lead a practically normal life. The basic principles of managing narcolepsy in children are similar to those for adults, but a comprehensive approach is recommendable at the paediatric age, with special attention on the psychosocial aspects related to the patient themselves, the family and the school (teachers, companions), which are the aspects that can be handled through PC. Among them, the following should be highlighted:

1. **Information and education:** it is the corner stone, and its objective is to ensure that patients are not ignored or held up as objects of ridicule. The EDS causes a decrease in academic performance, wherefore the schedules and academic tasks of the patient must be adapted. Children should receive supervision when they perform potentially dangerous activities (such as swimming).

   Adolescents must be informed that, according to legislation in force, they cannot drive a vehicle. LG

   According to the general driving regulations, persons with narcolepsy cannot obtain or extend their driver's license. When there might, exceptionally, be a favourable decision for obtaining or extending a license, the validity of the permit or license could be reduced, according to the physician's judgement.

2. **Sleep hygiene strategies:** one very important aspect is education about healthy sleep habits (Annex 8).

3. **Scheduled naps:** EDS can be partially controlled if a patient with narcolepsy sleeps a brief, scheduled nap throughout the day.

4. **Pharmacological treatment:** the decision about using drugs for narcolepsy is made at a secondary care or Hospital Care. The drugs used include psychostimulants, antidepressants and sodium oxybate.

It is important that the PC paediatrician consider the possible interactions that the aforementioned drugs could have with other drugs. Table 29 summarises these main interactions.

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Table 29. Table of interactions between drugs used for narcolepsy[232]

	Interactions, warnings/ precautions	Contraindications	Consequences of the interaction	
Methylphenidate	Anti-coagulates, alcohol, phenobarbital, phenytoin, neuroloeptics, primidone.	Halogenated anaesthetics, clonidine, MAOI	Drugs that reduce plasmatic levels	Decreases the action / concentration of
Clomipramine	Coumarin anticoagulants, H2 antagonists (cimetidine), antidepressants (SSRI, TCAD), some hypertensives (clonidine, alpha methyldopa, reserpine, guanethidine), antihistamines, antiparkinsonians, atropine, CNS depressants, neuroleptics, sympathomimetics (adrenaline, noradrenaline, enphedrine), thyroid supplements	Antiarrhythmic drugs (quinidine, propafenone), MAOI		Antihypertensives
Imipramine	Alcohol, alprazolam, calcium antagonists (diltiazem, verapamil), anticholinergics, beta-blockers (labetalol, propranolol), cimetidine, citalopram, disulfiram, estrogens, SSRI, phenytoin, L-DOPA, neuroleptics, quinidine, sertraline, sympathomimetics.	MAOI.		Barbiturates, carbamazepine, phenytoin, phenobarbital, rifampicin, tobacco.
Fluoxetine	NSAIDs, alprazolam, anticoagulants, antidepressants (TCAD, SSRI), carbamazepine, digitoxine, phenytoin, flecainide, lithium, neuroleptics, propafenone, tryptophan, sumatriptan, warfarin	Pimozide	Barbiturates, carbamazapine, tobacco	Anti-hypertensives (clonidine, guanethidine)
Venlafaxine	Alcohol, cimetidine, SSRI, haloperidol, ketoconazole, lithium, metoprolol, risperidone, triptans, tryptophan, warfarin.	MAOI.		
Sodium oxybate	Alcohol, TCAD, CNS depressants, ethosuximide, phenytoin, tramadol, valproate			

ASA: Acetylsalicylic acid.

TCAD: Tricyclic antidepressants.

NSAIDs: Non-steroidal anti-inflammatories.

SNRI: Serotonin and norepinephrine reuptake inhibitor.

SSRI: Selective serotonin reuptake inhibitor.

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Recommendations about the treatment of narcolepsy

√	Parents/guardians should be advised to inform schools about the needs of their children so that their school schedules and school work can be adapted according to their needs, without affecting their academic performance.
√	Children should receive supervision when they perform potentially dangerous activities (such as swimming).
√	Adolescents who are diagnosed with narcolepsy and who have driver's licenses will be advised not to drive and to notify their status to the Department of Motor Vehicles. They will also be informed about legislation in force, which states that persons with narcolepsy may not obtain or extend a driver's license, unless a favourable medical report is issued, in which case the validity period of the license can be reduced according to the physician's opinion.
√	Sleep hygiene strategies must be explained, thereby insisting on education about healthy habits (Appendix 8).
√	It is recommendable to take a short, scheduled nap throughout the day.

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8. Information for the patient/relatives of the patient

Questions to be answered:

- How can better compliance with/adherence to the treatment of sleep disorders in childhood and adolescence be achieved?
- What is the basic information that must be provided to relatives and patients with sleep disorders?

In the process of adhering to a patient's treatment, there are numerous health-related behaviours that have an influence, which frequently act as barriers that hinder the process. With respect to sleep disorders in the paediatric and adolescent populations, the most notable barriers, apart from the very characteristics of the disorder, usually come from factors that are related more to the socio-cultural context in which both the patient and the family coexist, and therefore, in order for parents to form an active part of the adherence process, it is important to take into account their perceptions, preferences and expectations with respect to the therapeutic decisions that are going to be recommended[425].

For the population with the ages covered by the guideline, the interventions that will be successful will be those that are accepted and viable, most of the time by the parents[426]. There are several factors that can be associated with this process. Often, the interventions that are proposed to parents are not accompanied by immediate changes in sleep routines, and a child's problem is maintained because it is a matter of taking on cultural beliefs and behaviour patterns that cannot be abruptly changed[427].

Other times it depends on the motivation of the person receiving the intervention message, and it is therefore necessary to take into account the parent-child relationship and/or their interaction. The desires and expectations of the parents are as important as those of the child when determining the sleep pattern that is endeavoured.

Emphasis on the importance of preparing the parents should also be noted[428]. Most parents are seeking information about sleep interventions. They know the theory, but the efforts don't achieve results when they have to face shouting and tantrums by their children. On other occasions, parents may think that the problem has been solved forever after the intervention, until short breaks in the good sleep routine that has been successfully established at the family home (holidays, teething, moving, etc) end up causing a relapse of the disorder and a perception of failure[425].

There are several studies in which the parents indicated that their knowledge about paediatric sleep, before resorting to health professionals, was fairly limited[425].

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One of the basic pillars that must be established to achieve better compliance with / adherence to the treatment of childhood and adolescent sleep disorders is therefore the information that parents themselves, children and adolescents are going to receive when they go to their health centre, as well as how this information is provided to them.

This information must form a part of the comprehensive management of sleep problems at the PC level. It is important to provide all the general information about sleep disorders that parents, caretakers children, and adolescents might need, including more specific information about the disorder that affects them and the effective treatment interventions that currently exist[429].

It is also necessary to consider the most frequent barriers that can arise regarding compliance with many of the interventions that are recommended, given that they are based on psychological therapies, so that parents and patients can be informed about them. These barriers include the following:

- A considerable investment in time and effort is required of the parents and the patients.
- There can be some aggravation derived from the difficulty of integrating new patterns of behaviour in life habits, such as having to keep the same sleep schedules every day, regardless of weekends and holidays, or getting up from bed until sleepy again, which can also involve or affect the entire family.
- Inconveniences derived from having to eliminate certain habits that can alter the sleep behaviour can also be encountered, such as the use of video games or the consumption of substances such as caffeine, chocolate, etc.

Regarding how to inform parents, there are several favourable circumstances that help to generate a change in the attitudes of parents and in the behaviours of children:

1º The health professionals with whom the child's parents have a good relationship and in whom they trust are the source of the message.

2º A scheduled consultation allows a relationship between parents and health professionals.

3º The message for parents has to be clear and simple, given both verbally and in writing.

Currently there are deep-rooted beliefs about the fact that it is normal for many children to wake up at night and for them to not be able to get back to sleep on their own. Realistic information that helps parents to overcome this classical conditioning and that stimulates them to put the information into practice must be given, and they themselves must see the results.

Information directed at the patient and at family members is presented in Appendix 15, 'Learning to know and manage sleep problems in childhood and adolescence', as an aid to comprehensive management of sleep problems by PC professionals.

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Recommendations about information for the patient and adherence to treatment

√	It is recommendable to provide information to the parents/caretakers and children/adolescents who have sleep problems (or who are suspected of having them), thereby including general information about the problem and about effective interventions (see Appendix 15 – information for the patient).
√	To improve adherence to treatment and facilitate shared decision-making, the experiences, preferences and expectations of the parents/caretakers and children/adolescents regarding the therapeutic decisions to be made must be taken into account.
√	It is recommendable to help parents/caretakers and children/adolescents acquire a certain degree of motivation to carry out a health professional's recommendations regarding sleep hygiene strategies and psychological interventions that require behaviour modification.
√	Parents/caretakers and children/adolescents must be made aware of the barriers that can arise and the effort involved in complying with certain psychological interventions regarding the adoption of new patterns of behaviour (keeping the same sleep times every day, getting out of bed until becoming sleepy again, eliminating certain habits that can alter sleep behaviour [such as playing video games], foods/drinks with caffeine, eating chocolate, etc.).

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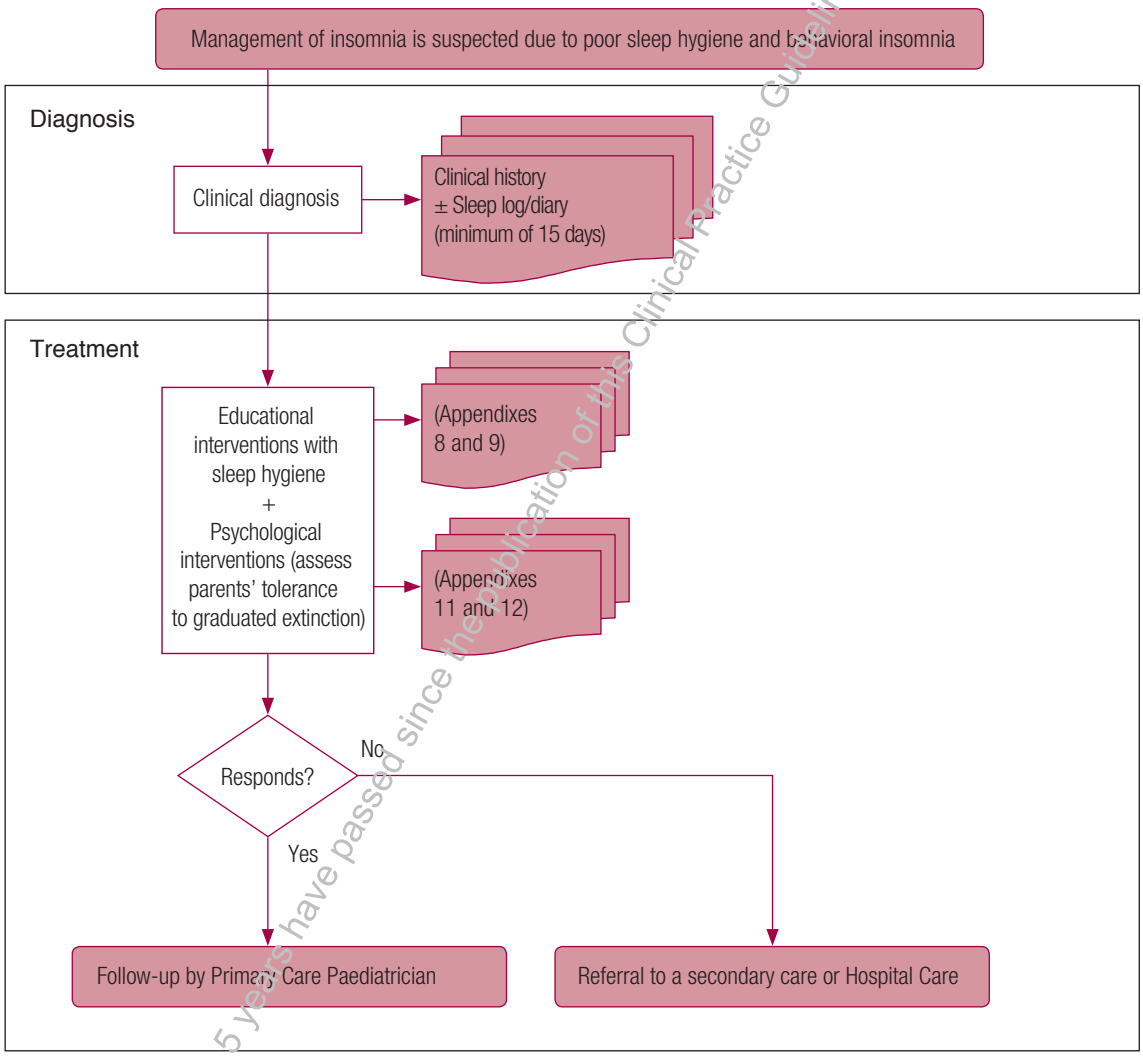
9. Diagnostic and therapeutic strategies.

Questions to be answered:

- What are the steps to follow with a child or adolescent who has sleep disorders?

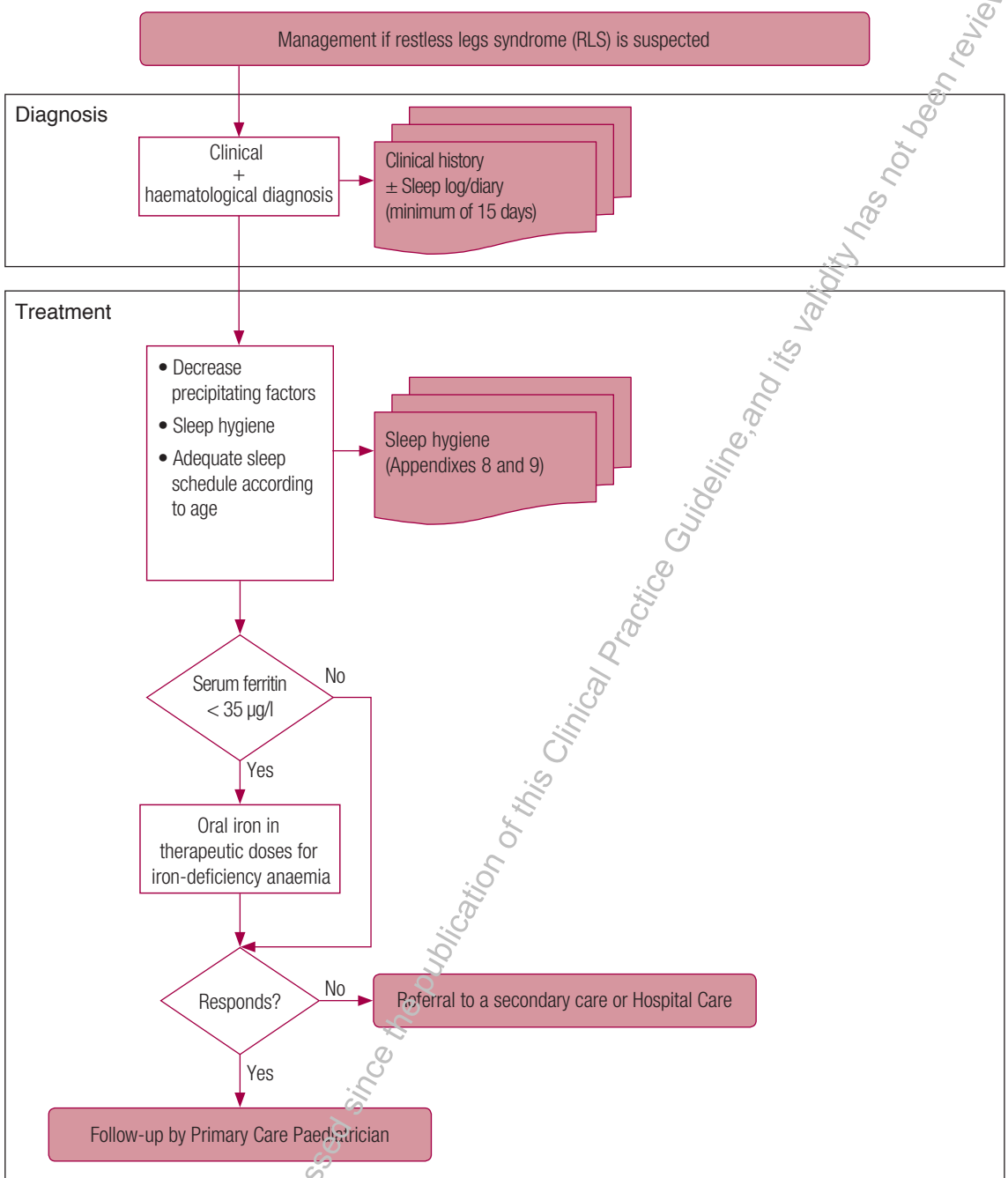
The steps to follow with a child or adolescent who has a sleep disorder (or is suspected of having one) are shown in the management algorithms shown below, based on the recommendations proposed in the guideline:

9.1. Algorithm 1



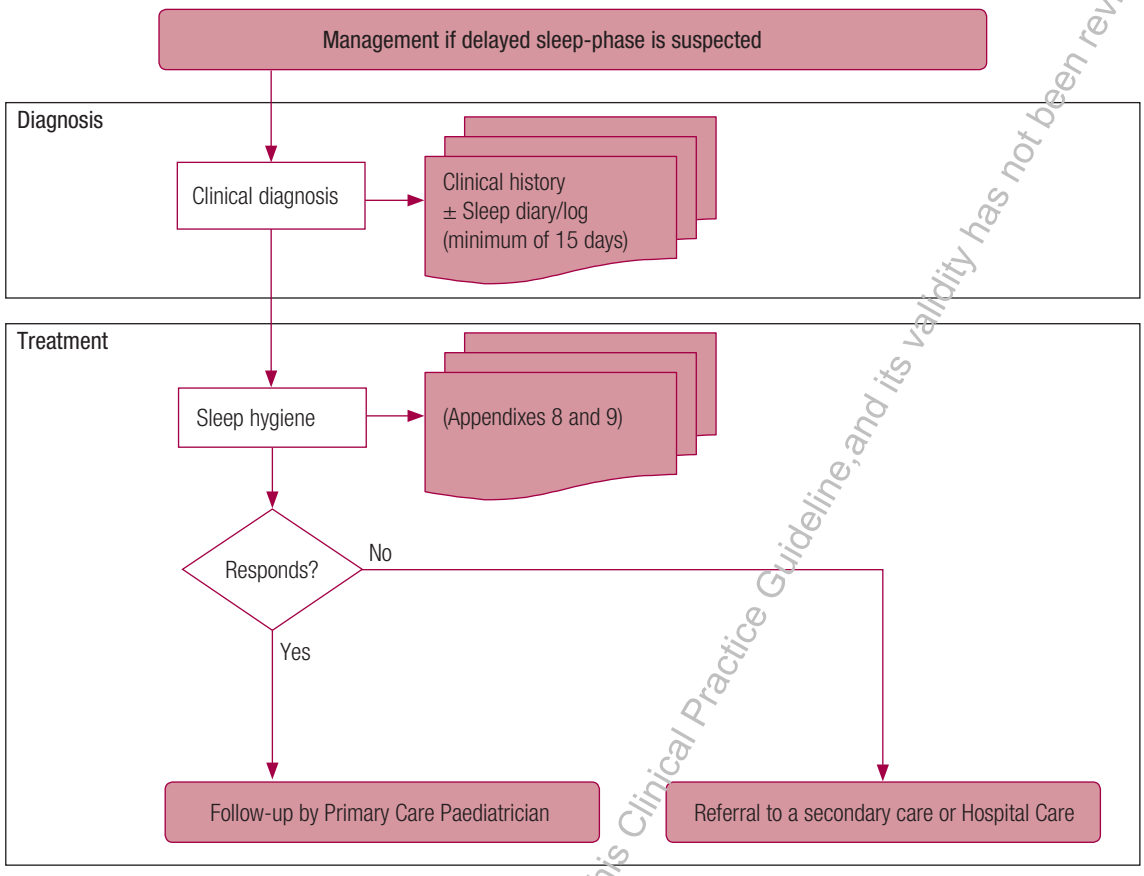
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9.2. Algorithm 2



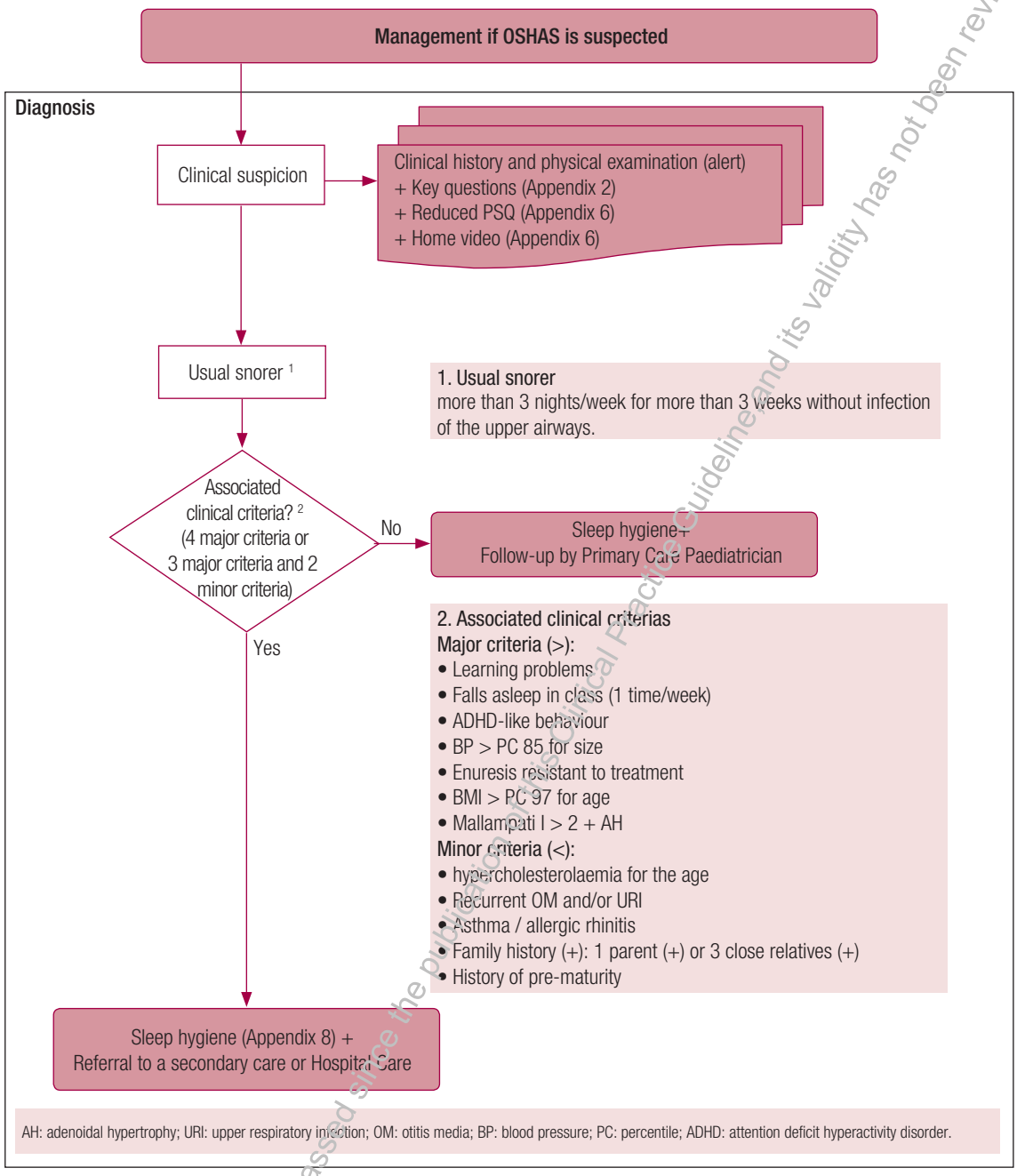
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9.3. Algorithm 3



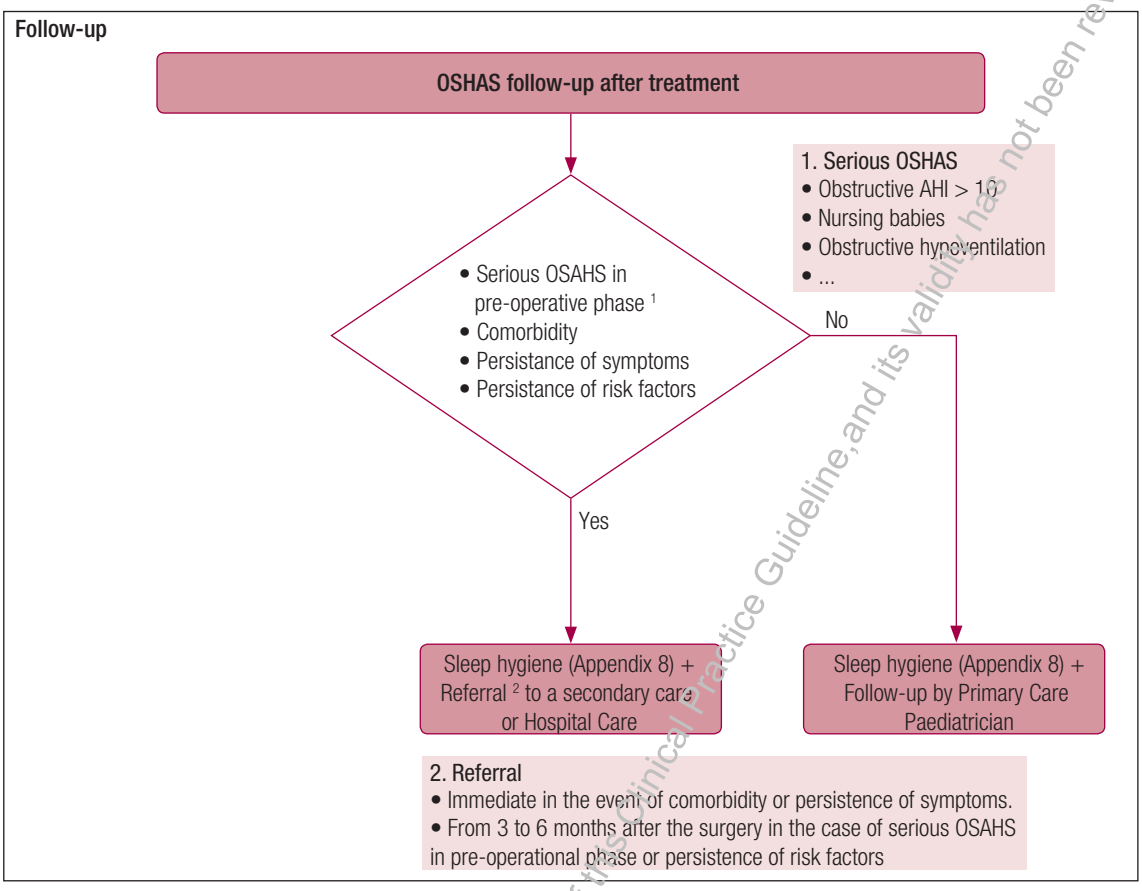
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9.4. Algorithm 4



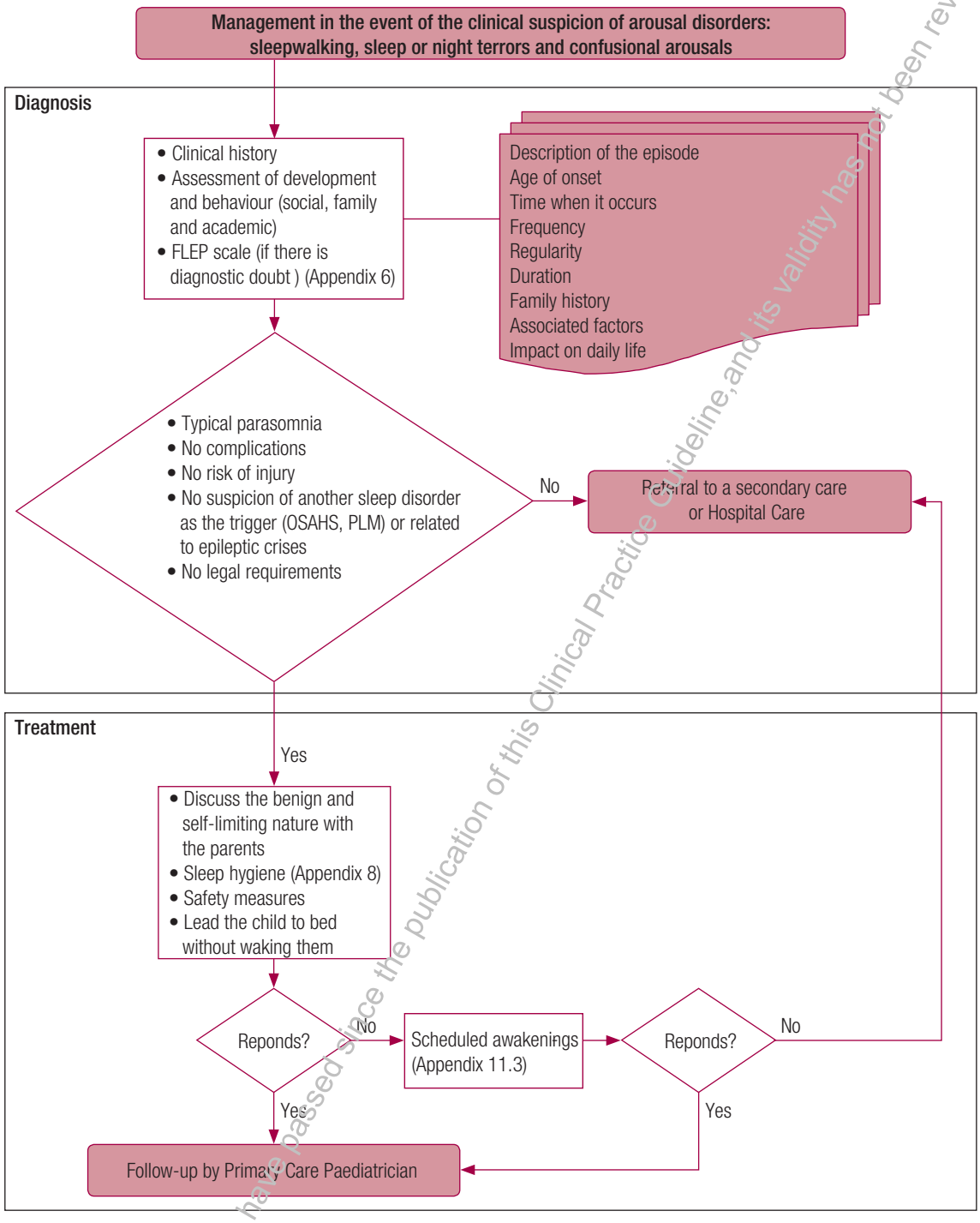
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9.5. Algorithm 4 (continued)



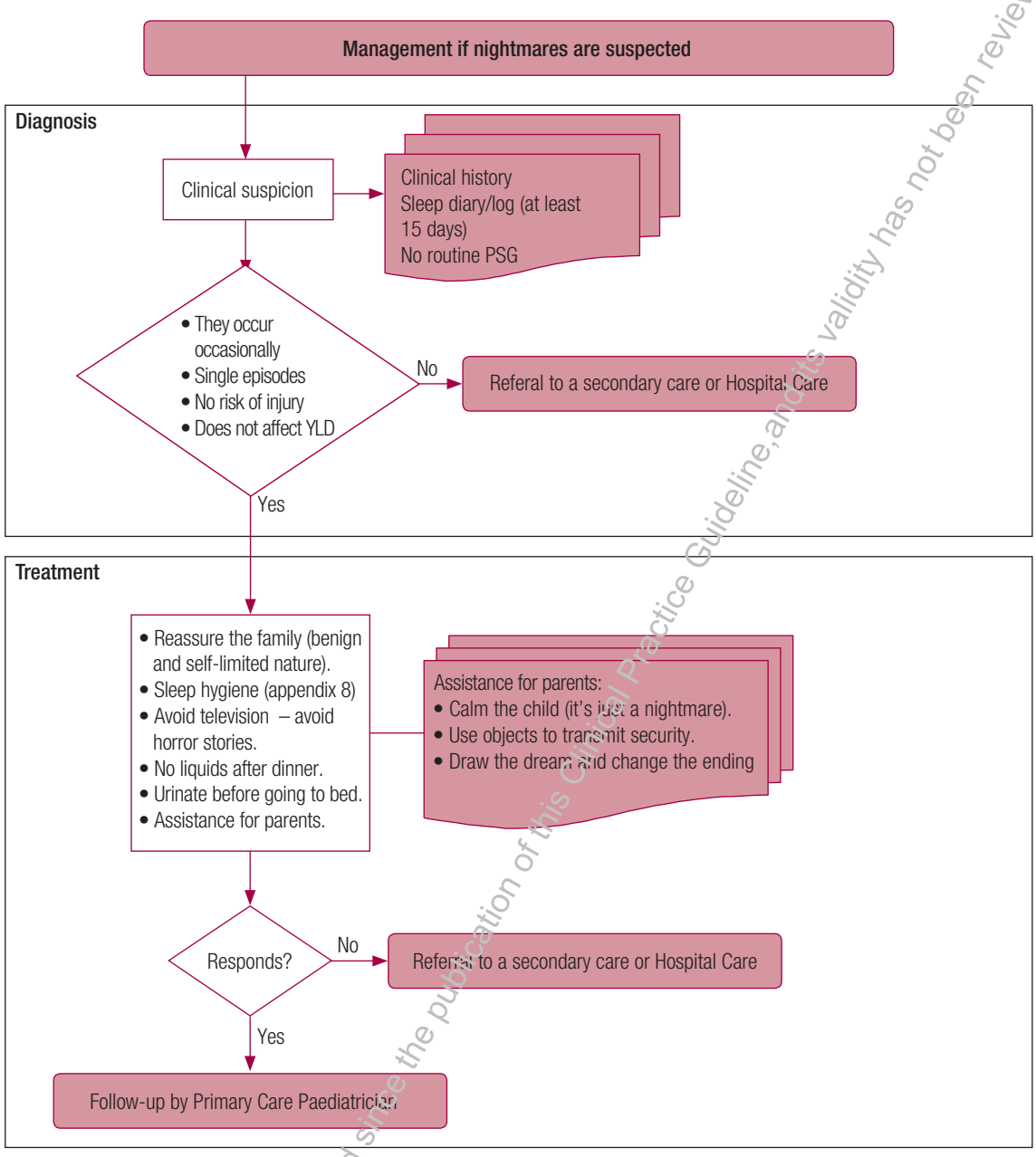
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9.6. Algorithm 5



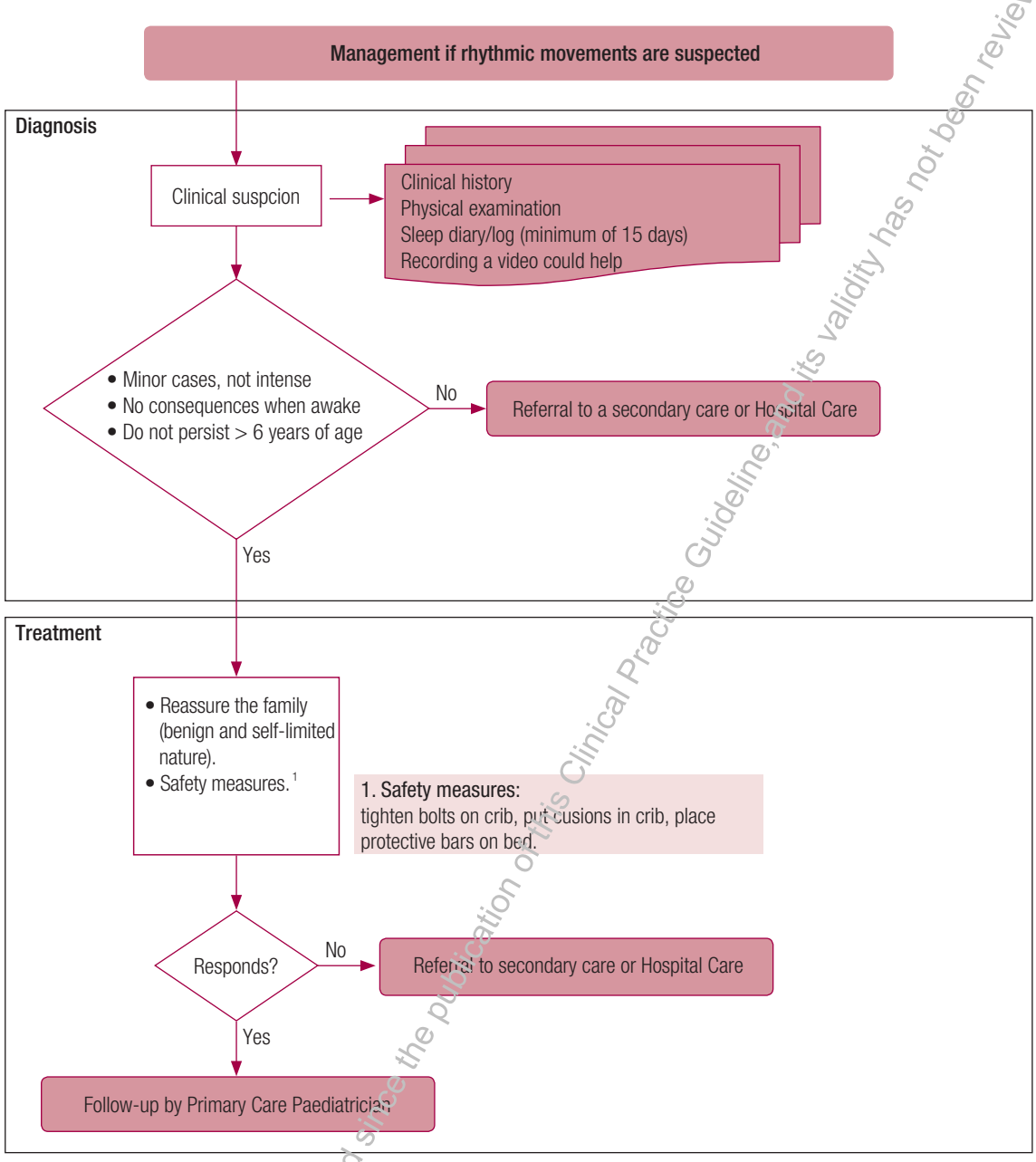
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9.7. Algorithm 6



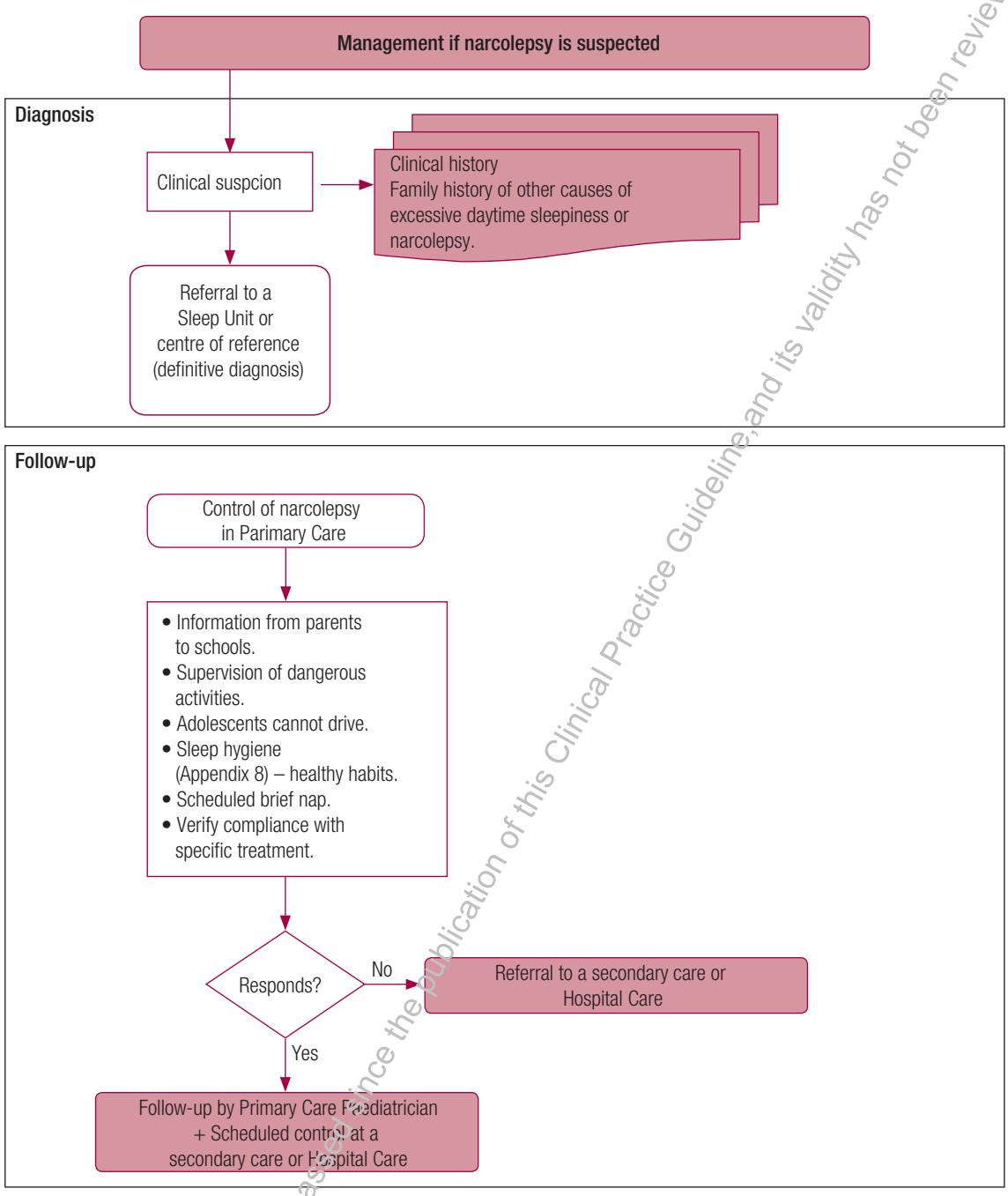
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9.8. Algorithm 7



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9.9. Algorithm 8



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10. Dissemination and implementation

- What is the strategy for disseminating and implementing the guideline?
- What are the indicators for monitoring the key recommendations?

10.1. Dissemination and implementation strategy

Clinical Practice Guidelines are useful for improving the quality of care for and outcomes in patients. The great challenge today is to get professionals to adhere to them. An implementation strategy directed at overcoming the barriers that exist in the environment where they are going to be applied is fundamental.

The plan for implementing the *Clinical Practice Guideline for Managing Patients with Sleep Disorders in Childhood and Adolescence in Primary Care Health Centers* includes the following interventions:

- Presentation of the guideline to the media by health authorities.
- Presentation of the guideline to the directorates and sub-directorates of Primary Care Health Centers and HospitalCare of the various regional health services.
- Institutional presentation of the guideline, in cooperation with the Quality Agency of the Ministry of Health, Social Policy and Equality, to the various scientific societies, patient associations and professionals involved.
- The informative material prepared for the patient will be highlighted in all presentations, thereby favouring distribution of the material among all health professionals and, in turn, among parents/caretakers and children/adolescents with this health problem.
- Effective distribution directed at the professional groups involved (paediatricians, family physician, nurses and social workers in Primary care; child neurologists, psychiatrists, neurophysiologists, psychologists, respiratory specialists and otolaryngologists) to facilitate dissemination.
- Interactive presentation of the guideline at health centres by local opinion leaders.
- Distribution of the guideline in electronic format on the web pages of the Ministry of Health, Social Policy and Equality; of GUIASALUD; of the UETS; and of the scientific societies and patient associations involved in the project.

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- Publication of the guideline in scientific journals.
- The establishment of good care criteria for a child/adolescent with sleep problems in programme contracts and clinical management contracts, as it is established in the guideline.
- Evaluation of the effectiveness of implementation by establishing support systems for clinical decisions, thereby integrating the guideline and the indicators selected in the computer programme used in Primary Care Health Centers.

10.2. Proposal of indicators.

A series of indicators have been designed, which it must be possible to measure through the information system in Primary Care Health Centers, for the purpose of evaluating both the healthcare given to a paediatric patient (and their parents/caretakers) who has suffered from a sleep problem/disorder and the possible impact from having implemented the guideline. The purpose has not been to design a comprehensive and detailed evaluation that involves using all the proposed indicators. The intention is to provide a tool for any interested clinics and managers, which can be useful for specifically designing an evaluation of the care given to paediatric patients with sleep disorders in Primary Care Health Centers.

Two types of indicators are proposed:

- **Activity indicators:** This battery of indicators attempts to follow up on the distribution of patients and on use of evaluation tools in PC.

Evaluation criterion	Activity indicators
1. Screening of sleep problems.	• Number of children/adolescents on whom sleep problems have been screened.
2. Suspicion of sleep problems.	• Number of episodes of suspected sleep problems handled in PC.
3. Use of the sleep log/diary.	• Percentage of patients, suspected of sleep problems, who were evaluated using a sleep log/diary.
4. Follow-up.	• Percentage of patients with sleep disorders who are in follow-up in PC.
5. Referral to Hospital Care.	• Percentage of patients with sleep disorders followed-up on in PC who are referred to a secondary care or Hospital Care due to a complication/injury/secondary effect.

- **Compliance indicators:** They are based on the recommendations proposed in this guideline and therefore on the available scientific evidence and on the consensus of professionals. Even though the proposed standards of compliance should be 100% (or 0% in some other cases), the reality of the PC context has been taken into account when establishing said standards

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Good Care criterion	Compliance indicators	Standard
1. Screening of sleep problems.	• Percentage of children/adolescents in whom sleep problems have been screened using the BISQ/BEARS scales in PC.	90%
2. Clinical diagnosis (suspicion).	• Percentage of patients with a suspected diagnosis of sleep disorders who follow the clinical criteria of the guideline.	85%
	• Percentage of patients, suspected of sleep disorders, who were evaluated according to the recommendations of the guideline.	90%
3. Management of sleep disorders in PC.	• Percentage of patients diagnosed with any of the sleep disorders included in the guideline (except PLM) in whom sleep hygiene practices had been initiated in PC.	100%
	• Percentage of patients diagnosed with any of the sleep disorders included in the guideline and without complications, who were referred to a secondary care or Hospital Care.	10%
	• Percentage of patients diagnosed with insomnia due to poor sleep hygiene or behavioral insomnia who received treatment in PC with sleep hygiene practices and psychological interventions.	90%
	• Percentage of patients suspected of OSAHS who were referred and who meet the associated clinical criteria.	90%
	• Percentage of patients with sleep disorders, nightmares or typical and slight rhythmic movements who are referred to a secondary care or Hospital Care.	10%
	• Percentage of patients with RLS and serum ferritin figures < 35 ug/l who received treatment with oral Fe in PC.	90%
4. Follow-up in PC.	• Percentage of patients with serious OSAHS in the preoperational phase (constructive AHI > 10, nursing babies), comorbidity, the persistence of symptoms or FR who were referred to a secondary care or Hospital Care.	90%
	• Percentage of patients with narcolepsy in whom compliance with the specific treatment in PC is verified.	90%
	• Percentage of patients with narcolepsy in follow-up in PC who are referred for scheduled control to a secondary care or Hospital Care.	90%

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11. Future lines of research

11.1. Epidemiology of sleep disorders

Additional studies that contribute information about sleep habits and the prevalence of disorders in childhood and adolescence must be conducted.

Prevalence studies that take objective measures into account are also necessary. For example, when the sleep time is evaluated in children from 6 to 11 years of age through questionnaires of the parents, the latter generally over-estimate the total sleep time and the sleep latency. Studies that objectively quantify the fragmentation of sleep are also needed.

Moreover, specific studies about the aetiology of these disorders, thereby focusing on the causality of the associations that could exist, are needed.

11.2. General assessment and diagnosis

Studies focussed on diagnosis and on the evaluation tools of sleep disorders must be conducted. Instruments that are validated in our context and that can cover the child and adolescent population of different age groups and stages of development are needed for diagnosing these disorders in order to identify the risk population, evaluate the severity and evaluate the evolution of the disorders.

It is also clear that there is a limited ability to measure the impact that these disorders have in daily functioning in general and in family functioning specifically. It must be kept in mind that daily functioning varies with age; for example, children tend to show hyperactivity and adolescents tend to show daytime sleepiness. This complicates the development of evaluation instruments. As a first step, however, the instruments that are validated for subjective measurements of adults could potentially be modified to reflect the various symptoms that are present in younger patients. Research on these modified scales could increase the value of the information resulting from paediatric clinical trials.

11.3. Therapeutic interventions

Studies with a larger sample size must be conducted to determine the most effective sleep education and prevention models or programmes for parents, children and adolescents. Additional cost effectiveness studies that assess the various parent education programmes are also needed.

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Research is required to assess the efficacy of using sleep hygiene practices applied as both monotherapy and as adjuvants of other therapeutic interventions.

More short- and long-term research that makes a direct comparison between the various psychological therapies for insomnia is required. Studies that compare the effectiveness of a single therapy versus all others or the superiority of a combination of techniques versus using just one technique are also needed.

Studies that compare structured treatment programmes with different durations must be conducted to be able to establish conclusions about the optimum duration of psychological treatment. They should also provide follow-up on the effectiveness of this type of treatment in the long term.

Studies that directly explore the appearance of secondary effects through participation in psychological therapy programs are also needed.

There is also a need for information about adherence to treatment with psychological interventions for insomnia to succeed in getting parents to be able to put them into practice with their children.

Randomised, double blind RCTs of a greater sample size and of high quality are needed, with follow-up of a longer duration, to investigate the efficacy and safety of pharmacological interventions for treating insomnia in childhood and adolescence.

Comparative studies of a larger sample size that study the activity of nutritional supplements for treating paediatric insomnia are needed.

Therefore, RCTs that assess the sedative activity of a plant or combinations of plants for childhood and adolescent insomnia are needed.

Randomised, double blind RCTs of a greater sample size and of high quality are needed, with follow-up of a longer duration, to investigate the efficacy and safety of using white noise for treating paediatric insomnia.

Randomised RCTs of a greater sample size and of high quality in the paediatric population are needed, with follow-up of a longer duration, to investigate the efficacy of conducting physical exercise programmes for treating RLS in the paediatric population. In addition, more RCTs are needed in the paediatric population with RLS to determine the effectiveness and optimum duration of therapy with iron.

More RCTs are needed to determine the effectiveness of phototherapy or bright light therapy for treating DSPS in children. More RCTs are also needed to determine the effectiveness of chronotherapy for treating paediatric DSPS.

It has been verified that more RCTs must be conducted, both short- and long-term and with the pertinent declarations of interest, to evaluate the use and safety of melatonin in the paediatric population, especially in children under the age of 3.

There is also a need for studies in the paediatric population regarding safety and efficacy in treatments for narcolepsy.

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12. Appendixes

Appendix 1. Physiology of sleep

Features of sleep

Sleep is a biological state that is present in animals and human beings, and it is defined according to behavioral and physiological features.

Behavioral features: during sleep, there is an absence or a decrease of voluntary body movements, and a stereotyped posture of rest is adopted, which is different in each animal species. Before sleep, we look for a safe and calm place, adopting a comfortable posture that helps us to get to sleep and in an environment without noise. Moreover, there is a limited response to low-intensity, external stimuli, which is reversible (unlike a coma).

Physiological features: in 1929, the psychiatrist Hans Berger developed the electroencephalogram (EEG), which allowed recording brain activity and its diverse variations through the scalp[430]. Brain electrical activity is shown in the EEG trace, which identifies four types of biological rhythms characterised by their frequency, topography and reactivity: alpha rhythm (8-13 Hz, located in posterior regions, during the calm wake state and with the eyes closed), beta rhythm (above 13 Hz, appearing in the frontal areas and in the active wake state), theta waves (4-7.5 Hz) and delta waves (≤ 3.5 Hz).

In 1937, Loomis *et al*. observed typical changes in the brain's electrical activity during sleep and an increase in the proportion of slow waves as sleep became deeper, which allowed the first classification of sleep phases to be established (stages A, B, C, D and E)[83].

In 1968, Rechtschaffen and Kales[83] established criteria that facilitate the study of changes of the brain's electrical activity during sleep. Up to a few years ago, these criteria had been used in all sleep laboratories in the world. By recording the fundamental biological signals (EEG, EMG and EOG), it is possible to identify sleep phases and wake episodes. Recently, these criteria were revised by expert committees of the AASM, thereby establishing recommendations that were published in 2007[82].

There are two, well-differentiated types of sleep: Rapid Eye Movement sleep, known as REM sleep or paradoxical sleep, and slow-wave sleep, also known as Non-REM (Non Rapid Eye Movement) sleep, as opposed to REM sleep[176].

Slow-wave or Non-REM sleep consists of stage N1 (previously called 'stage 1 NREM'), stage N2 (previously called 'stage 2 NREM'), and stage N3 (previously called stages 3 and 4 of NREM sleep or deep sleep). In this stage of sleep, we observe an absence of rapid eye movements, muscular quiescence and regularity, with a slow pulse and respiration, a reduction of blood pressure and a lower threshold of alertness than in REM sleep. There are also dreams in NREM sleep, which are described as *pleasant or unpleasant sensations*.

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In the REM sleep stage, we observe rapid movements of the eyes and of the small facial muscles. In this stage, an increase and irregularity of the pulse, breathing and blood pressure are also characteristic. In males, penile erections are related to episodes of REM sleep. This stage has been called 'paradoxical', because it is when we observe maximum muscle relaxation and the maximum threshold of alertness, with a light sleep according to EEG criteria (with brain activity similar to the active wake state). This is the sleep period during which the most 'cinematographic' dreams occur, although it's often not possible to remember the content.

During the first three months of life, three types of sleep are distinguished: **active sleep**, equivalent to REM sleep in an older child or adult; **quiet sleep,** equivalent to NREM sleep in an older child or adult; and a third type of sleep called **indeterminate sleep,** which does not meet the EEG characteristics of either active sleep or quiet sleep. In neonates, active sleep occupies up to 60% of sleep and precedes quiet sleep.

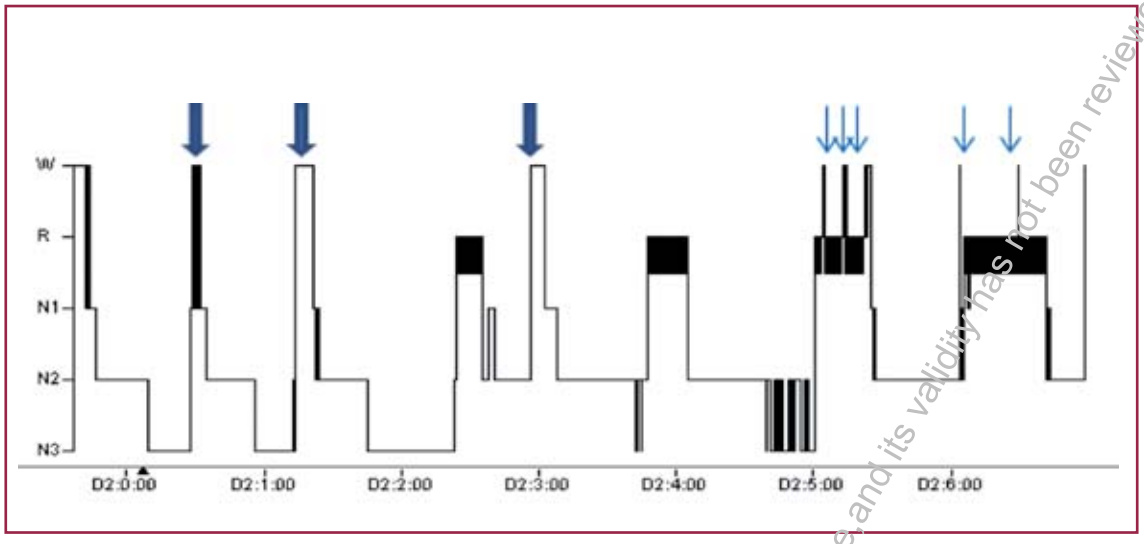
As from the age of two months, we could start talking about 'NREM sleep', which at this age occupies the majority of sleep and precedes REM sleep. REM sleep, which is very abundant in the first few weeks of life, decreases over the years. In older children, at the start of the night there is a greater proportion of deep sleep (N3), while REM sleep is much more abundant during the second half of the night. In pre-adolescents, in objective terms, there is a delay in the onset of sleep physiologically, and years later, in adolescence, deep sleep is less abundant than in previous years.

During the course of the night, a child shows various sleep cycles, meaning sequences of NREM sleep (quiet sleep in neonates) and REM sleep (active sleep in neonates). In children over 2-3 months of age –when we can now talk about 'NREM sleep' and 'REM sleep'– the sleep cycle is characterised by one complete episode of NREM sleep (N1, N2, N3) followed by an episode of REM sleep, and the duration is variable according to the age: about 50-60 minutes in a neonate (in this case, the cycle is characterised by 'active sleep' followed by an episode of 'quiet sleep'); while in children over 3 months of age, the NREM sleep-REM sleep cycle lasts 60-70 minutes; and in children over 3 years of age, it lasts 80-90 minutes.

The graphic representation of the chronological organisation of the different stages of sleep throughout the night is what is known as a hypnogram (see Figure 5).

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Figure 5. Hypnogram of normal sleep in a 6-year old child



Note: The abscissas represent the day/night times, and the ordinates represent the various stages and phases of sleep (from the top down: wake-W, REM-R, N1, N2, N3 sleep). The episodes of REM sleep are marked with a black bar, and nocturnal awakenings are indicated with an arrow (the bold arrows indicate awakenings of more than 1 minute in duration).

In order to be able to correctly identify the phases of sleep, it is essential to run at least one simultaneous record of the electroencephalogram (EEG) of the muscle tone or an electromyogram in the axial muscles, in the area of the chin or the submental region (EMG) and of the eye movements or an electro-oculogram (EOG)[309]. Other, complementary tests used in some sleep records are the following, for example: the ECG to detect alterations of the cardiac rhythm, an electromyographic record in the tibialis anterior muscles to record periodic movements of the legs or oxygen saturation, the oronasal air flow, the thoraco-abdominal breathing effort to detect apneas or hypopneas, etc.

The proportion of each stage of sleep in relation to total sleep undergoes variations throughout life. In the neonatal period, the transition from wake to sleep takes place in the REM phase (active sleep), which represents 60% of the sleep time. The REM-Non-REM cyclical alternation happens every 50-60 minutes, linked into groups of 3 or 4 cycles that are separated between each other by periods of wakefulness and that have no circadian distribution. The number of hours of sleep at this age is around 16. In childhood, the quantity of sleep of slow waves is maximum, decreasing to close to 40% in the second decade of life.

The majority of the functions of almost any living system has a rhythm of approximately 24 hours, which is known as a circadian rhythm (from the Latin *circa*, which means 'almost', and *dies*, which means 'day'). Some environmental stimuli have the capacity to activate the biological rhythms. Light is the main external agent, although social stimuli also act at this level.

In 1972, it was demonstrated by Stephan and Zucker and by Moore and Eichler that a small region of the hypothalamus, the suprachiasmatic nucleus (SCN), is where the circadian clock (*biological clock*) is located. These *internal clocks* are also influenced by external synchronisers or *zeitgebers* (such as light, temperature, etc.). Light is the main modulating agent of the SCN through melatonin, synthesised in the pineal body.

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Some rhythmic biological phenomena have a shorter period than circadian rhythms, and they are known as 'ultradian rhythms'. Their periods cover from a few minutes to hours (the term 'ultra' designates a greater frequency). Eating, sleep cycles and the release of hormones have ultradian rhythms.

There are circadian rhythms that have a duration of approximately 24 hours. The wake-sleep cycle is a circadian rhythm, and the nature of the alternation between REM sleep and NREM sleep is ultradian. The internal nature of circadian rhythms involves the existence of physiological mechanisms in charge of generating and maintaining the body's time organisation.

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Appendix 2. Key questions

Appendix 2.1. Key questions that may lead to the suspicion of sleep disorders

DURING THE DAY…

- Does the patient perform poorly in school?
- Is the patient hyperactive?
- Does the patient have a behaviour disorder? Is the patient aggressive?
- Does the patient have frequent accidents?
- Does the patient have growth pains?
- Does the patient have morning headaches?
- Does the patient have a deficient weight-to-height ratio?
- Does the patient have excessive daytime sleepiness (over 5 years of age)?
- Does behaviour improve if the patient sleeps more?

DURING THE NIGHT…

- Does the patient have frequent awakenings (3-5 episodes/night, more than 3 nights/week) (older than 1 year)?
- Does the patient take longer than half an hour to fall asleep? Does the patient cry?
- Does the patient snore at night?
- Does the patient have respiratory pauses?
- Does the patient breath through the mouth?
- Does the patient have difficulty waking up in the morning?
- Is the patient excessively irritable upon waking?

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Appendix 2.2. Questions that may be useful for a detailed assessment if an arousal disorder is suspected

Description of the event to help distinguish between arousal disorders, nightmares, REM-sleep behaviour disorder and nocturnal seizures:
At what age did the episodes begin?
What happens during the episode?
How long after the child goes to sleep does the episode occur? How long does the episode last?
Does the child remember the episode the next day?
What is the child's response to stimuli during the episode?
How frequently does it occur?
Has the child ever walked during an episode?
Has the child ever hurt himself or others during an episode?
Sleep-wake routines to determine if sleep deprivation is a contributing factor:
What is the child's bedtime routine?
Does the child have access to technologies (TV, computer, video games, MP3 player, cell phone) during the night?
What time does the child wake up on weekdays? On weekends? How long does it take the child to go to sleep?
After falling asleep, how many times does the child wake up?
Does the child take a nap or fall asleep during the day?
Does the child take caffeine?
On average, how many hours does the child sleep per 24-hour period?
Evaluation of potential triggers and associated disorders:
Does the child snore?
Does the child have pauses when breathing?
Does the child complain of odd feelings in the legs that are increased with rest and relieved with movement? Does the child kick while sleeping?
Has the child been diagnosed with any other sleep disorder or developmental or behavioral disorder? Does the child currently have any infectious disease or any fever?
Does the child suffer from frequent migraines?
Does the child have anxiety or depression?
Are there any potential stressors?
Is the child taking any medications or illicit drugs?
Evaluation of daytime consequences:
Does the child have any problems with attention or learning?
Does the child have problems with behaviour or mood?
Does the child appear hyperactive or excessively sleepy?
Evaluation of the genetic association:

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Does any member of the family suffer from sleepwalking or night terrors?
Is there anyone in the family who snores or suffers from obstructive sleep apnea?
Is there anyone in the family with restless legs syndrome?
Is there a medical history of epilepsy in the family?

Modified from *Principles and practice of pediatric sleep medicine*, 2005[309].

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Appendix 3. Nomenclature used by nursing in Primary Care Health Centers to assess sleep in children

An assessment of Functional Patterns can structure the clinical interview (see Table 30) for detecting sleep-related problems. This assessment can be completed by the questionnaires previously mentioned in the guideline.

Table 30. Assessment of Functional Patterns

Perception of health:

- How they describe their health.
- Knowledge about sleep and habits for sleeping.
- What have they done to manage it.
- Use of drugs (prescribed or self-medication) and/or products (health food stores, para-pharmacies, etc.).
- Use of oral devices during sleep (pacifier, finger, etc.).

Nutritional:

- Pattern of daily food and drink intake (intake at night, use of bottles, number of nighttime breastfeedings, etc.).
- Intake of substances that might affect sleep (in breastfed babies, substances that the mother takes can affect the baby's sleep, etc.).

Elimination:

- Enuresis.

Activity/exercise:

- Description of usual daytime activities.

Rest/sleep:

- Usual rest pattern.
- Number of awakenings at night.
- Difficulties with respect to sleep.
- Where, with whom and how the child sleeps.

Self-perception (referring to the child or the family):

- The thing that concerns them the most.
- What are the objectives with respect to the current situation.

Role/relationships:

- Assess the family and social life. Adaptation/stress:
- Recent changes in their life.
- There is something that they would like to change in their life.
- How they manage or have managed other stressful situations.

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Based on this assessment, it is possible to detect alterations that provide orientation for the nursing diagnosis and for being able to prepare a care plan.

As stated in Chapter 5, the NANDA classification (International Classification of Nursing Diagnosis) includes the diagnosis of sleep disorders in its classification, thereby providing their defining characteristics and related factors (see Table 30).

The Nursing Interventions Classification (NIC) and the Nursing Outcomes Classification (NOC) with respect to sleep are presented below (Table 31).

Table 31. NIC and NOC classification

NOC	
0004-Sleep: magnitude and pattern of natural periodic suspension of consciousness during which the body is restored. Indicators: • Sleep habit. • Sleep pattern. • Nap appropriate for the age. • Uninterrupted sleep. • Sleep quality.	Assessment scale: 1. Seriously compromised. 2. Substantially compromised. 3. Moderately compromised. 4. Slightly compromised. 5. Not compromised.
NIC	
1850 – Sleep enhancement: facilitation of regular sleep-wake cycles. Include the patient's regular sleep-wake cycle in care planning. • Encourage the patient to establish a routine when going to bed in order to facilitate the transition from the wake state to sleep. • Facilitate the maintenance of the patient's usual routines when going to bed, signs of pre-sleep and familiar objects for children. • Adjust the ambience (light, noise, temperature, mattress and bed) to favour sleep. • Help to eliminate stressful situations before going to bed. • Help the patient to avoid foods and beverages that interfere with sleep when it is time to go to bed. • Discuss, with the patient and the family, technical comfort practices to favour sleep and changes in life style that might contribute to sleep. • Control participation in activities that cause fatigue while awake to avoid becoming excessively tired. • Teach the patient to perform autogenic muscle relaxation or other, non-pharmacological forms of inducing sleep. • Have available or carry out pleasant practices (massage, affectionate positioning or contact). • Promote an increase in the number of sleep hours if necessary. • Regulate stimuli from the environment to maintain normal day-night cycles. • Verify the patient's sleep scheme and observe the physical circumstances, obstructive sleep apnea, obstructed airways, pain and frequent irritation. 5240 – Counselling: use of an interactive help process centred on the needs, problems or feelings of the patient and their loved ones to promote or support the ability to resolve problems and interpersonal relations. 4360 – Behaviour modification. promotion of a behaviour change. 6040 – Relaxation therapy: Use of techniques to encourage and elicit relaxation for the purpose of decreasing undesirable signs and symptoms such as pain, muscle tension and anxiety.	

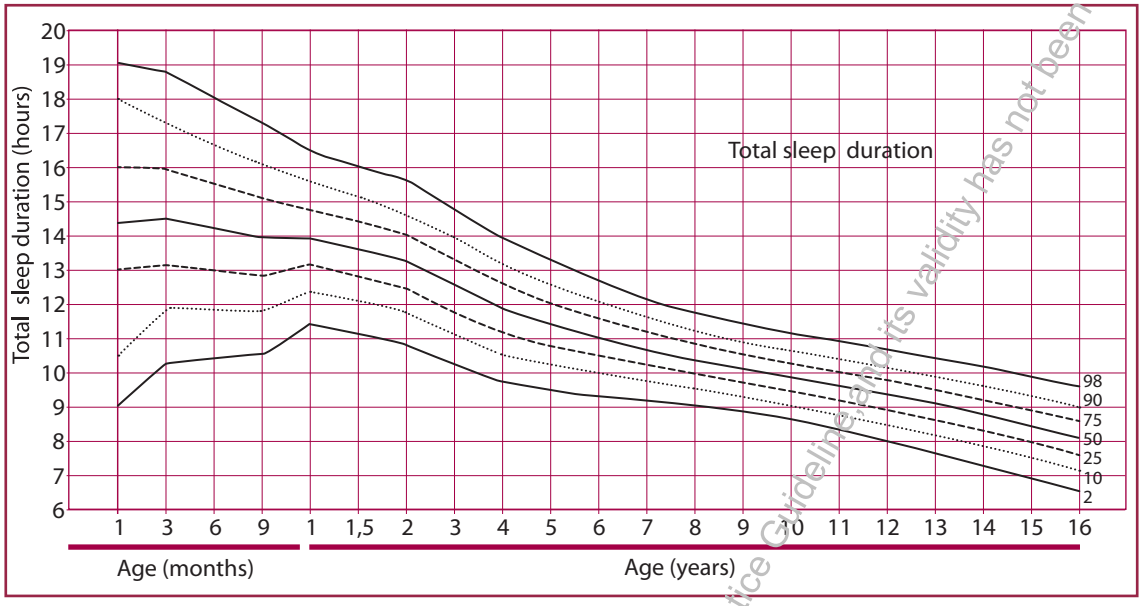
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Using the nursing diagnosis, together with the classification of outcomes (NOC) and of nursing interventions (NIC), allows the following:

- Standardising the interventions that professionals perform.
- Conducting follow-up whereby it is possible to quantify the evolution of the problem using certain indicators.

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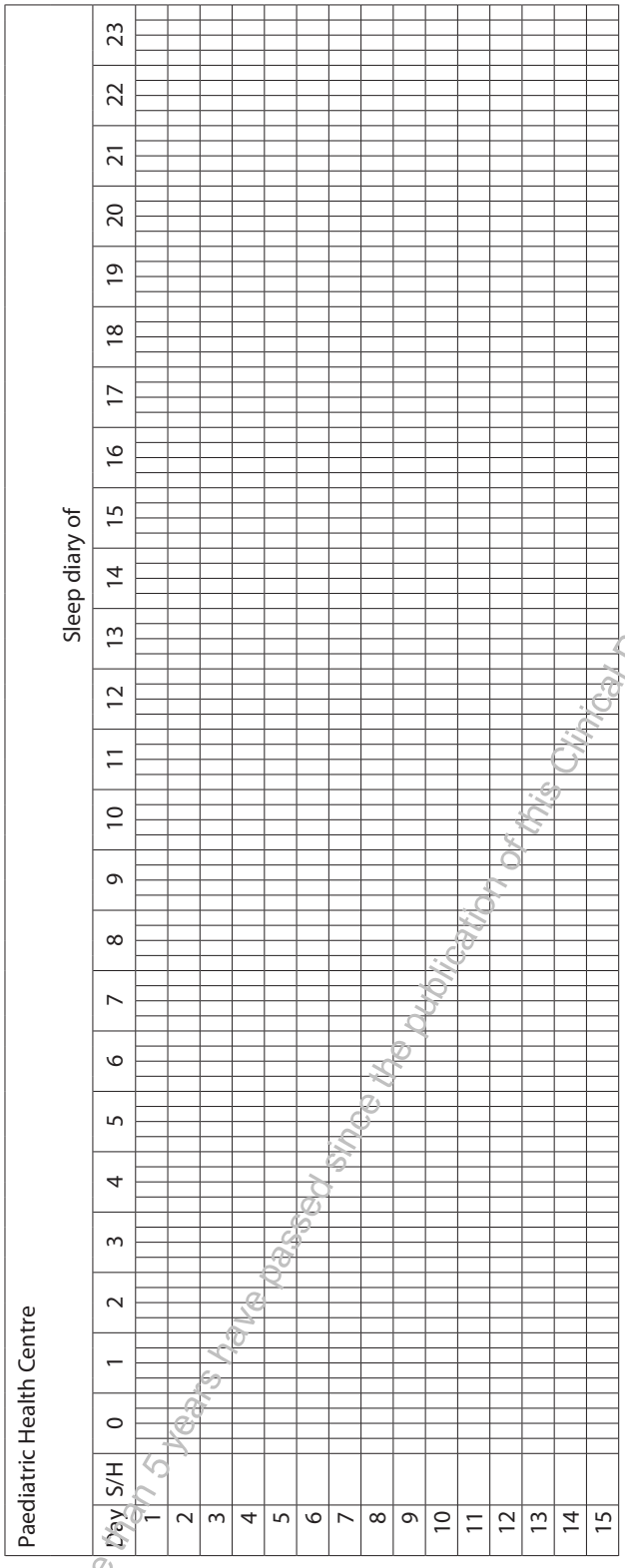
Appendix 4. Percentiles of total sleep duration in 24 hours, from childhood to adolescence



Modified from Iglowstein I. *et al*. *Pediatrics,* 2003[85].

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Appendix 5. Sleep-wake log/diary



Fill in the hours when the patient is sleeping ▭ and leave blank ▭ when awake. Mark with a downward arrow ↓ when the patient is put to bed and with an upward arrow t when the patient gets up. S/H: Sundays or holidays.

Example: sleeps until 4 in the morning. Wakes up at 4 and goes to bed at 4:15. Remains awake until 5:30, and then falls asleep until 9 At nine, gets up. At 15:00 hours is put down for a nap, falling asleep at 15:15, waking up at 16:30. Put down to bed at 20:30, sleeping from 21:00 to 23:00. From 23:00 to 0:00, remains awake.

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Appendix 6. Measurement instruments (scales) of paediatric sleep problems.

BISQ[102,103]. Brief Infant Sleep Questionnaire. Adapted from Sadeh, A.

You must give only one response, the one that seems the most appropriate.

Name of the person filling out the questionnaire.

Relationship with the child.

Date:

Name of the child:

Date of birth:

Boy ☐ Girl ☐

Sleeping arrangement: ☐

Infant crib in a separate room. ☐

Infant crib in parents' room. ☐

In parents' bed. ☐

Infant crib in room with sibling. ☐

Other ☐ (specify):

How much time does your child spend in sleep during the NIGHT (between 7 in the evening and 7 in the morning)?

Hours: Minutes:

How much time does your child spend in sleep during the DAY (between 7 in the morning and 7 in the evening)?

Hours: Minutes:

How much time during the night does your child spend in wakefulness? (from 12 in the evening to 6 in the norming).

Hours: Minutes:

Average number of night wakings per night?

How long does it take to put your baby to sleep in the evening?

Hours: Minutes:

When does your baby usually fall asleep for the night?:

Hours: Minutes:

How does your baby fall asleep?

While feeding D ☐

Being rocked D ☐

Being held ☐

In bed alone ☐

In bel near parent ☐

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BEARS[104]. Childhood sleep disorder screening

The 'BEARS' scale is divided into five major sleep domains, thereby providing comprehensive screening for sleep disorders affecting children in the 2- to 18-year old range. Each domain has a question for each age group.

B = Bedtime problems

E = Excessive daytime sleepiness

A = Awakenings during the night

R = Regularity and duration of sleep.

S = Sleep-disordered breathing.

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

P: Questions directed at parents, C: ask the child directly.

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SDSC[105]: Sleep Disturbance Scale for Children. Bruni's Sleep Disturbance Scale for Children (modified)

1. How many hours of sleep does your child get most nights?				
1 9-11 h	2 8-9 h	3 7-8 h	4 5-7 h	5 < 5 h
2. How long does it take your child to fall asleep?				
1 < 15 m	2 15-30 m	3 30-45 m	4 45-60 m	5 > 60 m
For the questions below, use the following scale: 1 = never; 2 = occasionally (1-2 times a month); 3 = sometimes (1-2 times per week); 4 = often (3-5 times per week); 5 = always (daily)				
3. The child goes to bed reluctantly.				
4. The child has difficulty getting to sleep at night.				
5. The child feels anxious or afraid when falling asleep.				
6. The child startles or jerks parts of the body while falling asleep.				
7. The child shows repetitive actions such as rocking the head to fall asleep.				
8. The child experiences vivid, dream-like scenes while falling asleep.				
9. The child sweats excessively while falling asleep.				
10. The child wakes up more than two times per night.				
11. After waking up in the night, the child has difficulty falling asleep again.				
12. The child has frequent twitching or jerking of the legs while asleep or changes position often during the night or kicks the covers off the bed				
13. The child has difficulties breathing during the night.				
14. The child gasps for breath during sleep.				
15. The child snores.				
16. The child sweats excessively during the night.				
17. You have observed the child sleepwalking.				
18. You have observed the child talking in their sleep.				
19. The child grinds their teeth while asleep.				
20. The child wakes from sleep screaming.				
21. The child has nightmares which they don't remember the next day.				
22. It is difficult to wake the child up in the morning.				
23. The child awakes in the morning feeling tired.				
24. The child feels unable to move when waking up in the morning.				
25. The child experiences daytime somnolence.				
26. The child falls asleep suddenly in inappropriate situations.				
				Total

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Starting and maintaining sleep: questions 1, 2, 3, 4, 5, 10 and 11 Restless legs syndrome/Periodic limb movement disorder/Growth pains: question 12: Sleep breathing disorders: questions 13, 14 and 15. Arousal disorders: questions 17, 20 and 21. Sleep-wake transition alterations: questions 6, 7, 8, 12, 18 and 19 Excessive/deficient daytime sleepiness: questions 22, 23, 24, 25 and 26 Sleep hyperhidrosis: questions 9 and 16.
Cut-off line: 39
Start and maintenance: 9.9 ± 3.11 Restless legs syndrome. 3 Sleep-related breathing disorders. 3.77 ± 1.45 Arousal disorders: 3,29 ± 0,84 Sleep-wake transition alterations: 8.11 ± 2.57 Excessive sleepiness: 7,11 ± 2,57 Hyperhidrosis: 2,87 ± 1,69
Interpretation: The cut-off line is at 39. This means that if the sum of the scores of all the questions reaches this figure, it could be suspected that there is a sleep disorder, and the scores of each group of disorders has to be analysed. For each group, their cut-off score and the interval is indicated again to consider if the child could have this disorder.

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P.S.Q.[106,108] Pediatric Sleep Questionnaire. Chervin's Pediatric Sleep Questionnaire

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Instructions Please respond to the following questions related to the behaviour of the boy or girl, both when asleep and awake. The questions refer to the usual behaviour, not the behaviour necessarily observed in recent days, because it may not be representative if the child has not been feeling well. If you are not sure about how to respond to any question, ask us. Whenever the word 'usually' is used, it means that it occurs most of the time or more than half of the nights. We use the term 'child 'to refer to both girls and boys.			
Name of the child:			Date of birth
Age:	School year ☐		Date of the questionnaire
Questionnaire completed by	Mother ☐		Observations.
	Father ☐		
	Both		

Night-time behaviour and behaviour while sleeping	YES	NO	DK
While sleeping, does your child…			
1. ever snore?			
2. snore more than half the time?			
3. always snore?			
4. snore loudly?			
5. have 'heavy' or loud breathing?			
6. Have you ever seen your child stop breathing during the night?			
If yes, describe what happened: (at the end of the questionnaire)			
7. Have you ever been concerned about your child's breathing during sleep?			
8. Have you ever had to shake your sleeping child or wake them up to get them to breath?			
9. Does your child have restless sleep?			
10. Does your child have abrupt leg movements in bed?			
11. Does your child have 'growth pains' (pain of unknown cause), which get worse in bed?			
12. While your child is asleep, have you observed if he kicks with one or both legs?			
13. Does your child kick or have regular, rhythmic movements, for example every 20-40 seconds?			
14. Does your child sweat a lot, making pyjamas wet with perspiration?			
15. Does y our child get out of bed at night for any reason?			
16. Does your child get out of bed at night to urinate?			
17. If yes, on average, how many times does the child get up at night?			
18. Does your child normally sleep with the mouth open?			
19. Is your child's nose usually congested or 'stuffed' at night?			
20. Do any allergies affect your child's ability to breath through the nose?			
21. Does your child tend to breathe through the mouth during the day?			
22. Does your child have a dry mouth on waking up in the morning?			

Sivan's video score[280]

Instructions A video is recorded during 30 minutes of sleep. The recording is made of the bare thorax and abdomen of the child, with a sound register and without correcting the postures that occur (hyperextension of the neck to increase the diameter of the upper air way is common) and preferably in the later hours of the night –between 05:00 and 05:30 in the morning, because breathing obstruction events are more frequent in REM phases– or when parents observe that breathing noises are more intense.			
	1	2	3
Inspiratory noise	None	Weak	Loud
Type of inspiratory noise		Episodic	Continuous
Movements during sleep	No movements	Few movements (< 3)	Numerous movements (> 3)
Number of waking episodes	1 point for each episode		
Number of apnoeas	None-intermittent	Periodic	Continuous
Chest retractions	None-intermittent	Periodic	Continuous
Mouth breathing	None-intermittent	Periodic	Continuous

Interpretation: ≤ 5 = normal; 6-10 = doubts about OSAHS; ≥ 11 = OSAHS.

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FLEP Scale: Frontal Lobe Epilepsy and Parasomnias

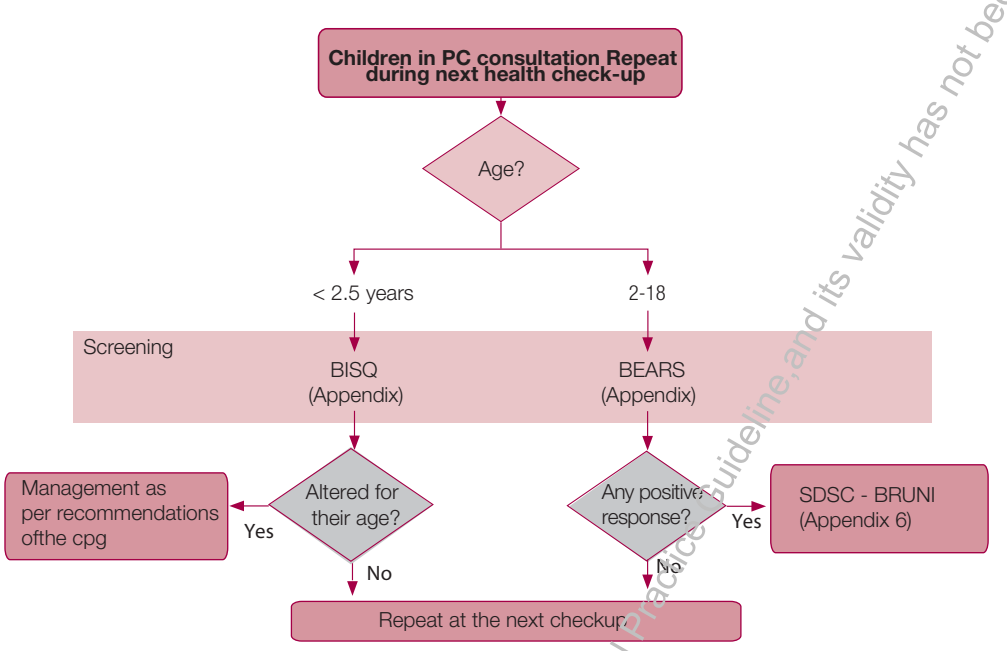
Clinical feature		Score
Duration of a typical event		
< 2 minutes		
2-10 minutes		0
>10 minutes		-2
Typical number of events occurring in a single night		
1-2		0
3-5		1
>5		2
Time of night when the events most commonly occurs		
First third (60-90 minutes)		-1
Others (including no pattern or at 20 minutes).		1
Symptoms		
Aura-associated event	yes	2
	no	0
The patient sometimes wanders outside the bedroom during the events.	yes	-2
	no (or certain)	0
Performs complex directed behaviours (dressing, picking up objects, etc.) during the event.	yes	-2
	no (or certain)	0
There is a clear history of prominent dystonic posturing, tonic limb extension or cramping during events.	yes	1
	no (or certain)	0
Stereotypy of the events		
Highly stereotyped		1
Some variability		0
Highly variable/unvertain		-1
Recall of the event		
Yes, lucid recall.		1
No or vage recollection only.		0
Vocalisation: the patient speaks during the events and recalls it.		
No		0
Yes, only sounds or single words.		0
Yes, coherent speech with incomplete or no recall.		-2
Yes, coherent speech with recall.		2
Total		

Scoring: > 3: Diagnosis of epilepsy very likely.
1-3: Diagnosis of epilepsy likely, more investigation required.
< 1: Diagnosis of epilepsy not very likely.

Modified from Derry *et al.*, 2006[319].

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Appendix 7. Schematic for using questionnaires to assess sleep in Primary Care Health Centers



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Appendix 8. Preventive and sleep hygiene strategies, according to age, for acquiring or maintaining a good sleep pattern

Appendix 8.1. Format for parents, caretakers and/or adolescents

Under the age of 2 months

- It is very important for the baby to remain awake while eating, given that he will thus begin to associate food with the wake state. It is fairly difficult to keep the baby awake, because he tends to fall asleep. Parents have to talk to him, caress him a little bit and stimulate him gently so that he maintains a certain alertness. It is recommendable for parents to feed the child in the same place whenever they can, with comfortable light, gentle background music and a pleasant temperature.
- It is very normal for some intervals between feedings to be shorter or longer. It doesn't matter. The same routines should be followed.
- After each meal, it is important to hold the baby awake in your arms for about 15 minutes. This will facilitate the elimination of gases and will possibly prevent some colic.
- After changing the baby, leave him in the crib, always attempting to leave the baby awake so that he learns to fall asleep on his own.
- These routines should be repeated every time that the child wants to eat during the day and at the nighttime feeding, except for the time when the child is held awake in your arms after feeding. This feeding will be shorter, only 5 minutes, because it is the feeding that the child will slowly do away with, thus being able to sleep more hours consecutively.
- It is advisable to keep feeding episodes at night short and uneventful. The intention is to send the initial message to the child that nighttime is for sleeping. When the child wakes up at night to feed, do not turn on the light, do not speak to the baby or lull him. Feed him soon and in silence. If you have to change his diaper, do so with the least possible amount of stimulus.
- It is very recommendable that the mother follow the same sleep times as the child. Thus will partially help to prevent post-partum depression. It has been demonstrated that one factor that causes this depression is the mother's lack of sleep when feeding her child.
- *Regarding sleep, it is important to know the following:*
    - *Crying is not the same thing as hunger.* During the first few months, crying is a baby's only means of communicating. It is important to know the types of cries to be able to deal with a baby correctly. When a child is hungry, the crying is energetic, and it slowly gets stronger and more rhythmic. Occasionally, a baby may hit himself in the cheek, bite his fist or suck on his fingers. When he feels pain, the first shriek is sharp and prolonged, followed by a long pause of apnea and short panting, followed by shrieking. If he has gas, he stretches and contracts his legs and arms. When the child feels alone, he begins with a whine, followed by complaining that ceases when the baby is picked up. When the baby is nervous, he cries strongly and does not respond to his parents' attempts to calm him. It is usually due to excessive stimuli, and this type of crying typically appears in the afternoon.

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- Avoid playing with the baby at night. Save this activity or any other that stimulates the baby (cuddling, caressing, etc.) for periods when the baby remains awake during the day.
- The baby should be placed in the crib when he is awake but sleepy. His last memory before going to sleep should be the crib and not the presence of food. The intention is for the baby to accept the crib as a familiar nighttime space.
- From the beginning, develop a pre-sleep routine (such as a bath-massage, a lullaby or any other routine and peaceful activity), which should end in the bedroom.
- However, it is not a good idea for the baby to fall asleep as soon as his head hits the pillow. Children take about 20-30 minutes to fall asleep. Parents should try not to be present during this period.

From 2 to 5 months

- Make the child's bedtime always the same. Using different routines could hinder development of the sleep habit.
- Do not wake a baby up at night to feed him. If he becomes restless, it's a good idea to wait 5 minutes to see if he's hungry. Before feeding him, the mother should try to lull him to sleep for a brief period. If it's necessary to feed him, the time during which breast feeding is offered or the amount of milk in the bottle should be reduced.
- At around 3 months, a decision should be made regarding the place where the child is going to sleep, and the appropriate changes should be made; for example, going from the bassinet to the crib or from the parent's bedroom to the child's own bedroom.

From 5 to 12 months

- During the first 8 months, it is common and normal for babies to wake up at night. He shouldn't be fed at night, given that at this age a healthy child no longer needs it, and you should try not to change the atmosphere by turning on a light or taking the baby out of the crib. The child should be consoled with caresses and tender words.
- The baby can be given a transitional object, such as a stuffed animal or a safe toy to be his companion in the crib.
- The bedroom door should be left open.
- Every day, carry out and complete the pre-sleep routine that you have established (bath, pyjama, song-story or any other routine and peaceful action that works for you), which should end in the child's bedroom.
- Be sure to place the child in the crib or bed while he is sleepy but still awake in order to give him the opportunity to learn to fall asleep on his own.

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As from 12 months

- The atmosphere should be peaceful and dark.
- The bedroom temperature should be comfortable: excess heat or cold favours waking up at night.
- Ambient noise should be the minimum possible.
- The daily bedtime should be approximately the same every day. The daily wake time should be approximately the same every day.
- Avoid putting the child to bed if he is hungry. However, an excess of liquids favours waking up at night.
- The child must learn to fall asleep on his own, without help. If he throws tantrums, don't pay attention. Parents should leave the bedroom, and if he gets up, he should be put to bed immediately, and you should avoid talking to him. Above all, the parents' attitude must be firm: you must always do the same thing and be certain that this is what has to be done.
- The message must be sent that the child is being taught to go to sleep, on his own, and this isn't any type of punishment or dispute between the parents and the child.
- Vigorous physical activity should be avoided 1-2 hours before putting the child to bed.
- Certain foods should be avoided, such as cola beverages, chocolate, etc.
- Very long or late naps should be avoided.
- Remember that the routine prior to bedtime should end in the child's bedroom. Completing this routine every day, the same way, helps the child to feel secure and to predict and anticipate what is expected of him.

At 2 years of age

- When the child complains or cries at night, you should think about what has happened during the day. Do not shout at the child; he should be secure in the fact that his parents are there to calm him down if necessary.
- Parents should not impose upon themselves any time limit for managing to get a child to sleep well. It probably won't happen, and there will be even more stress. You should limit yourselves to following the routines.
- Don't lose control when a child wakes up in the middle of the night. Parents must send the message that the child is capable of falling asleep on his own. If parents get upset, the child will just get even more agitated.
- If there has been any recent change in the child's life, he shouldn't be expected to sleep deeply.
- If he is allowed to sleep outside the bed, it won't help him at all to learn how to fall asleep on his own.

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- Parents must understand that, by sleeping in their bed, a child's sleep physiology is altered, in addition to the parents'. The sleep of older children who sleep with their parents is less restorative and involves a greater risk of asphyxia.
- The breast, bottle or pacifier might seem very useful for falling asleep, but the child will just end up needing them whenever he has to go to sleep and whenever he wakes up.
- Establish clear limits (number of stories, songs, etc.) if the child complains or objects when left alone.
- A couple should take turns: they will rest more, and the child will not be in charge of the night. If this is not possible, parents should take a break if they start to get upset. The important thing is to send the message of calmness and educational certainty.
- Every family has its own level of tolerance and its own beliefs: there are no good systems or bad systems, just different ones.

2-5 years

- During the day, is recommendable that children take a nap as a complement to nighttime sleep.
- Avoid putting a child to bed hungry or after drinking too much liquid.
- Do away with consuming stimulating beverages/foods (chocolate, cola beverages, etc.).
- Try to avoid vigorous physical activity 1-2 hours before putting the child to bed.
- Avoid very long or late naps.
- Be especially careful about not emphasising anxiety or fear by alluding to the 'bogeyman', ghosts, etc.
- Avoid associating food or sleep with punishment or rejection.
- If the child sporadically has difficulties getting to sleep, think about what has happened during the day, and don't shout at the child. Security and calmness should be the message sent to the child.
    - No time limit for falling asleep that day should be imposed: it will be very difficult to meet that limit, and the child's anxiety or nervousness will increase.
    - A parent mustn't lose their cool. The message we are trying to send is: 'you're able to enjoy sleeping alone'.
    - If parents get upset, a child will become even more agitated. A couple should take turns. If this is not possible, the parent should leave the room for a few minutes, rest, drink some water and when they are more relaxed, start again.
- At this age, routinely sleeping outside the bed is not going to help a child learn to fall sleep.

Source: Modified from the Paediatric Group of the Spanish Sleep Society (SES) and the Sleep Unit of the Spanish Society Out-patient Paediatrics and Primary Care (SEPEAP)[111].

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Directed at families

- It is important to have information about the changes that take place in adolescence, especially about the normal delay of sleep onset, increased needs for sleep and the alterations that occur to sleep due to the use of mobile phones, internet, etc., right before going to bed.
- It is essential to learn to recognise the signs of sleep deficit in young people: irritability, difficulty waking up, recovery of sleep on weekends, etc.
- There must be family dialogue about sleep and its influence on health and well-being. The objective is to sensitise an adolescent about the importance of sleep.
- The importance of setting the example of good sleep hygiene habits by the parents must be kept in mind.
- It is advisable to favour a sleep-friendly atmosphere in the home at the end of the evening or the initial nighttime hours.
- The attempt should be made to prevent young people from compensating for the sleep deficit accumulated during the week by increasing sleep hours on the weekends, beyond what is reasonable. If they sleep a few more hours, it could be beneficial; but if they get up on Sunday at noon, it will be difficult to get back to the usual bedtime that night.

Directed at adolescents themselves

- Keep regular schedules. Even on weekends!
- Exposure to intense light in the morning helps to advance the sleep phase. It is not advisable to use sunglasses routinely.
- Stimulating activities should be promoted during daytime hours when there is a tendency to sleep.
- If a nap is taken, it should be short, between 30 and 45 minutes, and should be taken during the initial hours of the afternoon.
- There are certain substances, such as tobacco, alcohol and other drugs, whose effects are harmful to sleep and health in general.
- It is important to have regular meal times.
- Stimulants (caffeine, cola drinks, etc.) should also be avoided, especially after the midday meal.
- Regular physical exercise is necessary, although never in the hours before going to bed.
- Wakeful activities (studying, video games, using mobile phones, etc.) should be avoided one hour before sleeping.
- Avoid falling asleep with the television on, given that this decreases the depth of sleep. Ideally, a television should not be placed in the bedroom.
- It is good to learn to relax and adequately express emotions.

Source: Modified from the Paediatric Group of the Spanish Sleep Society (SES) and the Sleep Unit of the Spanish Society Out-patient Paediatrics and Primary Care (SEPEAP)[111].

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Appendix 8.2. Format for professionals of education centres

School plays a very important role in the healthy habits acquired by children and adolescents, because it can exercise a preventive function through the teaching-learning process. The transversal nature of many fundamental matters that affect children and adolescents must be taken into account, not only personally but also at an institutional level. These matters include the one we are dealing with here: sleep and the possible alterations thereof.

The task of providing teachers and the education system in general with information about sleep and sleep problems, and the possibility of including subjects related to sleep in education programs, depending on each age range, is fundamental.

Before pointing out the essential aspects on which the prevention task and the action of educators and teachers must be based, we should start with some important aspects:

Reconciliation. Fathers and mothers truly have difficulties when reconciling work and family life, and consequently children –above all the youngest– spend an excessive amount of time outside the home after getting up early, like an adult.

Specific needs of some children. Teachers must know that some children with certain sleep disorders may be going to their school, and these children need specific strategies during school hours.

Schedules designed for adults. The schedules of school times adapt more to the agendas of parents and teachers than to the children themselves.

Need for coordination between the various regional/national ministries. A fluid system should be structured, thereby allowing paediatricians and educators to transmit or complement information about certain aspects related to sleep. This would avoid, among other things, the anxiety that educators have when they don't know what or how to respond to certain demands by parents, who are also anxious because they don't know how to act.

In the entire Spanish territory, the educational brackets are similar: Pre-school, primary school, secondary school and the final two years of secondary school, and there are certain, practical recommendations about sleep that educators could apply, depending on the age of the children.

Early pre-school stage (cycle of 0-3 years)*

The base for adequate health education is established at this time in a child's life.

Educators should know that:

- They have to listen to the demands of parents without entering into a 'circle of anxiety', and they should refer parents to their paediatrician in case of doubt.
- The must explain to parents that the educational project of a pre-school centre holds education about healthy habits to be fundamental and that collaboration is basic to achieve this.

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- There are tools for responding to inadequate information that parents get, both bibliographical and *on-line*.

Educators must transmit the following to parents:

- A child has to starting acquiring sleep-wake rhythms throughout their first year of life.
- A well-cared for baby is not the one that sleeps the most.
- Sleep has to be a pleasurable activity, and associating the crib with punishment has to be avoided.
- The time that a baby needs to sleep becomes shorter as they grow.
- It is not advisable to do away with a child's nap after one year of age, believing that this way they will sleep earlier and better at night.
- It is important to take care of the external conditions of the bedroom: noise, light, temperature.
- Pay special attention to the relationship between the parent/caretaker/educator and the child, but not solely during the time before going to sleep.
- One must know how to listen to the *demands* of each child, such as the type of crying and the need for possible transitional objects (stuffed animal, blanket).
- The principle of individualisation must be applied, in the sense that each child is different and there are different ways of putting children to bed.

*(Normally, according to legislation in force, no child attends pre-school before the age of 4 months).

Pre-school education (cycle of 3-6 years)

Starting at this age, most children nowadays are already in the pre-school stage at pre-school education and primary education schools. The capacity of schools and their personnel should make it possible to have a continuation-transition phase in aspects that are as important as the possibility of taking a nap.

Educators and parents must know that:

- Children get up early to go to school, in many cases because of the work schedule of their parents.
- If a child's nap has been abruptly eliminated, some indicators of fatigue can be perceived more clearly than in the preceding cycle.
- It must be kept in mind that certain aspects of the sleep evolution process, such as nightmares, are not synonyms of problems or disorders.
- Cooperation between parents and educators regarding these matters must be promoted.

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Primary education (6-14 years)

Both educators and parents must know that:

- Cooperation between parents and teachers, even though it becomes more difficult as children grow and the parents' presence at school decreases, continues to be essential.
- The teaching-learning process clearly benefits when the subject has adequate health habits.
- The causes of fatigue in some children come from having established inadequate habits for healthy sleep, such as the following:
    - inappropriate schedules;
    - poor use and/or abuse of electronic devices outside or inside of their bedrooms and without control by adults;
    - incorrect eating behaviours (excessive consumption of cola beverages and caffeine, chocolate, pre-packaged pastries, copious dinners) close to bedtime;
    - lack of daily physical exercise.

  In the education system, it must be taken into account that:
- To the extent possible, the attempt should be made to schedule physical activity during the first hour of the morning.

Secondary education – high school (14-18 years)

In the education system, it must be taken into account that:

- Adolescents are in the middle of hormonal change. Considering these circumstances, it would be advisable to establish schedules that avoid added fatigue in many cases.
- To the extent possible, the attempt should be made to schedule physical activity during the first hour of the morning.
- There are other causes that interfere with the acquisition of healthy sleep habits, such as the following: sedentary lifestyle, poor nutrition, consumption of substances and harassment at school, in addition to what was pointed out regarding the preceding stage.
- For teachers, intervention is complicated, even more so if we consider that this is the preparation stage for higher education. Therefore, the process and development of personal autonomy should take precedence.

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Appendix 9. Education for parents about paediatric sleep

- Just as we teach our children other behaviours that help them to progressively achieve a degree of autonomy, we must teach them to sleep alone.
- The obligation as parents is not to put a child to sleep, but rather facilitate the ability for them to get to sleep and learn to fall asleep alone.
- To prevent problems with sleep, the normal development of sleep-wake patterns must be favoured. For a child's complete maturation, good attachment is fundamental. Attachment is the affective bond that a child usually establishes with the mother or the person who takes care of the child most of the time. It is not dependency, and it does not involve over-protection. It should be an element of security and will evolve over the first few years of life.
- To establish good attachment, it is important to:
  1. Perceive the child's signals and respond to them correctly and quickly.
  2. Always respond the same way to the same behaviour of the child, even though we may be tired or be taking care of something else.
  3. Maintain frequent although not overwhelming physical contact with the child.
  4. Allow children to decide to the extent that they can, thereby favouring their autonomy.
- For a child, the sleeping event can involve separation. Good separation means a predictable and routine act that contributes satisfaction and security, to both the parents and the child, while bad separation will make the child respond with anxiety, make the parents feel pressured emotionally and make them both fearful in the event of new separations. It is advisable to establish gradual distancing during the day, thereby allowing a child to be in other rooms, entertaining himself alone.
- All adults who participate in teaching the sleep habit must act the same way. A child must know that, whatever happens, he is going to get the same, adequate response from the parent or caretaker.
- A child's reaction to re-education can be tough (getting out of the crib or bed, shouting, making a fuss): they may want to negotiate ('stay just a minute', 'read me one more story'), they can play the role of the victim (crying with true sadness), they can make constant requests ('I want a glass of water', 'I need to go to the bathroom') or they can do anything else that makes us go take care of them.
- When nothing has worked, despite everything, and we're facing a sleep problem in children, what we must do is re-educate. To do so, it is important to know that one of the conditions that favours good sleep in a child the most is the feeling of security that we are able to transmit to them, but above all the feeling that the child can perceive in our attitude, tone of voice and gestures.
- Parents must be convinced that what they are doing is the best thing for their children.

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Appendix 10. Outcome measurements used to assess the efficacy/effectiveness of therapeutic interventions for sleep problems

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Primary measure of outcome	
Subjective report of the patient, parents or caretakers about the quality of nighttime sleep (for example, satisfaction with the time children take to fall asleep or that they spend awake at night, with the duration of nighttime sleep, the sensation of getting restorative sleep, etc.).	
Secondary measures of outcome	
1.Sleep parameters*	
Resistance when it's time for bed.	
Number of nights when episodes occur.	
Duration of nighttime awakenings.	
Number of tantrums when it's time for bed.	
Duration of the tantrums.	
Number of nighttime awakenings.	Number of awakenings throughout the night.
Sleep efficiency (%)	Percentage of sleep obtained with respect to time in bed. Calculated using the following formula: [(total sleep time) / (total time in bed)] x 100 Sleep efficiency < 85% is considered clinically significant.
Good bedtimes	Number of times per week when, at bedtime, the child takes less than 10 minutes.
Good nighttimes	Number of nights per week that the child sleeps without sleeping with the parents or waking them up.
Sleep latency (minutes)	Time elapsed between bedtime or turning out the light and the moment when the child falls asleep.
Total sleep time (minutes)	Total duration of nighttime sleep obtained.
Maintenance of nighttime sleep (number)	Number of awakenings throughout the night.
Time awake after sleep onset (minutes)	Total time of nighttime wakefulness as from sleep onset until final awakening.
2.Sleep quality. Global score in standardised scales related to sleep.	
3.Daytime functioning. Global score in standardised scales, including behaviour, mood, self-esteem, parent-child relations, fatigue or daytime sleepiness (for example, Fatigue Severity Scale, Fatigue Profile of Mood Status Scale, Paediatric Daytime Sleepiness Scale, Epworth Sleepiness Scale). Performance of attention and concentration tasks (for example, computerised or pencil and paper tasks or reaction time).	
4.Well-being of the parents. Global score on standardised scales, including mood, total state of mental health, stress on education, satisfaction.	
5.Frequency of secondary effects. Quantity, persistence and frequency of undesired secondary effects.	

*Sleep parameters refer to those that are obtained through the sleep-wake diary, actigraphy or PSG, except for the time and relative quantity of sleep phases, which can only be obtained through the PSG.

Appendix 11. Psychological interventions for insomnia problems. (Format for parents, caretakers and adolescents)

Before putting any of these techniques into practice, the advice of the paediatric team must be followed, because they know the child or adolescent and also know the parents, and they can recommend the techniques that they consider to be most effective according to the particular case.

In order to understand the functioning and success of these techniques, it is advisable to know that a child's behaviour is regulated by the consequences of their behaviour, such that if the consequences are positive, the behaviour will tend to be repeated; but, conversely, if the consequences are negative, the behaviour will be eliminated.

You must remember to always use positive reinforcement (praise the execution of the desired behaviour whenever it may occur) and as immediately as possible after achieving the desired behaviour (first thing in the morning, coinciding with when the child wakes up). A reward programme could be established (small rewards), which can be increased as achievement of the behaviour progresses (for example, three consecutive nights). Conversely, any type of punishment due to the absence of achievements must be avoided.

Graduated extinction

The following instructions should be followed when conducting graduated extinction:

- The parents' attitude must be calm and firm, thereby attempting to eliminate any emotional reaction of anger, irony or threat.
- After having completed whatever the pre-sleep routine is, which will have ended in the child's bedroom, leave the child in bed (still awake), turn out the light and leave the bedroom with a brief goodbye, such as 'time to go to sleep', 'goodnight' or 'see you tomorrow'. Some children need a nightlight, which they will voluntarily do away with later, and sometimes flexibility on this point will facilitate your job.
- Before going into the bedroom to calm your child, you must wait a period of time, during which the child will normally have been crying.
- Whenever you go into the child's bedroom, you must do so calmly, without approaching the crib or bed and without taking the child out. Your stay in the child's room shouldn't last longer than a minute, during which time you must assure the child that nothing is wrong and that you are there, afterwards leaving the room.
- You must only enter the room if the child cries during the entire waiting period or calls you non-stop.
- Even though there is no optimum waiting period for all children, rather it depends on both their temperament and the parents', a table with suggested waiting times is offered below:

DAY	1st wait	2nd wait	3rd and subsequent waits
1st	1 minute	2 minutes	3 minutes
2nd	2 minutes	3 minutes	5 minutes
3rd and subsequent	3 minutes	5 minutes	from 5 to 7 minutes

- Once sleep has started, if the child wakes up during the course of the night and calls for attention, repeat the process following the same system of waiting periods used at the beginning of the night.
- The second day is usually harder than the first, given that the child knows what's going to happen.
- Be patient, be firm and use positive reinforcement right from the first achievement.

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Delaying bedtime

When a child takes a long time to fall asleep, this method can be used to modify their sleep schedule. It seeks to bring bedtime as close as possible to the rapid onset of sleep.

- First complete all the positive routines that make up the established pre-sleep ritual.
- Progressively delay the child's bedtime by 30 minutes with respect to the time the child previously tended to go to bed, until you find the time when the child falls asleep quickly (in 15-30 minutes), always keeping the wake time the same.
- If the expected rapid onset of sleep does not occur as a result of delaying the bedtime, take the child out of bed at that time and keep him awake for a period of time (30-60 minutes) before allowing him to go back to bed.
- After succeeding in establishing the time when rapid sleep onset occurs, you will advance this time by 15 minutes every 2 or 3 nights.
- Be patient, be firm and use positive reinforcement right from the first achievement.

Scheduled awakenings

- Before being able to apply this technique, you must keep a log that allows knowing the child's usual pattern of spontaneous awakenings during the night. In other words, know the times when those awakenings occur, so that the occurrence of those awakenings can be anticipated.
- With the log done, wake up the child between 15 and 30 minutes before the expected time of each of the awakenings and give the child the usual attention (calm them, cover them).
- If the child's spontaneous awakenings do not disappear after a few days, the period of time between the scheduled awakenings will be progressively increased until the spontaneous awakenings disappear.

Stimulus Control for adolescents

In order to break the association between the context in which an adolescent falls asleep and insomnia, the instructions below can be followed:

- Do not use the bed or the bedroom for any activity other than sleeping: Don't read, don't watch television, don't talk on the phone, avoid worrying, avoid arguing with the family and avoid eating in bed.
- Establish a series of regular routines before going to sleep, which indicate that the time for going to bed is approaching: for example, close the door, brush your teeth, turn on the alarm clock and take care of everything else that is logical at this time of night. Carry out these routines every night in the same order. Adopt the sleeping position you prefer, and arrange your favourite pillows and blankets.
- When you're in bed, all the lights should be turned off with the intention of going to sleep immediately. If you cannot get to sleep after a short while (approximately 10-15 minutes), you should get up and go to another room. It is advisable to engage yourself in a relaxing activity until you feel sleepy, at which time you should go back to the bedroom to sleep.
- If you don't fall asleep in a short period of time, repeat the preceding step. Do it as many times as necessary during the night. This same procedure should be used if you wake up in the middle of the night and cannot get back to sleep within approximately 10 minutes.
- Keep a regular wake time in the morning. Turn on the alarm and get up at approximately the same time every morning, on both weekdays and holidays, regardless of the time you've gone to bed. This regulates your internal biological clock and synchronises the sleep-wake rhythm.
- Do not take any nap during the day. If you stay awake all day, you'll be sleepier at night, which will then facilitate going to sleep more quickly. However, if daytime sleepiness is too overwhelming, you can take a short nap after eating, as long as you sleep no more than half an hour.
- Try to relax at least one hour before going to bed. Avoid using the bed for thinking about your worries. At some other time during the day you can set aside 30 minutes for thinking about whatever worries you or about things that you have pending, thereby trying to find solutions (writing them down on a sheet of paper or in a planner could help). If worries return while you're in bed, tell yourself: 'Enough already, I'll think about it tomorrow. Now it's time to sleep'.
- Avoid negative thoughts such as 'I'm not going to be able to sleep today'. Instead, think 'today, I'm simply going to relax and rest'.
- Remove your clock from the nightstand: looking at it every so often will only create more anxiety and will make it difficult to fall asleep.
- Do not use the computer before going to bed, because the luminosity of the screen can act as a neurological activator.

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Appendix 12. Assessment of parents' tolerance to graduated extinction

Tolerance to the disorder[1]	Mother		Father	
1.The behaviour is so serious or upsetting that it is impossible for the parents to ignore it.	Yes	No	Yes	No
2.It is difficult for the parents to listen to the child being upset for a long periods of time.	Yes	No	Yes	No
3.They find it too difficult to put the child back in bed.	Yes	No	Yes	No
Tolerance to schedules[2]	**Mother**		**Father**	
4.Is someone in the family willing to stay up later at night to put a sleep plan into action?	Yes	No	Yes	No
5.Is someone in the family willing to get up earlier in the morning to put a sleep plan into action?	Yes	No	Yes	No
Attitudinal barriers[3]	**Mother**		**Father**	
6.Are they emotionally unable of taking care of it on their own?	Yes	No	Yes	No
7.Do they feel guilty when they force their child to go back to bed?	Yes	No	Yes	No
8.Do they think that they are damaging their child by trying to change the way he slept?	Yes	No	Yes	No

[1] A positive response makes extinction initially inadvisable.

[2] If a negative response, assess: graduated extinction versus another psychological intervention.

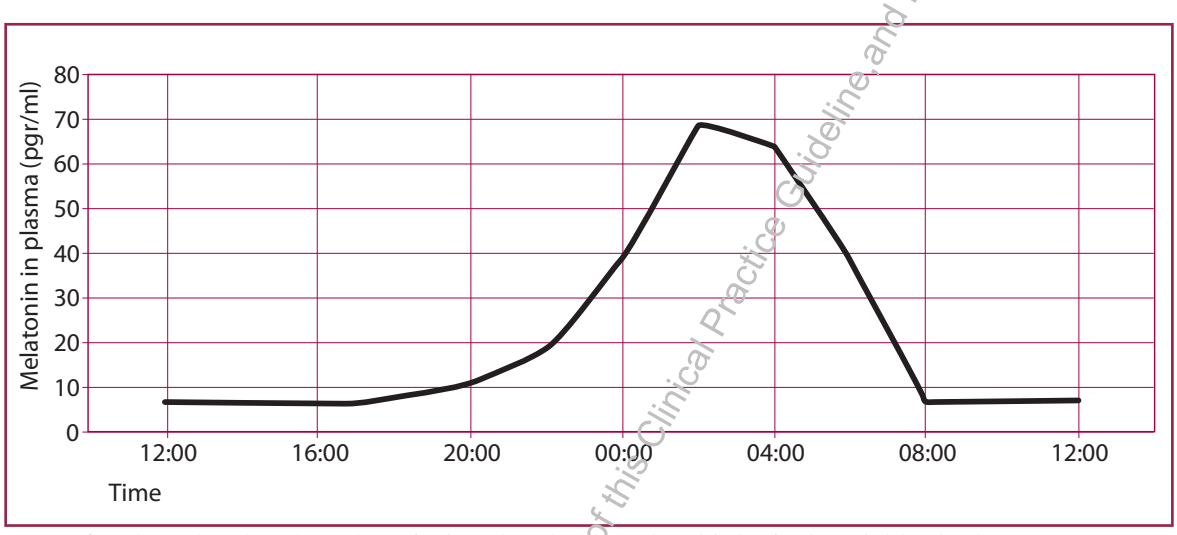
[3] If a positive response: prior intervention in the family.

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Appendix 13. Circadian rhythms

Circadian rhythms (CRs) are intrinsic biological rhythms of a periodic nature that appear at 24-hour intervals. In mammals, the most important circadian rhythm is the sleep-wake cycle. In humans, the central circadian pacemaker or biological clock is in the suprachiasmatic nucleus (SCN) of the anterior hypothalamus, which is regulated by exterior cues from the environment (zeitgebers, which means 'time giver' in German), the most powerful of which is exposure to light-darkness. Light is perceived by the retina, which modules the synthesis of melatonin (the 'hormone of darkness'), and it helps to synchronise the internal clock and the natural day-night alternation. In addition, artificial light and the moment of exposure to it can modify the pattern of melatonin production and can affect sleep. The melatonin secretion curve is shown in Figure 6.

Figure 6. Fluctuation of the concentration of melatonin during a 24-hour period



On the other hand, melatonin is related to another biological variable, body temperature, such that the melatonin peak comes at the same time as the body temperature valley, a time that coincides with maximum fatigue and minimum alertness (1-4).

Effect of exogenous melatonin

1. *Exogenous melatonin in sleep:* the role of melatonin as a sleep promoter has been well known for decades. Moreover, melatonin has a chronoregulation function for adjusting the sleep phase and re-synchronising the biological clock. To achieve one effect or another, it is necessary to know the dose and the time when melatonin is administered.
2. *Other functions:* melatonin influences the majority of the body's systems. It has an antigonadotrophic effect in humans, it takes part in the appearance of puberty, it causes central vasoconstriction and peripheral vasodilatation, and it is an antioxidant (1).

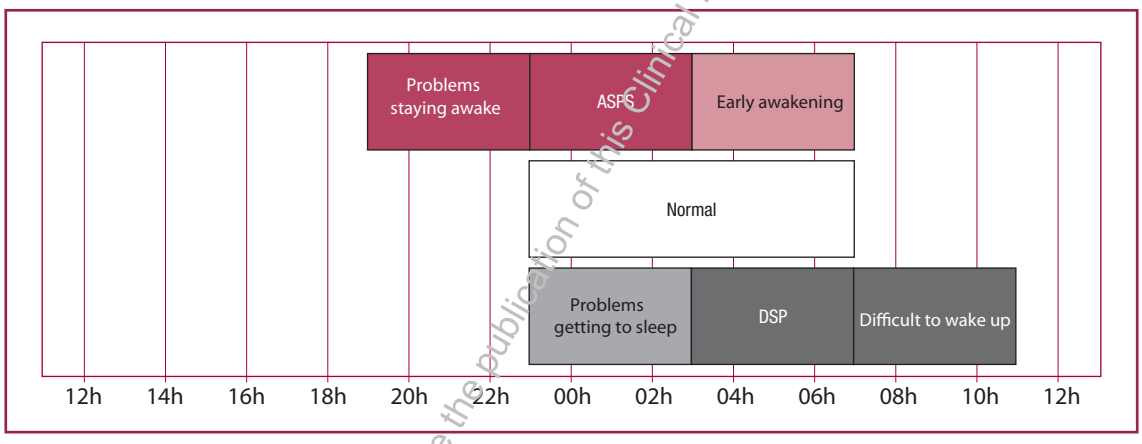
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Circadian rhythm sleep disorders

In circadian rhythm disorders (CRDs), the quantity and quality of sleep is normal, but that quantity and quality occur at the wrong time according to normal schedules. In them, the circadian pacemaker is delayed or moved forward with respect to the desired time, or it may simply be out of adjustment. In paediatrics, CRDs are relatively frequent and are observed in 10% of these patients. Children and adolescents with a CRD have not correctly trained their biological clock according to the environmental zeitgebers, and they have a delayed phase (delayed sleep-phase syndrome, DSPS), an advanced phase (advanced sleep-phase syndrome, ASPS), a CR of more than 24 hours (Free-Running disorder or hypernychthemeral syndrome) or an irregular pattern of sleep and wake episodes. Of all these, DSPS is the most frequent in paediatrics and is relatively infrequent in adolescents.

Commonly, there is a genetic component, with a medical history of affected family members and, from the clinical point of view, these disorders tend to cause daytime sleepiness due to the debit of sleep hours occurring on a daily basis. The diagnosis of CRDs is basically clinical. The sleep-wake pattern must be assessed in all cases using a sleep log/diary for at least 2 weeks, which will be used to record the sleep hours; the drugs, alcohol or tobacco that is used; the sports played; and other factors that can have an influence. For greater accuracy, there are some complementary tests that should be conducted at a Sleep Unit (actigraphy, polysomnography in some cases, the determination of biological markers, etc.) (Figure 7).

Figure 7. Schematic description of sleep complaints in patients with DSPS and ASPS



ASPS: advanced sleep-phase syndrome.

DSPS: delayed sleep-phase syndrome.

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Appendix 14. *Cataplectic facies*. Localised cataplectic status in the facial muscles.

9-year old girl with narcolepsy-cataplexy. Protrusion of the tongue, characteristic of episodes of cataplexy in children, cataplectic facies (images obtained from the video record).



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Appendix 15. Information for patients

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Learning to know about and manage sleep problems in childhood and adolescence

Information for parents, educators and adolescents



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This information has been drafted by the development group of the Clinical Practice Guideline (CPG) on Sleep Disorders in Childhood and Adolescence in Primary Care, prepared within the framework of the Quality Plan for the National Health System of the Ministry of Health, Social Policy and Equality. 2010. Clinical Practice Guidelines of the SNS: UETS No. 2009/8.

This information is also available in electronic format at the web page of GuíaSalud and of the UETS.

Both the complete and the summarised version of the CPG can also be consulted at these web pages.

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Learning to know about and manage sleep problems in childhood and adolescence

Information for parents, educators and adolescents

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Presentation

This document is directed at parents, caretakers and educators of children with sleep problems or those who would simply like information about the preventive strategies that can be used so that these problems don't arise. It is also directed at older children and adolescents so that they themselves are capable of recognising the importance of sleep in their daily lives and can follow some minimum guidelines about getting appropriate sleep.

The information provided in this document is based on and forms a part of the Clinical Practice Guideline on Sleep Disorders in Childhood and Adolescence in Primary Care of the National Health System, and the recommendations in it have been prepared based on existing scientific literature and on the consensus of the development group of said guideline. The document has been drafted by the Health Technologies Assessment Unit (UETS) of the Laín Entralgo Agency, with the participation of both a broad group of expert professionals on the subject (paediatricians, family physician, nurses, psychologists, neurologists and neurophysiologists), as well as parents and patient associations who have contributed their experiences and needs.

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What should we know about sleep?

While caring for their children, parents discover the importance of sleep when they see how the quality and quantity of their children's sleep can affect the well-being of the entire family. Sometimes, even though children grow up and pass through different stages of development, problems at bedtime don't disappear, rather they simply change shape. To the following initial questions: How can I get my child into bed if he is crying, shouting and begging not to go? What should I do if my child wakes me up in the middle of the night? How much do children need to sleep? How long should naps last? We could add other questions such as, why does my child snore when he's asleep? Why does he wake up with nightmares? Why is my child so sleepy during the day?

Human beings spend, on average, one third of their lives sleeping. Sleeping is a necessary activity, because it re-establishes the basic physical and psychological balance of people. So sleep plays a fundamental role in child development and well-being. It favours attention and memory processes, it helps to consolidate learning, and it promotes better behaviour.

The duration of nighttime sleep varies according to age, state of health, emotional state and other factors. Thus, every child is unique and has their own and determined sleep needs. Their ideal sleep time is that which allows them to carry out daily activities normally. The following table and graphic of the percentiles provide a guideline about the general characteristics and approximate figures of sleep hours according to age:

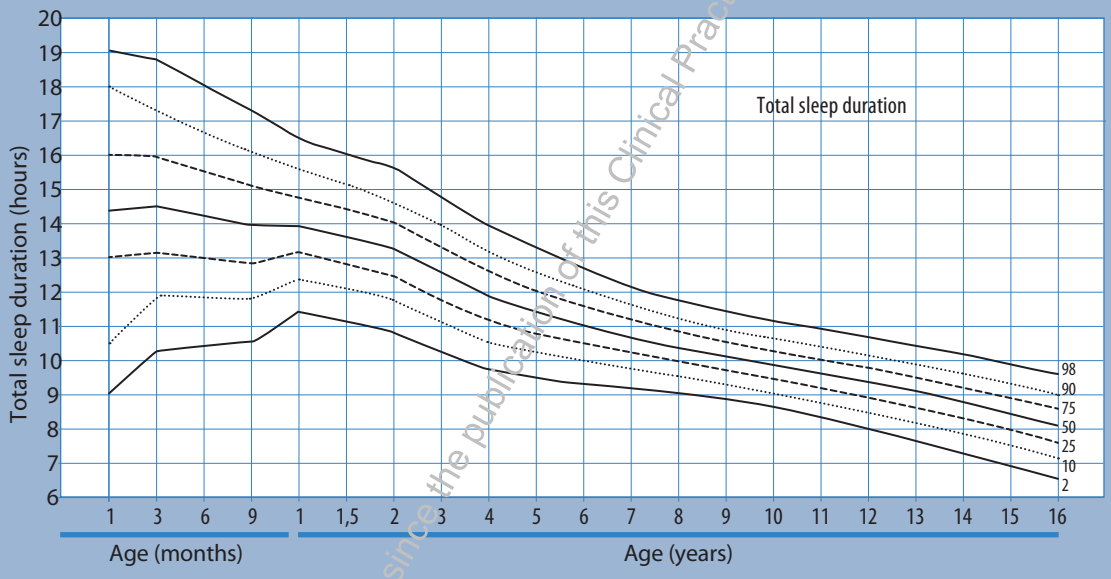


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- Sleep needs are variable according to age, and they are greater in the youngest children. Newborns sleep approximately 16-18 hours. At 2 years of age, children sleep an average of 13 hours per day, which is reduced to 10-12 hours at 3-5 years of age, and at 5 years of age a child sleeps approximately 11 hours per day. Between 6 and 10 years, the average is 10 hours of sleep per day.
- At 6 months of age, a baby establishes his wake-sleep rhythm, with nighttime sleep of up to 5 continuous hours.
- Under normal conditions, awakenings during sleep decrease significantly in the prepuberty stage (pre-adolescence) with respect to childhood.
- Naps are normal up to 3-4 years of age (up to 18 months of age, one morning nap and another afternoon nap).
- Nighttime awakenings are normal at certain ages: they appear in 20-40% of children under 3, in 15% at 3 years of age and in 2% of children at 5 years of age.
- Adolescents need to sleep about 8-10 hours per day, and they show a certain delay in the start of sleep (they tend to go to bed and wake up in the morning later than usual).

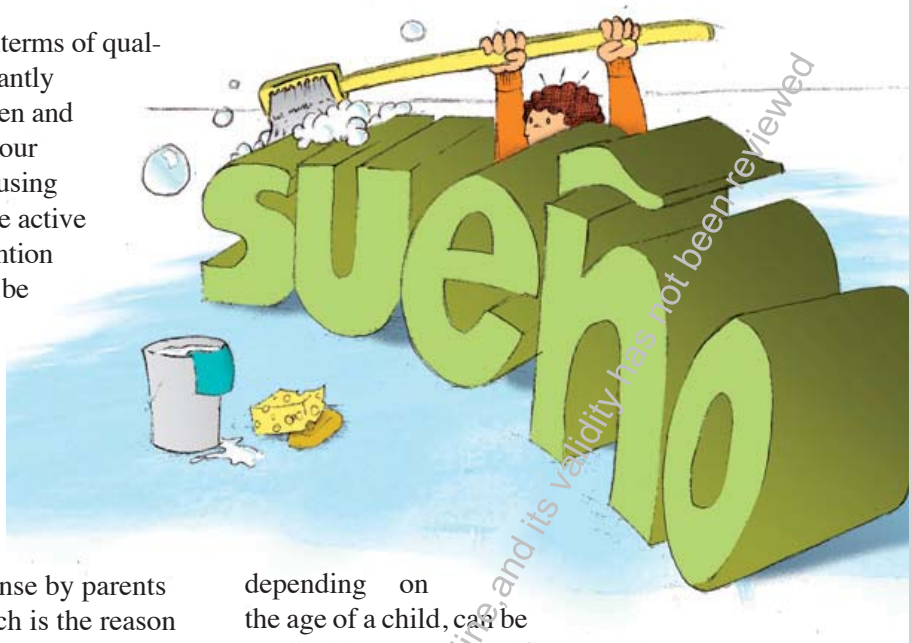
Percentiles of total sleep duration in 24 hours, from childhood to adolescence



Modified from Iglowstein I. *et al.*, Pediatrics, 2003.

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Therefore, inadequate sleep in terms of quality and/or quantity can significantly affect the functioning of children and adolescents. It can alter behaviour and the mood state, thereby causing children/adolescents to be more active than normal, causing their attention to decrease or causing them to be unpleasant or more irritable. It can also cause sleepiness during the day, and very probably learning and mental development problems, therefore resulting in worse academic performance.



Whatever the cause, the response by parents always has to be support, which is the reason why it is important for parents to help their children develop good sleep habits from an early age.

What can we do to prevent sleep problems?

Sleep is a human behaviour, and as such, it can be modified in order to learn to sleep well. Our beliefs can have an influence on the onset and maintenance of sleep problems in our children. So that this doesn't happen, sometimes it's enough to correct certain mistaken ideas about the sleep process itself. Other times, healthy attitudes that favour the normal development of sleep have to be implemented. Thus, with adequate education from parents and caretakers starting when a child is born, most sleep disorders can be prevented.

In this sense, Appendix 1 presents a series of practical recommendations about preventive strategies and sleep hygiene practices that, depending on the age of a child, can be applied by parents and/or caretakers to help children acquire or maintain a good sleep pattern. Likewise, Appendix 2 offers an education programme for parents about child sleep. But before putting them into practice, it is good to know that:

- It must be kept in mind that every child is different. The sleep patterns of your child can be different from those of your friends' children and even those of your other children.
- It is advisable to build your child's routines and schedules according to their own needs and rhythms. Only when parents have become familiar with these patterns of their own children can they begin to establish rhythms and routines according to family needs.
- Be realistic about objectives and expectations. They way in which your child sleeps will change with their age and the maturation process.

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When should we suspect a sleep problem?

There are a series of cues that parents can observe and that can help with the suspicion of whether or not there is a sleep problem in a child.

DURING THE DAY…:

- Does the child perform poorly at school? Have learning and memory problems at school?
- Is the child hyperactive (overly active)?
- Does the child show aggressiveness, behaviour problems?
- Does the child behave better if he sleeps more?
- Does the child have frequent accidents?
- Does the child have growth pains?
- Does the child have morning headaches?
- Are the child's weight and height retarded? Is the child over 5 and does he fall asleep during the day?

AT NIGHT…:

- Does the child wake up frequently (he's older than 1 year and requires the presence of parents 3 to 5 times per night, more than 3 nights per week)?
- Does the child take longer than half an hour to fall asleep? Does the child cry?
- Does the child snore?
- Does the child have difficulty waking up in the morning?
- Is the child too irritated when he wakes up?



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If some of these cues are present, it is important to talk with your paediatrician so that the doctor can assess the presence of a sleep problem or disorder and take the first steps to correcting it. Sometimes, depending on the problem, the child may be referred to other specialists.

When do we talk about sleep disorders?



We talk about sleep disorders when:

- Your child's sleep problems (mood alterations, difficulty concentrating, sleepiness during the day, physical and mental fatigue, general state of stress and anxiety) significantly affect their daily life.
- The sleep problem is affecting the parent-child relationship, the relationship of the entire family or the child's social and school relationships.

The most important thing is to recognise that a sleep disorder is affecting your child so that it can start to be resolved as soon as possible.

What types of sleep disorders are there?

There are many types of sleep disorders that affect childhood and adolescence. To facilitate an understanding of the information in this document, sleep disorders have been divided into three categories:

- The child who has trouble falling asleep.
- The child who does strange things at night.
- The child who falls asleep during the day.

Each category is covered in greater depth below, looking at the most relevant disorders included in each one.

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The child who has trouble falling asleep

This category includes insomnia, restless legs syndrome and the delayed sleep-phase syndrome.

Insomnia

The essential characteristic of insomnia is difficulty getting to sleep or staying asleep, or the sensation of not having had restorative sleep, and it has occurred for at least 1 month, thereby causing significant distress in the child or adolescent.

Children can be affected fundamentally by two types of insomnia: behavioral insomnia or inadequate sleep hygiene insomnia.

What is behavioral insomnia?

The main characteristic of behavioral insomnia is the child's inability to get to sleep if he is alone, showing resistance and anxiety at bedtime. This means that sleep onset is delayed or that there are multiple awakenings throughout the night and consequently a lack of sleep maintenance once sleep has started. In some cases, children need certain associations –rocking them, feeding them, a certain object, the presence of their parents– to initiate sleep or to fall back asleep after having woken up at night. If this condition does not occur, the onset of sleep is delayed significantly. In other cases, there are behaviours that reflect resistance to going to bed, which come in the form of verbal protests, shouting, crying, fighting, getting out of bed and repeated demands for attention or food and drink or stories. Parents usually indicate that their child has 'never' slept well, that nighttime awakenings are very

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frequent and that, if there is any period of normalcy, the arrival of an external stimulus (illness, family moves) causes the problem to re-appear. As a result of all this, they go back to using erroneous methods and behaviours, thereby reinforcing the problem.

What is insomnia due to inadequate sleep hygiene?

This type of insomnia is associated with activities that are carried out during the day and that are necessarily those that prevent adequate sleep quality at night and therefore prevent a child from staying awake and alert during the day. A child or adolescent can even carry out activities that will increase the awakenings or that are contrary to the principles of well-organised sleep. These include acts that lead to a state of hyper-alertness, such as the routine consumption of chocolate, cola drinks and alcohol or caffeine before going to bed, performing intense mental, physical or emotional activities, also before going to bed; using technologies such as computers, video games or mobile phones; or having inappropriate conditions of light or noise. Or they may do things that prevent the correct organisation of sleep, such as frequent naps during the day, large variations of the times that they go to bed or get up and spending a lot of time in bed. All these factors will have an influence on a decrease in the ability to function well during the day, with the consequent decrease in their quality of life.

What causes insomnia?

There are several factors that contribute to the appearance, development and maintenance of this disorder, always considering that it has an influence on both the physical and mental development of the child or adolescent as well as on the cultural and environmental relationships where the child or adolescent develops.

Thus, the following are highlights among the factors that increase the possibility of having insomnia:



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- The family context (background of insomnia in the parents, conflictive parent-child relationships, family disorganisation and situations of family stress in general).
- Inadequate sleep habits (attitudes that are too permissive or strict about bedtime and wake time, prolonged breast-feeding to induce sleep, sharing the parents bed due to the child's demands, practices such as the child watching television alone or in bed or having the television turned on too much time at home).
- The consumption of certain substances that have negative effects on maintaining sleep (caffeine, tobacco, alcohol and chocolate).

How is the diagnosis made and what can parents do to help in this phase?

It is important that parents seek help from a health care professional to be able to establish the diagnosis of the problem. Various clinical tools can be used for this, such as the following:

- ***Medical record:*** questions will be asked about aspects such as onset of the problem, the family medical history, the presence of other possible illnesses and the behaviour of their child.
- ***Sleep log/diary:*** It will be necessary to know the sleep schedules of their child for all 24 hours of the day. To gather this information, the sleep-wake log or diary can be a highly useful tool, where all the information related to sleep can be recorded (Appendix 3).

What are the treatment options?

The insomnia disorder is one of the most frequent problems in children, and it can usually be treated and resolved with help from health care professionals and with parental support. These people are the ones indicated for preparing the most appropriate treatment plan, depending on the child's own characteristics and those of the family and always taking into account the parents' preferences. With any treatment measure for insomnia, the importance of the parents' cooperation must always be taken into account.

Effective treatment strategies include sleep hygiene, psychological interventions and pharmacological interventions.

Sleep hygiene strategies

The are a series of healthy habits that, together with the information that can be provided by your health centre about the importance and need for sleep, can help to improve your child's insomnia.

Appendix 1 shows these strategies in detail, but it is advisable to insist on some more specific practices for this disorder, such as the following:

- A constant routine should be followed, both during the day and at night;
- A relaxing period before going to bed should be established; Play and entertainment should be avoided before going to bed;
- Ensure that television programmes, video games and the use of mobile phones are adequate according to the child's age;
- There must be an adequate environment for sleeping: without noise, no lights, a comfortable temperature, etc.
- Avoid stimulating meals and beverages, such as cola drinks, chocolate, etc.

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- Avoid long naps, especially close to bedtime.

Psychological interventions

Another treatment option includes so-called psychological interventions that act on behaviour and that can mainly serve to reduce resistance at bedtime and reduce nighttime awakenings. They will also help to improve the functioning of children during the day and the parents' well-being. For younger children, some of the recommendable techniques include graduated extinction, delaying bedtime and scheduled awakenings. For adolescents, there is another technique that can also be used, which is to stimulus control. Appendix 4 explains these techniques in greater detail.

Medication

The use of medication must be limited to those cases in which there is no response to the previously proposed strategies (sleep hygiene, psychological interventions), and always under the prescription and supervision of a doctor.

When you go to your health centre, bring information about any substance, medication, herbal product, or alternative medicine that your child may be taking for their sleep problems.

Restless legs syndrome.

What is the restless legs syndrome?

The restless legs syndrome is characterised by the urgent need to move the legs in situations of rest, an event that in many cases appears to be associated with an unpleasant sensation. Irritation usually appears below the knees. The symptoms appear or become worse at the end of the day, and they are alleviated with movement. Sometimes these symptoms are also present in the arms and/or during the whole day. The way to alleviate them is by moving, and a child's efforts at stopping these movements are only effective for a short period of time. It is a disorder that has a major impact on a child's quality of life and can cause insomnia, because the child cannot initiate sleep or gets tired during the day. It can also cause a child's attention to decrease or, conversely, increase a child's activity. In serious cases, it can even cause excessive daytime sleepiness.

What causes it?

It is a disorder whose causes are not totally known. It is known that there is a family predisposition, because 70% of the children and adolescents who suffer from it have an affected first-degree relative and because, if there is a family medical history, the clinical manifestations appear several years before they usually do. Other factors that can have an influence include an alteration of the levels of iron or dopamine (one of the substances that is responsible for neuronal communication).

How is it diagnosed?

The diagnosis of this disorder in children is sometimes difficult. Children do not understand the meaning of the urgent need to move their legs, and they only describe what they feel as an 'unpleasant feeling' in the form of 'irritation', 'discomfort' or 'pain'. In these situations, parents must seek professional help.

Several tools can be used for making the diagnosis.

- ***Medical record:*** questions about aspects such as personal and family background

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will be asked, or if the parents or twin siblings are already diagnosed with this disorder.

- ***Physical and analytical examination:*** running some tests could help to know if the symptoms have another, different cause.
- ***Sleep logs/diaries, questionnaires and home videos:*** your health centre may use some of these techniques to also help with the diagnosis.

To discard any other sleep disorder or another illness that may have some similar symptoms, it's possible that your doctor may think it's necessary to conduct a complementary test.

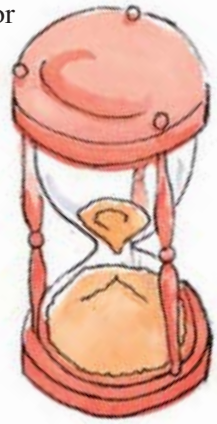
What are the treatment options and what can parents do to help?

- In less serious cases, parents can put a series of general strategies into practice (see Appendix 1), which will reduce or eliminate those factors that have an influence on the disorder. It is important to pay special attention to the following:
- limiting the consumption of caffeine, chocolate, nicotine, alcohol and drugs;
- applying adequate sleep schedules, depending on the age of a child.
- It is also essential to offer support for these children while they are in school. Many children appear to become worse during the day, which could be caused by the obligation to remain seated in class, without moving around. To reduce the discomfort in their legs in class, it is recommendable that the family notify the school about the problem to get support and cooperation. This can all translate into practices such as allowing the child to get up to take a walk during class, doing some physical exercise during breaks or changing position frequently.
- Whenever it may be detected that the disorder is influenced by an iron deficiency, the professional will be one to recommend oral treatment with iron.
- If a child does not respond to general sleep hygiene strategies and oral iron intake, referral to a sleep specialist can be assessed.

Delayed sleep-phase syndrome.

What is the delayed sleep-phase syndrome?

The delayed sleep-phase syndrome (DSPS) is an alteration of the sleep rhythm that usually begins to appear more clearly in the second decade of life. It is characterised by insomnia when going to bed and difficulty waking up in the morning at the desired time, consequently involving sleepiness during the day. In general, the onset and end of sleep are delayed with respect to the conventionally accepted hours of sleep. Despite the difficulty of initiating sleep, once it begins its characteristics are normal. Since the child or adolescent doesn't sleep enough, they may show daytime fatigue, poor academic performance and a decrease in attention, in addition to sleepiness, and they are therefore very frequently accused of being 'lazy and unmotivated'. If they are left to sleep as they wish, the duration of sleep is normal and they wake up rested, like on weekends.



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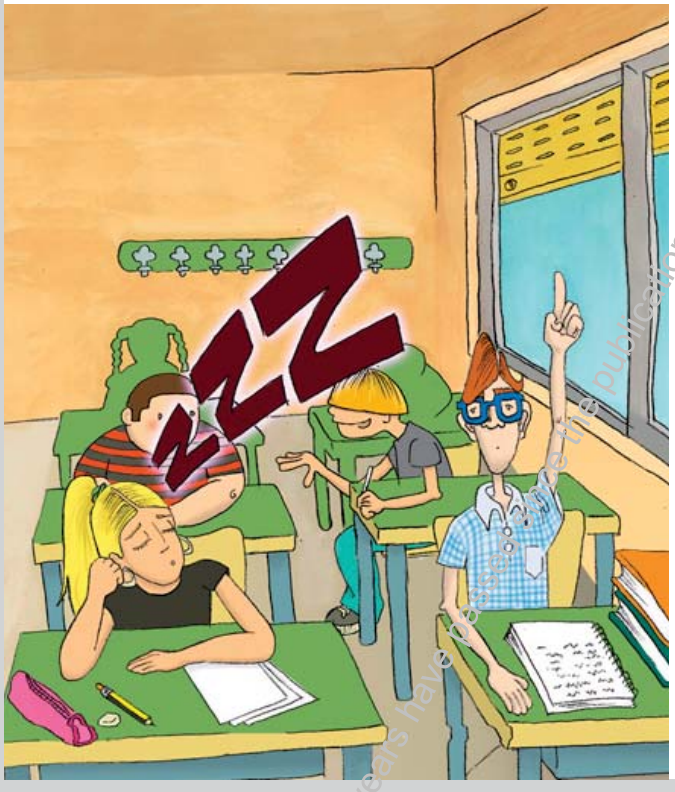
What causes it?

The origin of the causes of this disorder is not well known. What is known is that it appears more frequently among children and adolescents than among adults, and more so among boys. Commonly with this problem, some genetic mutations can have an influence. Moreover, there is usually a family medical history or in some children a greater sensitivity to light, either in the morning or in the afternoon.

How is it diagnosed?

It is important that parents seek professional help so that the diagnosis of the problem can be established. The following various tools are used for the diagnosis:

- ***Medical record:*** questions will be asked about aspects such as family medical history, onset of the problem, the child's behaviour or the existence of emotional problems.



- ***Sleep log/diary:*** it will be necessary to know details about the quality and quantity of your child's sleep. To gather this information, the sleep-wake log or diary can be a highly useful tool, where all the information related to sleep for all 24 hours of the day is recorded (Appendix 3).

To discard any other sleep disorder, inadequate sleep hygiene or other mood or anxiety disorders, which have some similar symptoms, it's possible that your doctor may think that it's necessary to conduct a complementary test.

What are the treatment options and what can parents do to help?

- The most common treatment is to put into practice a series of preventive and sleep hygiene strategies that will reduce or eliminate those factors that have an influence on the disorder. In addition to those included in Appendix 1, some specific practices for this disorder are detailed below:
- Avoid naps.
- Understand that the bed is used for sleeping (and not for eating, studying, listening to music, talking on the phone, etc.).
- Do some relaxing activity when it's close to bedtime.
- Avoid excessive exposure to luminosity (from the television, the computer, video games or other devices) at the end of the day.
- Increase exposure to natural light in the morning.

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The child who does strange things at night

This category includes the sleep apnea-hipopnea syndrome (OSAHS), sleepwalking, sleep terrors, confusional arousals, nightmares and rhythmic movements.



Obstructive sleep apnea-hipopnea syndrome (OSAHS).

What is the apnea-hipopnea syndrome?

The obstructive sleep apnea-hipopnea syndrome (OSAHS) in childhood is a sleep-related breathing disorder. It is characterised by the presence of repeated episodes of complete obstruction (apneas) or partial obstruction (hipopneas) of the upper airway, because the soft parts of the throat collapse and occlude during sleep.

It is commonly associated with symptoms that include snoring, although not all childrenwho snore will develop OSAHS, and not all patients with OSAHS snore in a manner that is recognisable to the parents. It is also associated with other sleep disorders. Children with

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OSAHS show restless sleep, with frequent movements and sometimes with strange postures, such as hyperextension of the neck, whose purpose is to increase the diameter of the upper airway. Having interrupted sleep prevents restorative rest, wherefore a child with OSAHS may show increased tiredness, headaches in the morning, irritability, worse academic performance or an increase in activity (paradoxically).

Childhood OSAHS is notably different from adult OSAHS with respect to the causes, symptoms and treatment.

What causes it?

The following factors, among others, can contribute to the appearance of this disorder: certain anatomical alterations (greater size of the tonsils, cranial malformation, etc.), neurological illnesses (neuromuscular, etc.) and others (obesity, gas reflux, etc.).

How is it diagnosed?

It is possible that, as parents, you may have observed some symptoms in the nighttime breathing of your child that make you suspect the existence of a problem. It is important that parents seek help from a health care professional to be able to establish the diagnosis of the problem. The various tools that can be used for this are the following:

- ***Medical record:*** in addition to asking questions about aspects such as family medical history or the presence of other illnesses that your child may have, other key questions will be related to the presence of usual snoring, if the child has to make considerable efforts to breath while sleeping or if breathing pauses (apneas) are observed during sleep.

There are also a series of warning signs and symptoms that parents can detect:

- If sleep is restless.
- If the child moves a lot.
- The child adopts strange postures (hyperextension of the neck, face-down position with the knees underneath the thorax, semi-seated or needing several pillows).
- The child wakes up frequently.
- The child sweats heavily during the night.
- Excessive daytime sleepiness (infrequent in small children).
- The child breaths through the mouth at night and/or during the day.
- Nasal voice.
- The child starts wetting the bed again when he had already stopped doing so.
- The child has morning headaches.
- The child wakes up tired.
- The child has behaviour problems or learning problems and poor academic performance.

- ***Physical examination:*** with attention to aspects such as the weight and height of your child, their craniofacial anatomy or the size of the tonsils.
- ***Questionnaires:*** a specific questionnaire may be used to help with the diagnosis.
- ***Home video:*** the family could also be asked to make a nighttime sleep video of the child to see the intensity and the characteristics of the breathing noises, as well as confirm the movements that the child makes while he is sleeping.

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In the event of the clinical suspicion that your child may have OSAHS, you will be sent to specialised care (either a Secondary care or Hospital Care) for a more complete evaluation. At these places, complementary diagnostic tests will be requested, and the most appropriate treatment will be indicated.

What are the treatment options and what can parents do to help?

Until a definitive treatment is established at a secondary care or Hospital Care, and even after then, it is important to follow some sleep hygiene strategies. Appendix 1 includes details of these practices, but it is advisable to place special emphasis on the following:

- Always going to bed at the same time.
- Eating little dinner and not going to bed immediately afterwards.
- Avoiding stimulating beverages (cola, coffee, chocolate drinks, etc.) after midday.
- Restricting liquids before going to bed.



Keeping the room dark, without noise and at an adequate temperature and having a comfortable bed.

- For obese children, it is beneficial to start a diet to lose weight.

Sleepwalking, sleep terrors, confusional arousals, nightmares, rhythmic movements.

These disorders are encompassed within what are called parasomnias. Children can be affected by several types of parasomnias.

Sleepwalking/sleep terrors

What is sleepwalking?

It is a very common disorder in school-age children. It is generally benign and resolves itself with age, without the need for any treatment.

During sleepwalking episodes, a child gets up from bed and walks without being completely aware of their surroundings. A child could do many things, ranging from sitting up in bed asleep, to walking, to running around very chaotically. A sleepwalking child can also perform complex tasks, such as opening locked doors, taking food out of the refrigerator and eating, going down stairs, going outside the home and even doing stranger things such as urinating in a closet. During episodes, the child usually has their eyes open and can even mumble or give unintelligible responses or responses that make no sense. It is difficult to wake them, and the next day they rarely remember what has happened.

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What are night or sleep terrors?

They are sleep disorders that are similar to a nightmare, with the exception that they are much more spectacular. A sleeping child suddenly sits up in bed, shouting or crying, disturbed and distraught. The child's behaviour is that of intense fear (fast breathing, sweating, rapid heartbeat and dilated pupils), as if something very serious were happening. The child keeps his eyes open, staring into the distance but without seeing, and he also doesn't hear what is being said, because the child is asleep, even though he might not seem to be. The episode lasts a few minutes and ends spontaneously, with the child going back to sleep. As with sleepwalking, the child does not respond to external stimuli and does not usually remember the episode.

What causes them?

Sleepwalking and sleep terror episodes generally occur during the deepest phase of sleep, one or two hours after the child has fallen asleep. The cause is not precisely known, although it is known that it is much more frequent in children than in adults and in children with a family medical history. The following factors, among others, can trigger episodes of sleepwalking or sleep terrors:

- Insufficient sleep.
- Irregular sleep schedules.
- Other sleep disorders such as the apnea/hipopnea syndrome.
- Fever or another illness.
- Some drugs.
- Sleeping with the bladder full.
- Stress.

What can parents do?

In addition to consulting the series of healthy sleep habits included in Appendix 1, parents should take the following practices to decrease the risk that a child may suffer from an episode of sleepwalking or sleep terrors:

- The child must sleep enough hours.
- Naps should not be eliminated if they are regularly taken.
- Regular sleeping schedules should be maintained.
- Caffeine before going to bed must be avoided.
- A child should not be allowed to drink too much during the night and must urinate before going to bed.

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When a child is having an episode:

- Try not to wake them, because this could cause them to become more agitated.
- During sleepwalking episodes, the child should be led back to bed, talking to him gently with a calm and relaxed tone. If the child gets upset or bothered when trying to take them back to bed, let the episode run its course, simply preventing the child from hurting himself.
- During episodes of sleep terrors, parents should not interfere. The normal response of parents is to try to comfort their child, but this can cause an effect that is contrary to the desired effect and can cause the child be become more agitated. The best way to react to a night terror is to wait patiently for it to pass and be sure that the child does not hurt himself when stirring.
- It is not a good idea to discuss the episode the next day, given that this could worry the child and cause resistance to going to bed.

Sleepwalking and sleep terrors by themselves do not involve any risk to health; however, during a sleepwalking episode, a child could carry out actions that are potentially dangerous to himself or to others. Parents can also take some practices to increase safety and prevent their child from getting hurt during episodes:

- Locking doors and windows with mechanisms that their children don't normally use, and not only in the child's room, but also in the rest of the house.
- Hiding the keys to vehicles.
- Not allowing a child to sleep in bunk beds or high beds.
- Keeping dangerous objects out of their reach.
- Removing sharp objects or objects that can break from around the bed.
- Not leaving junk on the stairs or on the floor to prevent a child from tripping.
- Alarms or bells can be put on the child's bedroom door to alert parents if the child leaves the bedroom.

When should the paediatric team be consulted?

It should be recalled that sleepwalking and sleep terrors are common in school-age children and that most of the time the episodes disappear as the child grows up. Treatment is not generally necessary. However, if the episodes are common, if they cause a child to be tired and sleepy during the day, or if they have not disappeared when adolescence is reached, a professional should be consulted.

Nightmares

What are nightmares?

They are long, elaborate and complex dreams with a progressive increase in the sensation of terror, fear or anxiety. Typically, a child wakes up very afraid and entirely alert and gives a detailed description of a very anguishing and terrifying dream that they have had. Nightmares are differentiated from night terrors by the fact that, while a child remembers nothing about the content of the dream in a night terror, the opposite occurs with nightmares, and the child remembers everything and relates it as if they had actually experienced it. In some cases, a child believes that what he has dreamed is real.



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Nightmares can occur at any time during the night, although they are more frequent towards the end, and they usually disappear when the child wakes up. The episodes are short in duration, although after waking up, a child continues to be afraid and has difficulty getting back to sleep. In some cases, children hate bedtime, because they associate sleeping with nightmares.



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What causes them?

What causes them is unknown, but what has been discovered is that there are a series of factors that can contribute to the appearance of these dreams:

- Insufficient sleep.
- Some drugs.
- Stress and/or traumatic episodes.

What can parents do?

Appendix 1 includes a series of healthy sleep habits, which parents can consult, although several strategies that can contribute to preventing the appearance of nightmares should be emphasised:

- Before going to bed, avoid watching horror films and TV shows or listening to horror stories.
- Keep regular sleep schedules.
- Following a routine at bedtime will help children to be more calm. This can include taking a bath, reading, talking about nice things that happened during the day, cuddling, etc.
- A child should not be allowed to drink too much during the night and should urinate before going to bed.
- Identify those factors that might be stressful to the child and eliminate or reduce them.

When a child has a nightmare, doing the following could help:

- Calm the child, emphasising that it has only been a nightmare. It is important to remain calm, to be with them in the bedroom and make them feel safe. Most children will be tired from the nightmare and will go back to sleep immediately.

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- Help the child go back to sleep. In addition to offering affection and comfort, it may be helpful to bring them objects that symbolise security, such as their favourite stuffed animal, a blanket, a 'dream-catcher' or even playing soft music.
- Any comments or discussion about the nightmare should be postponed until the next day.
- The next day, the child can be encouraged to draw the nightmare in detail or describe it in writing. Later, the child can change the drawing has he likes or come up with an alternative ending that doesn't cause fear. These new images can be reviewed during the day, until the nighttime episodes disappear.

When should the paediatric team be consulted?

Nightmares are common in school age children, they are benign in nature, and they disappear over time. A professional should be consulted when the episodes happen almost every night, when several occur in the same night, when the child runs the risk of hurting himself or hurting others or when the nightmares interfere with activities of daily life.

Sleep-related rhythmic movements

What are sleep-related rhythmic movements disorder?

They are repetitive movements that repeat without varying and that affect certain parts of the body, such as the head, the torso, the limbs or even the whole body. They occur when a child is falling asleep at night, during a nap or when going back to sleep after waking up at night.

It is very common behaviour in children. In most cases, the movements start when a child is under the age of one year, and they disappear as the child grows. They are not considered to be a disorder unless they interfere with the child's daily activities, they affect sleep quality or they cause the child to injury himself. The movements that are observed most frequently, illustrated in the following figure, are:

- Head banging: the child is face down and repeatedly hits his head and sometimes his torso on the pillow. If he is face up, he hits the nape of his neck against the pillow and even against the headboard. It can also occur while seated: the child hits the wall or headboard of the crib with his head.
- Head rolling: movement of the head towards the sides.
- Body rolling: movement of the entire body towards the sides.
- Body rocking: rocking movement of the whole body.

What causes them?

It is uncertain why these movements occur. It is believed they serve to relax a child and help them fall asleep. It could also be a learned behaviour in which the child reproduces the rocking movements that parents make when rocking their child in a cradle.

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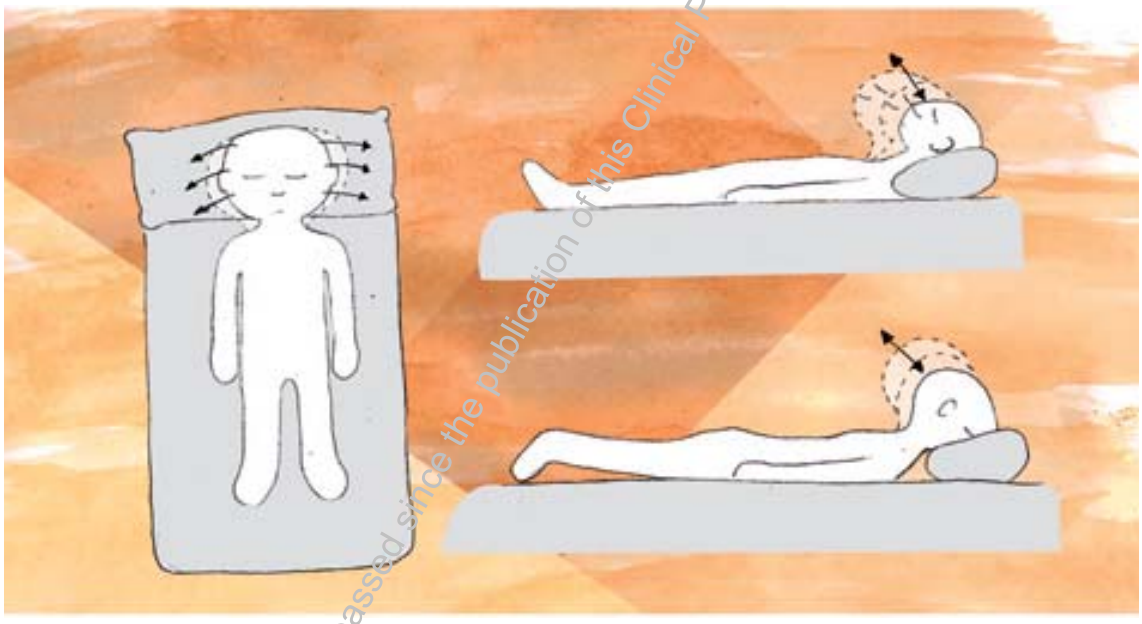
What can parents do?

Children with sleep-related rhythmic movements usually do not require any type of treatment. However, it could be useful to adopt some safety practices:

- It is highly unlikely that a child will hurt himself, even when it seems that he his hitting his head hard. In any event, cushions can be placed in a crib if there is concern about the child's safety, or protective bars can even be put on the bed if parents think the child might fall.
- It is important to not reinforce this behaviour. If you go to a child whenever he makes these movements, the behaviour is being reinforced, given that the child will repeat them in order to get attention.
- Move the bed or crib away from the wall so that the possible noise by the bed or crib hitting the wall won't disturb the sleep of the rest of the family.
- Any factor that might interrupt the child's sleep should be avoided, given that whenever the child wakes up, it's possible that the movements might start again.

When should the paediatric team be consulted?

When the movements are very serious or intense, when they have consequences during the day, when they cause the child to injure himself or if they don't disappear when the child turns 5, you should consult your health centre.



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The child who falls asleep during the day

Narcolepsy is included in this category.

Narcolepsy

What is narcolepsy?

Narcolepsy is a very infrequent disorder during childhood, and it tends to appear in adolescence and young adulthood. It is a sleep phase regulation disorder, and its most characteristic symptoms are the following:

- Sleepiness during the day: it is the universal symptom of narcolepsy, and it has a considerable effect on the quality of life of the people who suffer from this disorder. It usually manifests itself in the form of brief naps that appear abruptly and cannot be repressed (sudden sleep attacks). There are many children, especially the youngest, who develop an increase in their activity to compensate for the sleepiness.
- Cataplexy: it is characterised by an abrupt loss of muscle tone, usually triggered by an intense positive emotion (such as laughter, surprise, fear, anguish, intense exercise or fatigue), although in some cases it is not possible to identify a clear trigger. The phenomenon usually lasts a short time, consciousness is not lost, and the child completely recovers muscle tone once the episode has ended. The manifestations of cataplexy can be subtle, such as blinking, a dropping jaw and stilted language, or more noticeable, such as a dropped head or bent knees, even dropping to the ground in some cases.
- Vivid dreams: they are experiences that are difficult to differentiate from reality, with unpleasant content and with visual, audible and tactile symptoms. These manifestations can also appear during daytime naps. For many children, the vivid dreams involve a significant psychological load.
- Sleep paralysis: it is the sensation of immobility for a few seconds or minutes, which appears at the onset of sleep or at the end of the same, and it is sometimes accompanied by blinking and shrieks.

What causes narcolepsy?

An influence by a reduction in the amounts of a protein called hypocretin, which is produced in the brain, has been found to be among the trigger factors, together with other external factors and autoimmune phenomena. In most cases, narcolepsy is of unknown origin (the term for this unknown origin is called 'idiopathic'), although some neurological disorders of the central nervous system can cause the symptoms of narcolepsy (what is called secondary narcolepsy).

How is the diagnosis made and what can parents do to help in this phase?

Even though the diagnostic tests designed to confirm or discard this disorder should be done at a hospital (preferably at a secondary care or Hospital Care), if parents observe that their child has the aforementioned symptoms, it is important to seek help at a health centre to either discard this disorder or establish suspicions.

To help with the diagnosis of narcolepsy, your paediatrician may do the following:

- ***Medical record:*** to see if there is a family medical history of other causes of excessive daytime sleepiness or of narcolepsy, although family narcolepsy is very rare.

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- ***Physical examination:*** with attention to aspects such as weight and a neurological examination of your child to see if there is spontaneous falling asleep or episodes of cataplexy during the examination.

In the event of the confirmed clinical suspicion that your child may have narcolepsy, you will be sent to specialised care (either a Secondary care or Hospital Care) for a more complete evaluation. At these places, complementary diagnostic tests will be requested, and the most appropriate treatment will be indicated.

What are the treatment options and what can parents do to help?

Narcolepsy is a chronic disorder and requires treatment so that a child can lead a practically normal life. Even though the basic principles of the treatment for narcolepsy are similar for children and adults, the role of the parents in childhood and adolescence is especially important. Children and adolescents with narcolepsy can experience the illness with a sense of failure, and because of this they show problems with behaviour, lack of motivation, depression and difficulty relating to their friends, which involves a noticeable reduction in quality of life. There are a series of strategies that can be implemented, related to the social, family and academic contexts within which a child develops, so that the disorder has less of an effect and the child can lead a normal life.

- ***Information and education:*** it is the cornerstone, and its objective is to ensure that a child is not ignored or held up as an object of ridicule. Excessive daytime sleepiness involves attention problems and the appearance of spontaneous sleep episodes that delay learning, and a child suffers the consequences, with a decrease in academic performance. Because of a lack of understanding about the illness, in the social environment where children interact (school, teachers, friends, some relatives, neighbours), they are sometimes accused of being 'lazy', 'idle' or even drug addicts. Parents must inform the school, friends and acquaintances about the illness and the needs of their child. This can achieve the following:
- Transmitting the message to the child that they can be a good student despite having narcolepsy.
- Adapting school hours and tasks to the child's needs.
- Children receiving supervision when they perform potentially dangerous activities (such as swimming).
- Children receiving help when they have a cataplexy attack, for example.
- In addition to the aforementioned and with respect to adolescents, they must know that they must avoid driving vehicles. Legislation in force states that persons with narcolepsy may not obtain or extend a driver's license, unless a favourable medical report is issued, in which case the validity period of the license can be reduced according to the physician's opinion.
- ***Sleep hygiene:*** a very important aspect is education about healthy sleep habits. Appendix 1 offers these strategies in detail.
- ***Scheduled naps:*** excessive daytime sleepiness can be partially controlled if a child sleeps a short, scheduled nap during the day.
- ***Pharmacological treatment:*** the decision about using drugs for narcolepsy is established at a secondary care or Hospital Care.

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What should I keep in mind when going to the health centre?

During a visit to your health centre and in the process of evaluating and following up on your child, you will have to deal with various professionals. The following suggestions could be useful for facilitating the relationship and communication with them:

First, keep in mind that your child and you are the most important part, and it is therefore a good idea to express your preferences, during both the diagnostic process and regarding the different treatment options. Therefore:

- Showing your emotions and expressing your concerns to professionals are positive steps. You can trust your Primary Care team. They are there for you, and they will understand your fears, doubts and problems.
- Prepare what you want to say before you go. You are one of the people who know your child the best, and you have very valuable information that you should share. Forget about preconceived notions originating from opinions previously received from the family, or even from other professionals.
- Don't be afraid to ask questions regarding subjects about which you are unclear.
- Ask that the information be given to you in plain language, without the use of technical terms. Clear up any problems that may arise.



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Appendix 1. Preventive and sleep hygiene strategies, according to age, for acquiring or maintaining a good sleep pattern.

Under the age of 2 months

- It is very important for babies to remain awake while eating, given that they will thus begin to associate food with the wake state. It is fairly difficult to keep babies awake, because they tend to fall asleep. Parents have to talk to them, be affectionate with them and stimulate them gently so that they maintain a certain alertness. It is recommendable for parents to feed their children in the same place whenever they can, with comfortable light, gentle background music and a pleasant temperature.
- It is very normal for some intervals between feedings to be shorter or longer. It doesn't matter. The same routines should be followed.
- After each meal, it is important to hold a baby awake in your arms for about 15 minutes. This will facilitate the elimination of gases and will possibly prevent some colic.
- After changing a baby, leave them in the crib, trying to ensure that they are always awake so that they learn to fall asleep on their own.
- These routines should be repeated every time that a child wants to eat during the day and at the nighttime feeding, except for the time when they are being held in your arms after feeding. This feeding will be shorter, only 5 minutes, because it is the feeding that a child will slowly do away with, thus being able to sleep more hours consecutively.
- It is advisable to keep the nighttime feeding short and uneventful. The intention is to send the initial message to a child that nighttime is for sleeping. When a child wakes up at night to feed, do not turn on the light, do not speak to them and do not lull them. Feed him soon and in silence. If you have to change their diaper, do so with the least possible amount of stimulus.
- It is recommendable that a mother follow the same sleep times as her child. This will partially help to prevent post-partum depression. It has been demonstrated that one factor that causes this depression is the mother's lack of sleep when feeding her child.
- Regarding sleep, it is important to know the following:
- Crying is not the same as hunger. During the first few months, crying is the baby's only means of communication. It is important to know the types of cries to be able to deal with a baby correctly. When a child is hungry, the crying is energetic, and it slowly gets stronger and more rhythmic. Occasionally, babies may hit themselves in the cheek, bite their fist or suck on their fingers. When they feel pain, the first shriek is sharp and prolonged, followed by a long pause of apnea and short panting, followed by wailing again. If they have gas, they stretch and contract their legs and arms. When babies feel lonely, they begin with a whine, followed by complaining that ceases when a baby is picked up. When a baby is nervous, they cry strongly and do not respond to their parents' attempts at calming them. It is usually due to excessive stimuli, and this type of crying usually appears in the afternoon.

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- Avoid playing with the baby at night. Save this activity or any other that stimulates a baby (cuddling, caressing, etc.) for periods when the baby remains awake during the day.
- Babies should be placed in the crib when they are awake but sleepy. Their last memory before going to sleep should be the crib and not the presence of food. The intention is for a baby to accept the crib as a familiar nighttime space.
- Right from the beginning, develop a pre-sleep routine (such as a bath-massage, a lullaby or any other routine and peaceful activity), which should end in the bedroom.
- However, it is not a good idea for a baby to fall asleep as soon as their head hits the pillow. Children take about 20-30 minutes to fall asleep. Parents should try not to be present during this period.

From 2 to 5 months

- Make the child's bedtime always the same. Using different routines could hinder development of the sleep habit.
- Do not wake a baby up at night to feed him. If he becomes restless, it's a good idea to wait 5 minutes to see if he is hungry. Before feeding a baby, a mother should try to lull the baby to sleep for a brief period. If it's necessary to feed the baby, the time during which they are offered to breast feed or the amount of milk in a bottle should be reduced.
- At around 3 months, a decision should be made regarding the place where a child is going to sleep, and the appropriate changes should be made; for example, going from the bassinet to the crib or from the parent's bedroom to the child's own bedroom.

From 5 to 12 months

- During the first 8 months, it is common and normal for babies to wake up at night. They shouldn't be fed at night, given that at this age a healthy child no longer needs it, and you should try not to change the atmosphere by turning on a light or taking the baby out of the crib. The child should be consoled with caresses and tender words.
- A transitional object, such as a stuffed animal or a safe toy, can be given to a baby to be their companion in the crib.
- The bedroom door should be left open.
- Every day, apply and complete the pre-sleep routine that you have established (bath, pyjamas, song-story or any other routine and relaxed system that works for you), which should end in the child's bedroom.
- Be sure to place a child in the crib or bed while they are sleepy but still awake, which gives them the opportunity to learn to fall asleep on their own.

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As from 12 months

- The atmosphere should be peaceful and dark.
- The bedroom temperature should be comfortable: excess heat or cold favours waking up at night.
- Ambient noise should be the minimum possible.
- The daily bedtime should be approximately the same time every day. The daily wake time should be approximately the same time every day.
- Avoid putting the child to bed if he is hungry. However, an excess of liquids favours waking up at night.
- The child must learn to fall asleep on his own, without help. If he throws tantrums, don't pay attention. Parents should leave the bedroom, and if a child gets up, he should be put to bed immediately, and you should avoid talking to him. Above all, the parents' attitude must be firm: you must always do the same thing and be certain that this is what has to be done.
- The message must be sent that the child is being taught to go to sleep on his own, and this isn't any type of punishment or dispute between the parents and the child.
- Vigorous physical activity should be avoided 1-2 hours before putting the child to bed.
- Certain foods should be avoided, such as caffeinated beverages, chocolate, etc.
- Very long or late naps should be avoided.
- Remember that the routine prior to bedtime should end in the child's bedroom. Completing this routine the same way, every day, helps a child to feel secure and helps them foresee and anticipate what is expected of him.

At 2 years of age

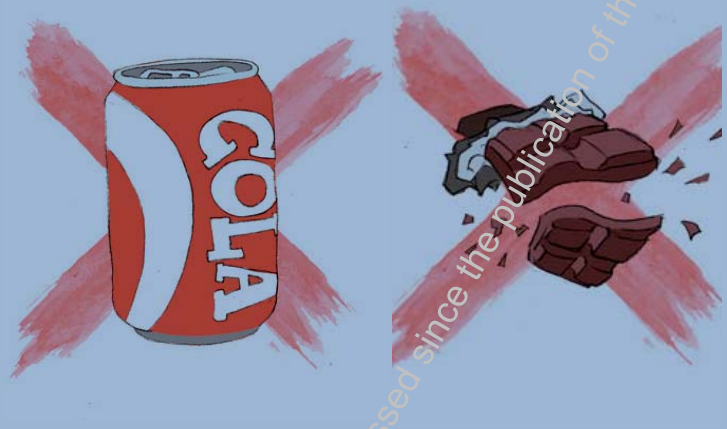
- When a child complains or cries at night, you should think about what has happened during the day. Do not shout at a child when this happens; he should be secure in the fact that his parents are there to calm him down if necessary.
- Parents should not impose upon themselves any time limit for managing to get a child to sleep well. It probably won't happen, and there will be even more stress. Parents should limit themselves to following the routines.
- Don't lose control when a child wakes up in the middle of the night. The message that the child is capable of falling asleep on his own should be conveyed. If the parents get upset, the child will just get even more agitated.
- If there has been any recent change in a child's life, he shouldn't be expected to sleep deeply.
- If a child is allowed to sleep outside the bed, it won't at all help him to learn how to sleep on his own.
- Parents must think that, when a child sleeps in the parents' bed, the child's sleep physiology is altered, in addition to the parents'. The sleep of older children who sleep with their parents is less restorative, and there is a greater risk of asphyxia.
- The breast, bottle or pacifier may seem very useful for falling asleep, but a child will end up needing them whenever he has to go to sleep and whenever he wakes up.
- Establish clear limits (number of stories, songs, etc.) if a child complains or objects when left alone.

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- A couple should take turns: they will rest more, and the child will not be in charge of the night. If this is not possible and if a parent starts to get upset, they should take a break. The important thing is sending the message of calmness and educational certainty.
- Every family has its own level of tolerance and its own beliefs: there are no good systems or bad systems, just different ones.

2-5 years

- During the day, it is recommendable that children take a nap as a complement to nighttime sleep.
- Avoid putting a child to bed hungry or after drinking too much liquid.
- Be especially careful about not emphasising anxiety or fear by alluding to the 'bogeyman', ghosts, etc.
- Dispense with the consumption of stimulating beverages/foods (chocolate, caffeinated beverages, etc.).
- Try to avoid vigorous physical activity 1-2 hours before putting a child to bed.
- Avoid very long or late naps.
- Avoid associating food or sleep with punishment or rejection.
- If a child sporadically has difficulties getting to sleep, think about what has happened during the day, and don't shout at the child. Security and calmness should be the message sent to the child.
- No time limit for falling asleep that day should be imposed: it will be very difficult to meet that limit, and the child's anxiety or nervousness will increase.
- A parent mustn't lose their cool. The message we are trying to send is: 'you're able to enjoy sleeping alone'.
- If parents get upset, a child will become even more agitated. A couple should take turns. If this is not possible, the parent should leave the room for a few minutes, rest, drink some water and when they are more relaxed, start again.
- At this age, routinely sleeping outside the bed is not going to help a child learn to fall asleep.



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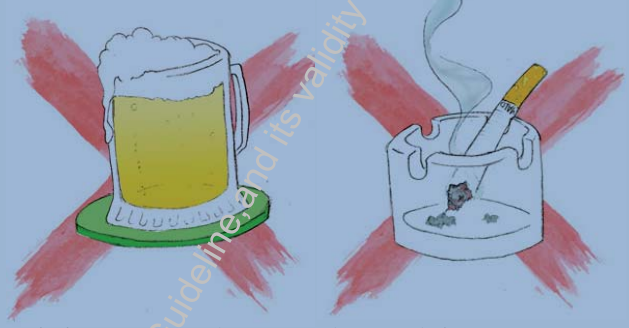
Adolescent stage

Directed at families

- It is important to have information about changes in adolescence, especially about the normal delay of sleep onset, increased needs for sleep and the alterations that occur to sleep due to the use of mobile phones, internet, etc., right before going to bed.
- It is essential to learn to recognise the signs of sleep deficit in young people: irritability, difficulty waking up, recovery of sleep on weekends, etc.
- There must be family dialogue about sleep and its influence on health and wellbeing. The objective is to sensitise adolescents about the importance of sleep.
- The importance of setting the example of good sleep hygiene habits by the parents must be kept in mind.
- It is advisable to favour a sleep-friendly atmosphere in the home at the end of the evening or the initial nighttime hours.
- The attempt should be made to prevent young people from compensating for the sleep deficit accumulated during the week by increasing sleep hours on the weekends, beyond what is reasonable. If they are allowed to sleep a few more hours, it could be beneficial; but if they get up at noon on Sunday, it will be difficult to get back to the usual bedtime that night.

Directed at adolescents themselves

- Keep regular schedules. Even on weekends!
- Exposure to intense light in the morning helps to advance the sleep phase. It is not advisable to use sunglasses routinely.
- Stimulating activities should be promoted during daytime hours when there is a tendency to sleep.
- If a nap is taken, it should be short, between 30 and 45 minutes, and it should be taken during the first hours of the afternoon.
- There are certain substances, such as tobacco and other drugs, which are harmful to sleep and to health in general.



- It is important to have regular meal times.
- Stimulants (caffeine, cola drinks, etc.) should also be avoided, especially after the midday meal.
- Regular physical exercise is necessary, although never in the hours right before going to bed.
- Wakeful activities (studying, video games, using mobile phones, etc.) should be avoided one hour before going to sleep.
- Avoid falling asleep with the television on, given that this decreases the depth of sleep. Ideally, a television should not be placed in the bedroom.
- It is good to learn to relax and adequately express emotions.

Source: Modified from the Paediatric Group of the Spanish Sleep Society (SES) and the Sleep Unit of the Spanish Society of Out-patient Paediatrics and Primary Care (SEPEAP). 2010.

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Appendix 2. Education for parents about paediatric sleep.

Parents' ideas and attitudes about sleep can have an influence on the appearance and development of subsequent problems. The following information allows having better knowledge about the ideal behaviour to follow for facilitating the normal sleep of a child.

- Just like we teach children other behaviours that help them to achieve a progressive degree of autonomy, we must teach them to sleep alone.
- Our obligation as parents is not to put the child to sleep, but rather facilitate the ability for them to get to sleep and learn to fall asleep alone.
- To prevent problems with sleep, the normal development of sleep-wake patterns must be favoured. For a child's complete maturation, good attachment is fundamental. Attachment is the affective link that a child usually establishes with the mother or the person who takes care of the child most of the time. It is not dependency, and it does not involve over-protection. It should be an element of security and will evolve over the first few years of life.
- To establish good attachment, it is important to:

  1. Perceive a child's signals and respond to them correctly and quickly.
  2. Always respond the same way to the same behaviour of a child, even though we may be tired or be taking care of something else.
  3. Maintain frequent although not overwhelming physical contact with a child.
  4. Allow a child to make decisions, insofar as they can, to favour their autonomy.

- For the child, sleeping may represent separation. Good separation means a predictable and routine act that contributes satisfaction and security, to both the parents and the child, while bad separation will make a child respond with anxiety, make the parents feel pressured emotionally and make them both fearful when new separations occur. It is advisable to establish gradual distancing during the day, thereby allowing children to be in other rooms, entertaining themselves alone.
- All adults who participate in teaching the sleep habits must act the same way. A child must know that, whatever happens, they are going to get the same, adequate response from the parent or caretaker.
- A child's reaction to re-education can be tough (getting out of the crib or bed, shouting, making a fuss), they may want to negotiate ('stay just a minute', 'read me one more story'), they can play the role of the victim (crying with true sadness), they can make constant requests ('I want a glass of water', 'I need to go to the bathroom') or they can do anything else that forces us to deal with them.
- When nothing has worked, despite everything, and we're facing a sleep problem with a child, what we must do is re-educate. To do so, it is important to know that one of the conditions that favours good sleep in a child the most is the feeling of security that we are able to transmit to them, but above all the feeling that the child can perceive in our attitude, tone of voice and gestures.
- Parents must be convinced that what they are doing is the best thing for their children.

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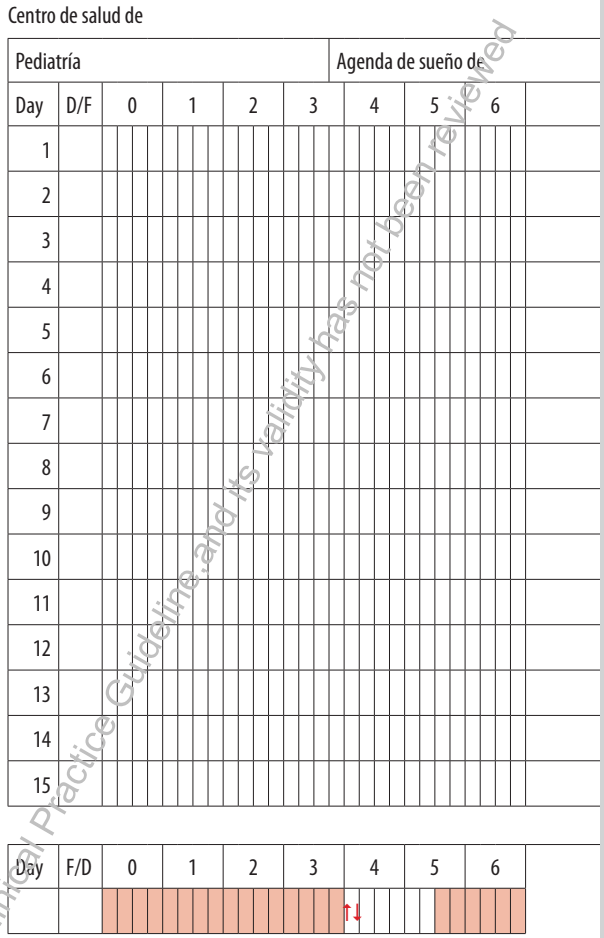
Appendix 3. Sleep-wake log or diary.

This instrument allows parents to gather important information about the sleep-wake schedules of their children.

Instructions

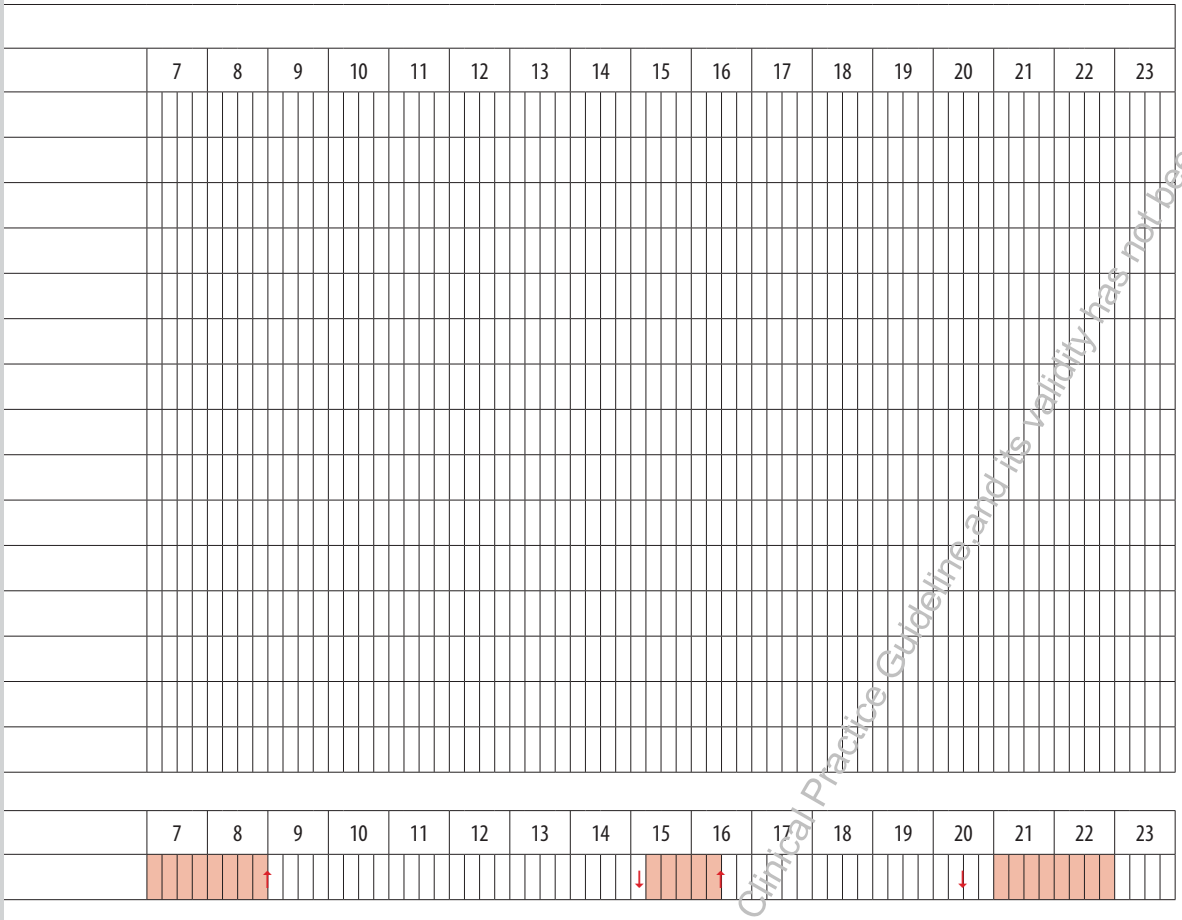
- Fill it in every morning according to what is recalled from the previous night.
- Fill it in every night to report the sleep conditions during the day (such as any naps taken).
- Shade the boxes corresponding to the sleep and nap times.
- Include in the log the information indicated below by writing the corresponding letter:
  - Bedtime: A
  - Wake time: L
  - Time when the light is turned off (darkness): O
  - Nocturnal awakenings: D
  - Light turned on: E

Fill in the hours when the child is asleep and leave blank when the child is awake. Mark with downward arrow when the child is put to bed and with an upward arrow when the child gets up. D/F: Sundays or holidays.



For example: the child sleeps until 4 in the morning. The child gets up at 4 and goes back to bed at 4:15. He stays awake until 5:30,

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and he then falls asleep until 9. The child gets up at nine. At 3:00 p.m. the child is put down for a nap and falls asleep at 3:15, waking up at 4:30 p.m.

The child is put down to bed at 8:30 p.m. and sleeps from 9 p.m. to 11 p.m. From 11 p.m. to 12 a.m., the child remains awake.

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Appendix 4. Psychological interventions for insomnia problems.

Before putting any of these techniques into practice, follow the advice of your paediatric team, because they know the child or adolescent and also know the parents, and they can recommend the techniques that they consider to be the most effective according to the particular case.

In order to understand the functioning and success of these techniques, it is advisable for parents to know that a child's behaviour is regulated by their consequences, such that if the consequences are positive, the behaviour will tend to be repeated; but, conversely, if the consequences are negative, the behaviour will be eliminated.

You must remember to always use positive reinforcement (praise the execution of the desired behaviour whenever it may occur) and as immediately as possible after achieving the desired behaviour (first thing in the morning, coinciding with when the child wakes up). A reward programme could be established (small rewards), which can be increased as achievement of the behaviour progresses (for example, three consecutive nights). Conversely, avoid any type of punishment due to the absence of achievements.

Graduated extinction

The following instructions should be followed when applying graduated extinction:

- The parents' attitude must be calm and firm, thereby attempting to eliminate any emotional reaction of anger, irony or threat.
- After having completed whatever the pre-sleep routine is, which will have ended in the child's bedroom, leave the child in bed (still awake), turn out the light and leave the bedroom with a brief goodbye, such as 'time to go to sleep', 'goodnight' or 'see you in the morning'. Some children need a nightlight, which they will voluntarily do away with later, and sometimes flexibility on this point will facilitate your job.
- Before going into the bedroom to calm your child, you must wait a period of time, during which the child will normally have been crying.
- Whenever you go into the child's bedroom, you must do so calmly, without approaching the crib or bed and without taking the child out. Your stay in the child's room shouldn't last longer than a minute, during which time you must assure the child that nothing is wrong and that you are there, afterwards leaving the room.
- You must only enter the room if the child cries during the entire waiting period or calls you non-stop.
- While there is no optimum waiting period for all children, rather it depends on both their temperament and the parents', a table with suggested waiting times is offered below:

Day	1st wait time	2nd wait time	3rd and subsequent wait times
1	1 minute	2 minutes	3 minutes
2	2 minutes	3 minutes	5 minutes
3 and subsquent days	3 minutes	5 minutes	From 5 to 7 minutes

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- Once sleep has started, if the child wakes up during the course of the night and calls for attention, repeat the process following the same system of waiting periods used at the beginning of the night.
- The second day is usually harder than the first, given that the child knows what's going to happen.
- Be patient, be firm and use positive reinforcement as from the first achievement.

Delaying bedtime

When a child takes a long time to fall asleep, this method can be used to modify their sleep schedule. It seeks to bring bedtime as close as possible to the rapid onset of sleep.

- First complete all the positive routines that make up the pre-sleep ritual that is established.
- Progressively delay the child's bedtime by 30 minutes with respect to the time the child previously used to go to bed, until you find the time when the child falls asleep quickly (in 15-30 minutes), always keeping the wake time the same.
- If, by delaying the bedtime the expected rapid onset of sleep does not occur, take the child out of bed at that time and keep him awake for a period of time (30-60 minutes) before allowing him to go back to bed.
- After succeeding in establishing the time when rapid sleep onset occurs, this time should be advanced by 15 minutes every 2 or 3 nights.
- Be patient, be firm and use positive reinforcement as from the first achievement.

Scheduled awakenings

- Before being able to apply this technique, you must keep a log that allows knowing the child's usual pattern of spontaneous awakenings during the night. In other words, you should know the times when those awakenings occur in order to anticipate when they will occur.
- With the log done, wake up the child between 15 and 30 minutes before the expected time of each of the awakenings and give the child the usual attention (calm them, cover them).
- If the child's spontaneous awakenings do not disappear after a few days, the period of time between the scheduled awakenings will be progressively increased until the spontaneous awakenings disappear.

Stimulus Control for adolescents

In order to break the association between the context in which an adolescent falls asleep and insomnia, the instructions below can be followed:

- Do not use the bed or the bedroom for any activity other than sleeping. Don't read, don't watch television, don't talk on the phone, avoid worries, avoid arguing with the family and avoid eating in bed.



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- Establish a series of regular routines before going to sleep, which indicate that the time for going to bed is approaching: for example, close the door, brush your teeth, turn on the alarm clock and take care of everything else that is logical at this time of night. Carry out these routines every night in the same order. Get in your preferred sleeping position, and arrange your preferred pillows and blankets.
- When you're in bed, all the lights should be turned off, with the intention of going to sleep immediately. If you cannot get to sleep after a short while (approximately 10-15 minutes), you should get up and go to another room. It is advisable to engage yourself in a relaxing activity until you feel sleepy, at which time you should go back to the bedroom to sleep.
- If you don't fall asleep in a short period of time, repeat the preceding step. Do it as many times as necessary during the night. This same procedure should be used if you wake up in the middle of the night and cannot get back to sleep within approximately 10 minutes.
- Keep a regular wake time in the morning. Turn on the alarm and get up at approximately the same time every morning, on both weekdays and holidays, regardless of the time you've gone to bed, this regulates your internal biological clock and synchronises the sleep-wake rhythm.
- Do not take any nap during the day. If you stay awake all day, you'll be sleepier at night, which will then facilitate going to sleep more quickly. However, if daytime sleepiness is too overwhelming, you can take a short nap after eating, as long as you sleep no more than half an hour.



- Try to relax at least one hour before going to bed. Avoid thinking about your problems while in bed. At some other time in the day you can set aside 30 minutes for thinking about whatever might be worrying you or about things that you have pending, thereby trying to find solutions (writing them down on a sheet of paper or in a planner could help). If worries return while you're in bed, repeat to yourself: 'Enough already, I'll think about it tomorrow. Now it's time to sleep'.
- Avoid negative thoughts such as 'I'm not going to be able to sleep today'. Instead, think 'today, I'm simply going to relax and rest'.
- Remove your clock from the nightstand: looking at it every so often will only create more anxiety and will make it difficult to fall asleep.
- Do not use the computer before going to bed, because the luminosity of the screen can act as a neurological activator.



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Where can I learn more about sleep problems?

Some books that can be consulted:

- Lara Jones. La noche estrellada de Lupe. Madrid. Ed. SM, 2008.
- Van Genechten, Guido. El libro de las buenas noches. Madrid. Ed. SM, 2008.
- Slegers, Liesbet. Nacho tiene una pesadilla. Zaragoza. Edelvives Infantil, 2006.
- Anna Canyelles. Odio la siesta. Barcelona. Edebé, 2006.
- Child Lauren. No tengo sueño y no quiero irme a la cama. Ediciones Serres, 2005.
- Sykes Julie, Williamson Melanie. ¡A la cama, ovejitas! Zaragoza. Edelvives, 2009.

Associations of patients and relatives

- ASENARCO. Spanish Sleep Association, telephone: 976 282765 (Zaragoza)

E-mail: asenarco@hotmail.com

Web page. http://www.asenarco.es/

- AEN. Spanish Narcolepsy Association, telephone: 91 533 89 36 (Madrid)

Web page. http://www.narcolepsia.org/

- AESPI. Spanish Association of the Restless Legs Syndrome

Telephone: 91 345 41 29 (Madrid)

Telephone: 93 212 13 54 (Barcelona)

Web page. http://www.aespi.net/

Internet resources

Other sources of information that can be used for more in-depth knowledge of all these sleep disorders include the following:

- Spanish Sleep Association, http://www.sesueno.org/.
- National Sleep Foundation. http://www.sleepfoundation. org/ es/article/en-español/los-niños-y-el-sueño
- National Library of Medicine of the USA. Medline Plus. http://www.nlm.nih.gov/medlineplus/spanish/ ency/article/002392.htm

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Learning to know about and manage sleep problems in childhood and adolescence

Information for parents, educators and adolescents

The information contained in this document attempts to provide advice and practical and simple guidelines for parents, caretakers and educators of children with sleep problems or for those who simply would like information about the preventive strategies that can be used so that these problems don't appear, thereby improving their health and their quality of life. It is also directed at older children and adolescents so that they themselves are capable of recognising the importance of sleep in their daily lives and can follow some minimum guidelines about getting appropriate sleep. Other resources are also included, such as reference books, patient associations and multimedia applications that are available on the Internet, which can also help you to manage slep.

Available at:

www.guiasalud.es

www.madrid.org/lainentralgo

Appendix 16. Glossary and abbreviations

Glossary

- **Actigraphy:** a test that, using an accelerometer placed on the patient's wrist, records the circadian activity. When no movement is recorded, the patient is sleeping, and therefore it is an indirect test for measuring the quantity of sleep. It is not advisable to use this technique by itself as a means for diagnosing insomnia or for evaluating the severity of the problem.
- **Arousal:** an abrupt change from deep sleep to a more superficial phase or state of wakefulness, which may or may not lead to awakening. This state of wakefulness is brief in duration, and the subject does not become conscious. This state is recognised in polysomnographic recordings, which fundamentally consider modifications of the electroencephalogram and of the electromyogram.
- **AGREE** (Appraisal of Guidelines, Research and Evaluation in Europe): an international initiative to facilitate the design and appraisal of clinical practice guidelines.
- **Axial muscle atonia:** lack of tone, vigour or weakness in organic tissues.
- **DALY** (Disability-Adjusted Life Year): a measure of the overall disease burden that reflects the number of years that a person could have lived but were lost due their premature death, and the years of productive life lost due to a disability.
- **Disease Burden** (DB): it is an indicator that allows measuring the health losses that, for a population, are represented by both the fatal consequences and non-fatal consequences of diseases. Their unit of measurement is the disability-adjusted life years (DALY).
- **Cochrane Library:** a database on effectiveness produced by the Cochrane Collaboration, consisting of original systematic reviews, among others, by this organisation.
- **Systematic desensitisation:** an exposure technique in which a subject is presented with stimuli in a hierarchical manner, beginning with those that produce lower levels of anxiety. This exposure can be done in the imagination or live.
- **RCA** (Randomised clinical trial): it is a study design in which the subjects are randomly assigned to two groups. One group (the experimental group) receives the treatment that is being tested, and the other group (the comparison or control group) receives a standard treatment (or sometimes a placebo). The two groups are monitored to observe any difference in the outcomes. The efficacy of the treatment is thus assessed.
- **Sleep efficiency:** percentage of sleep obtained with respect to time in bed. It is calculated using the following formula: [(total sleep time)/(total time in bed)]*100. *Sleep efficiency* < 85% is considered to be clinically significant.
- **Embase:** a European database (Dutch) produced by Excerpta Médica, with clinical medicine and pharmacology content.

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- **In-depth interview:** this is a qualitative research technique for obtaining information through a conversation with an interviewee who has previously established characteristics and an interviewer.
- **Case-control study:** this is a study that identifies persons with an illness (cases), such as lung cancer, and it compares the cases with a group without the illness (control). The relationship between one or several factors (for example, tobacco) related to the illness is examined by comparing the frequency of exposure to this factor or to other factors between the cases and the controls.
- **Primary study:** a study that collects original data. Primary studies are differentiated from synopses and reviews, which encompass the outcomes of primary individual studies. Systematic reviews are also different, which summarise the results of a group of primary studies.
- **Transversal descriptive study:** it is a study that describes the frequency of an event or of an exposure at a certain point in time (single measurement). It allows examining the relationship between a risk factor (or exposure) and an effect (or outcome) in a defined population and at a certain point in time (a cut-off). They are also called prevalence studies.
- **Discussion group:** a qualitative research technique that serves to identify attitudes, positions, assessments or perceptions about something or someone that a group of individuals has.
- **Sleep spindle:** a series of waves that are expressed rhythmically at a frequency of 11-16 Hz (generally 12-14 Hz), with a duration of at least 0.5 seconds, the maximum amplitude of which is usually observed in central regions.
- **Confidence interval:** it is an interval within which the true magnitude of the effect is found (it is never known exactly), with a pre-set degree of certainty or confidence. We often speak of a '95% confidence interval' (or '95% confidence limits'). It means that the true value would be found in this interval in 95% of the cases.
- **Qualitative research:** it is a methodology that encompasses a number of theoretical currents, methods and techniques, and it is characterised by studying phenomena in their natural context, thereby trying to find the meaning or the interpretation of the phenomena based on the meanings that people give them. This research uses empirical materials (interviews, observations, texts, etc.) that can better describe both routine and problematic situations and what they mean for the lives of individuals.
- **Sleep latency:** the time elapsed between when some goes to bed and the time when they fall asleep.
- **Maintenance of nighttime sleep (number)**: number of awakenings throughout the night.
- **Medline:** a predominantly clinical database produced by the US National Library of Medicine, available on CD-ROM and on the Internet (PubMed).

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- **Meta-analysis:** it is a statistical technique that allows integrating the outcomes of various studies (diagnostic test studies, clinical trials, cohort studies, etc.) into a single estimator, thereby giving more weight to the outcomes of the larger studies.
- **Morbidity:** an illness or the frequency at which an illness is present in a population.
- **Mortality:** the rate of deaths or the number of deaths due to a certain illness in a group of persons and within a certain period.
- **NICE:** it forms a part of the NHS (National Health Service of England). Its role is to provide doctors, patients and the general public with the best available evidence, basically in the form of clinical practice guidelines.
- **Participant observation:** it is a qualitative research technique that establishes deliberate communication between the observer and the observed phenomenon. The researcher captures the keys to what is observed, interprets what is occurring and this obtains systematic and complete knowledge of the observed reality.
- **Parasomnia:** a sleep-related behaviour disorder associated with brief or partial episodes of awakenings, without causing a major interruption of sleep or an alteration of the level of the daytime wakeful state. The symptom of presentation is usually related to the behaviour itself. Parasomnias do not mean an abnormality of the mechanisms that govern the circadian rhythm or of sleep and wake times.
- **Placebo:** a substance administered to a control group of a clinical trial, ideally identical in appearance and taste to the experimental treatment, which is believed to have no specific effect on that illness. Within the context of non-pharmacological interventions, the placebo is usually called the simulated treatment.
- **Polysomnography:** this technique records, during the night, various aspects related to a patient's sleep, such as the brain's electrical activity or muscle tone, among others, and it is represented by a hypnogram. It is considered to be a complementary test to the medical record and does not diagnose insomnia. It is indicated when the initial diagnosis of insomnia is uncertain or when treatment has been ineffective.
- **Prevalence:** the proportion of persons with a finding or an illness in a certain population at a given point in time.
- **Cognitive restructuring:** it is an intervention that involves posing questions to help people question the stereotyped and repetitive thoughts and images that increase fears, thereby replacing these irrational or distorted thoughts with other, more rational ones.
- **Resistance to sleep, fear of sleeping alone:** persistence, during more than 1 hour per night for one month, of protesting, of objections to going to bed and of rituals such as repeated goodnights, lights on, door open, etc.
- **Systematic review (SR):** it is a review in which the evidence about a subject has been systematically identified, assessed and summarised according to predetermined criteria. It may or may not include a meta-analysis.

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- **Circadian rhythms (CR):** they are intrinsic and periodic biological rhythms that occur at a 24-hour interval, the study of which is undertaken in a field called chronobiology.
- **Ultradian rhythm:** individual states of sleep that occur within the intervals of the body's circadian cycle, especially in reference to the ultradian cycle of 90-120 minutes of human sleep.
- **Case series:** analyses of series of patients with an illness.
- **SIGN:** a multi-disciplinary Scottish agency that prepares clinical practice guidelines based on evidence, as well as methodological documents on the design of the same.
- **Continuous sleep:** the presence of nighttime sleep without waking up, which requires no parental intervention, from at least 00:00 hours to 05:00 hours.
- **Exposure techniques:** behaviour modification techniques directed at reducing the responses of anxiety and at the same time eliminating the motor behaviours of avoidance and flight by presenting phobic stimuli to subjects, whether imaginary or live.
- **Cognitive behavioral therapy (CBT):** it is a form of structured psychotherapeutic intervention that uses diverse techniques to try to change dysfunctional beliefs and negative automatic thoughts.
- **Multiple Sleep Latency Test (MSLT):** a standardised diagnostic method that allows daytime sleepiness to be objectively measured. Using a polysomnographic record, this test measures the tendency to sleep, thereby offering the patient the opportunity to sleep in a bed and in the dark for approximately 20 minutes and at 2-hour intervals.
- **Total sleep time:** total time of nighttime sleep obtained.
- **Awake time after sleep onset:** total time of nighttime wakefulness as from sleep onset until final awakening.
- **Total awake time:** total time of nighttime wakefulness.
- **Arousal disorders:** disorders that have to do with the NREM sleep stages, in which physiological and psychological alterations occur, which may or may not lead to an awakening (arousals).
- **Sleep-wake rhythm disorder:** the presence of a destructured sleep pattern due to poor synchronisation between the endogenous circadian rhythm and the demands of the environment in which one lives.

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Abbreviations

ASA: Acetylsalicylic acid.

AASM: American Association of Sleep Medicine.

TCAD: Tricyclic antidepressants.

HC: Hospital Care.

AEP: Spanish Paediatrics Association.

AEPap: Spanish Association of Primary Care Paediatrics.

AEPC: Spanish Association of Behavioral Psychology.

AGREE: Appraisal of Guidelines Research and Evaluation.

NSAIDs: Non-steroidal anti-inflammatories.

ASENARCO: Spanish Sleep Association.

PC: Primary Care.

ASDA: American Sleep Disorders Association.

YLD: Years lived with a disability or poor health.

YLL: Potential years of life lost due to premature death.

DALY: Disability-adjusted years of life.

BEARS: (B = Bedtime Issues, E = Excessive Daytime Sleepiness, A = Night Awakenings, R = Regularity and Duration of Sleep, S = Snoring).

BISQ: Brief Infant Sleep Questionnaire.

BZD: Benzodiazepines.

ICPC-2: International Classification of Primary Care.

ICD-10: International Statistical Classification of Diseases and Related Health Problems.

CINAHL: Cumulative Index to Nursing & Allied Health Literature.

CINDOC: Centre of Scientific Information and Documentation of the High Council of Scientific Research.

Co2: Carbon dioxide.

CPAP: Continuous positive airway pressure.

DARE: Database Abstracts of Reviews Effects.

DLMO: Dim Light Melatonin Onset.

DSM-IV: Diagnostic and statistical manual of mental disorders (4th edition).

RCT: Randomised clinical trial.

EEG: Electroencephalogram.

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TENS: Transcutaneous electrical nerve stimulation.

EMG: Electromyogram.

NFLE: Nocturnal frontal lobe epilepsy.

COPD: Chronic Obstructive Pulmonary Disease.

EOG: Electro-oculogram.

EDS: Excessive daytime sleepiness.

ESS: Epworth Sleepiness Scale.

FLEP: Frontal Lobe Epilepsy and Parasomnias.

CPG: Clinical Practice Guideline.

TH: Tonsillar hypertrophy.

HTA: Health Technology Assessment.

AI: Apnea Index.

AHI: apnea-hypopnea Index.

RDI: Respiratory disturbance index per hour of sleep.

REI: Respiratory events index per hour of study (in nighttime respiratory polygraphy).

CI: Confidence Interval.

ICD: International Statistical Classification of Diseases and Related Health Problems.

ICSD: International Classification of Sleep Disorders, Diagnostic and Coding Manual.

INAHTA: International Network of Agencies for Health Technology Assessment.

MAOI: Monoamine oxidase inhibitors.

BMI: Body Mass Index.

SNRI: Serotonin and norepinephrine reuptake inhibitor.

SSRI: Selective Serotonin Reuptake Inhibitor.

LG: Legislation.

NANDA: North American Nursing Diagnosis Association.

PLM: Periodic Limb Movements.

NHS: National Health Service.

NIC: Nursing Interventions Classification.

NICE: National Institute for Clinical Excellence.

NOC: Nursing Outcomes Classification.

NREM: Non Rapid Eye Movement.

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WHO: World Health Organization.

OR: Odds Ratio.

ORL: Otolaryngologist.

BP: Blood Pressure.

PICO: Patient-Intervention-Comparison-Outcome.

RP: Nighttime respiratory polygraphy.

NPSG: All-night polysomnography.

PSQ: Pediatric Sleep Questionnaire.

PSAS: Pre-Sleep Arousal Scale.

PSQI: Pittsburgh Sleep Quality Index.

RDI: Respiratory Disturbance Index.

RERA: Respiratory event related arousal.

REM: Rapid Eye Movement.

SR: Systematic Reviews.

OSAHS: Obstructive Sleep apnea-Hypopnea Syndrome.

ASPS: Advanced Sleep-Phase Syndrome.

EDS: Excessive Daytime Sleepiness.

SDSC: Sleep Disorder Scale for Children.

SEMA: Spanish Society of Adolescent Medicine.

SEG: Spanish Society of Geriatrics and Gerontology.

SENEP: Spanish Society of Paediatric Neurology.

SENFC: Spanish Society of Clinical Neurophysiology.

SENP: Spanish Society of Paediatric Respiratory Medicine.

SEORL: Spanish Society of Otolaryngology.

SEPEAP: Spanish Society of Out-of-Hospital Paediatrics and Primary Healthcare.

SES: Spanish Sleep Society.

SIGN: Scottish Intercollegiate Guidelines Network.

MH: Mental Health.

CNS: Central Nervous System.

SNS: National Health System.

SOL: Sleep Onset Latency.

SOREMp: Sleep Onset Rapid Eye Movement Period.

RLS: Restless Legs Syndrome.

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UARS: Upper Airway Resistance Syndrome.

DSPS: Delayed Sleep-Phase Syndrome.

ASD: Autistic Spectrum Disorders.

BT: Behavioral Therapy.

CBT: Cognitive Behavioral Therapy.

ADHD: Attention Deficit Hyperactivity Disorder.

MSLT: Multiple Sleep Latency Test.

PLMD: Periodic Limb Movement Disorder.

CRD: Circadian Rhythm Disorder.

SRBD: Sleep-Related Breathing Disorders.

UESCE: Spanish Union of Scientific Nursing Societies.

UETS: Health Technologies Assessment Unit.

UA: Upper Airway.

RSV: Respiratory Syncytial Virus.

WONCA: World Organisation of National Colleges, Academies and Academia Associations of General Practitioners/Family Physicians.

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Appendix 18. Declaration of interests.*

Mª Inés Hidalgo Vicario, Francisca Romero Andújar, Elena Díaz Gállego, Francisca Menchero Pinos, Cristina Abad Sanz, Pilar Marín Orzanco, Mª Ángeles Abad Blasco, Marta Nieto Alonso, Margarita Machín Peñate, Rosa Mª Hernández López, Jose Antonio Municio Martín, Isabel Aranda García, Domingo Estévez Alcaide, Luis Domínguez Ortega, Miguel Tomás Vila, Mª Teresa Muñoz de la Montaña and Pablo Pascual Pascual have declared an absence of interests.

Milagros Merino Andreu has received support from the pharmaceutical industry to attend the annual conferences of the SEM, SES and ESRS. Gonzalo Pin Arboledas has participated in a research project on gaboxadol financed by Sanofy and has received professional fees as a speaker at various congresses of the AEPap. Ramón Ugarte Líbano has received support from the pharmaceutical industry to attend the Paediatrics Conference of Álava.

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* The methodological material, which is available at the web pages of both GuíaSalud and the UETS and which is where the information with the methodological process of the CPG is presented in detail, includes the model of the form used to collect the declaration of interests.

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