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Review

Sleep disorders and sleep hygiene in children

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ABSTRACT

Sleep is necessary for the psychological, physiological, and emotional growth of children and adolescents. Pediatric sleep disorders are common and sometimes overlooked by health professionals. Recent developments in screen time have led to more sleep-related problems among adolescents. Encouraging good sleep habits and limiting screen time in children is crucial for their health. Pediatricians have a responsibility to incorporate sleep hygiene advice and routine sleep checks into their practice to promote healthy child development. Heightened awareness, public health initiatives, and interdisciplinary collaboration are essential to tackle this pervasive problem effectively.

This study is a narrative review of the literature on sleep disorders and sleep hygiene in children and adolescents. Relevant publications were identified through searches of PubMed, Scopus, and SciELO databases using the following keywords: "pediatric sleep disorders," "sleep hygiene children," "screen time sleep adolescents," "obstructive sleep apnea children," "parasomnias childhood," and "behavioral insomnia pediatric." Priority was given to publications from 2019 onwards; however, seminal studies published before this date were also included where appropriate. Articles were selected based on their relevance to the scope of the review. Editorials and opinion pieces without supporting data were excluded.

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Trastornos del sueño e higiene del sueño en niños

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RESUMEN

El sueño es esencial para el desarrollo psicológico, fisiológico y emocional de niños y adolescentes. Los trastornos del sueño pediátricos son frecuentes y, en ocasiones, pasan desapercibidos para los profesionales de la salud. El aumento del tiempo frente a las pantallas ha provocado un incremento de los problemas de sueño en los adolescentes. Fomentar buenos hábitos de sueño y limitar el tiempo frente a las pantallas es fundamental para la salud infantil. Los pediatras tienen la responsabilidad de incorporar consejos sobre higiene del sueño y controles rutinarios del sueño en su práctica para promover un desarrollo infantil saludable. Una mayor concienciación, iniciativas de salud pública y la colaboración interdisciplinaria son esenciales para abordar este problema generalizado de manera eficaz.

Este estudio es una revisión narrativa de la literatura sobre trastornos del sueño e higiene del sueño en niños y adolescentes. Se identificaron publicaciones relevantes mediante búsquedas en las bases de datos PubMed, Scopus y SciELO utilizando las siguientes palabras clave: "trastornos del sueño pediátricos", "higiene del sueño en niños", "tiempo frente a las pantallas y sueño en adolescentes", "apnea obstructiva del sueño en niños", "parasomnias en la infancia" e "insomnio conductual pediátrico". Se priorizaron las publicaciones a partir de 2019. Sin embargo, también se incluyeron estudios fundamentales publicados antes de esta fecha, cuando fue pertinente. Los artículos se seleccionaron en función de su relevancia para el alcance de la revisión. Se excluyeron los editoriales y los artículos de opinión sin datos que los respaldaran.

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1. INTRODUCTION

Sleep is an important biological process that significantly affects children's physical growth, neurological development, emotional status, and overall development [1]. Sleep disturbances during infancy, childhood, or adolescence can lead to short and long-term health consequences, such as learning disabilities, behavioral problems, cognitive impairments, and mood disorders [2]. In recent years, there has been a significant rise in studies on sleep hygiene in pediatric populations, attributed to shifts in lifestyle and, especially, heightened screen exposure [3].

Sleep quality is associated with cardiovascular health, mental health, cognition, memory consolidation, immunity, reproductive health, and hormone regulation. In addition, insufficient sleep can result in additional accidents and can cause issues like being overweight and its results [4].

Sleep architecture undergoes significant changes throughout childhood. New-borns spend approximately 50% of their total sleep time in active REM sleep, which gradually declines to adult levels of 20–25% by early childhood. Non-REM sleep, particularly slow-wave sleep, becomes increasingly dominant with age and is closely linked to growth hormone secretion, synaptic consolidation, and immune function [2]. These developmental changes underscore the importance of age-appropriate sleep duration: infants require 12–17 hours, toddlers 11–14 hours, school-aged children 9–12 hours, and adolescents 8–10 hours per day [2]. The circadian timing of sleep is governed by the suprachiasmatic nucleus (SCN), which receives photic input via intrinsically photosensitive retinal ganglion cells (ipRGCs). This retino-hypothalamic pathway mediates the suppression of pineal melatonin secretion in response to light exposure, providing the physiological basis for the well-documented adverse effects of evening screen use on sleep onset in children [5].

In recent years, sleep hygiene, which encompasses a combination of behavioral and environmental practices that promote healthy sleep, has become a critical focus in pediatric sleep management [6].

Pediatricians need to know how to promote high-quality sleep, the physiology-related issues and age-specific sleep changes, and the importance of good-quality sleep during childhood. This review aims to provide an evidence-based overview of common pediatric sleep disorders, the impact of screen time on sleep health, and practical strategies for clinical assessment, prevention, and management.

2. COMMON SLEEP DISORDERS IN CHILDHOOD

Sleep problems are common in pediatric populations, impacting 25–50% of children at various stages of development [1]. These disruptions can substantially affect familial well-being, academic achievement, behaviors, and daytime functioning. The most common pediatric sleep disorders are parasomnias, insomnia, sleep-related respiratory illnesses, circadian rhythm abnormalities, restless legs syndrome, hypersomnia, and narcolepsy. Recommended sleep duration by age is shown in Table 1.

Table 1: Recommended sleep duration by age

Age group	Recommended sleep duration
New-born (0–3 months)	14–17 hours
Infant (4–11 months)	12–15 hours
Toddler (1–2 years)	11–14 hours
Preschool (3–5 years)	10–13 hours
School-age (6–12 years)	9–12 hours
Teenager (13–18 years)	8–10 hours

Difficulty initiating or sustaining sleep, accompanied by non-restorative sleep despite adequate opportunities for sleep, characterizes pediatric insomnia. It is frequently associated with persistent nocturnal awakenings, prolonged sleep-onset latency, and reluctance to adhere to a bedtime (6). Irregular sleep patterns or sleep-onset associations are commonly associated with behavioral insomnia, the predominant subtype in children. In infants and toddlers, behavioral insomnia often manifests as sleep-onset association disorder, in which the child requires specific conditions — such as feeding, rocking, or parental presence — to initiate or return to sleep. This pattern is among the most frequent sleep complaints in the first two years of life and can significantly disrupt family functioning [7].

Parasomnias are unwanted physiological phenomena that manifest during sleep onset, during sleep, or upon awakening. Night terrors, somnambulism, and confusional arousals are prevalent phenomena. These occurrences are predominantly innocuous and self-correcting; yet, they may elicit considerable parental anxiety. Parasomnias predominantly occur between the ages of four and twelve [8]. Nightmares are another common parasomnia, typically arising during REM sleep and peaking in children between three and six years of age. Unlike night terrors, children who experience nightmares are fully awake upon arousal and can often recall the disturbing dream content. Recurrent nightmares may be associated with anxiety, post-traumatic stress, or excessive exposure to frightening media content [8].

Sleep-Related Breathing Disorders (SRBDs) include several types of diseases, such as primary snoring and obstructive sleep apnea (OSA). Pediatric obstructive sleep apnea is characterized by repeated episodes of upper airway obstruction during sleep, resulting in oxygen desaturation and disrupted sleep patterns. Symptoms usually include daily behavioral issues, interrupted sleep, pronounced snoring, and episodes of gasping [9]. Adenotonsillar hypertrophy is a common underlying condition in children [10].

Sleep-wake disorders occur when the body's internal circadian cycle is misaligned with the typical sleep-wake pattern. Delayed sleep-wake phase disorder (DSWPD) poses significant risks for adolescents. This affects the process of awakening in the morning and delays the initiation of sleep. This may result in chronic sleep deprivation, absence from school, and alterations in mood [11].

Narcolepsy is a chronic neurological disorder characterized by excessive daytime sleepiness, cataplexy, sleep paralysis, and hypnagogic hallucinations. Although relatively rare in children, it is frequently misdiagnosed or diagnosed with considerable delay. Pediatric narcolepsy is associated with deficiency of the neuropeptide orexin (hypocretin) and can significantly impair academic performance and social functioning [12, 13].

Hypersomnia refers to excessive daytime sleepiness not explained by nocturnal sleep disturbances or other medical conditions. In children and adolescents, it may present as prolonged night-time sleep, difficulty waking in the morning, or recurrent episodes of daytime sleep. Causes include insufficient sleep syndrome, mood disorders, and, less commonly, conditions such as Kleine-Levin syndrome [12].

Sleep-related movement disorders encompass a spectrum of conditions characterized by repetitive movements that disturb sleep. Restless legs syndrome (RLS), marked by an uncomfortable urge to move the legs that worsens at rest and in the evening, affects approximately 2–4% of children and is often under recognized in pediatric populations. Periodic limb movement disorder (PLMD), frequently co-occurring with RLS, involves repetitive limb movements during sleep that can fragment sleep architecture and impair daytime functioning [14, 15].

3. SLEEP HYGIENE: DEFINITION AND COMPONENTS

Sleep hygiene comprises a set of behavioral and environmental practices to promote sufficient, healthy, and restful sleep [6]. Children and adolescents must adhere to

proper sleep hygiene, as their developing bodies and minds are particularly susceptible to sleep disturbances. Inadequate sleep hygiene is a significant contributor to insomnia and other sleep disorders in children. This may result from familial routines, cultural traditions, and individuals' use of technology. Adhering to consistent bedtimes and wake times, even on weekends, helps regulate the circadian rhythm and stabilize sleep architecture, as a regular sleep-wake pattern is essential for optimal sleep health. Irregular schedules, particularly in adolescents, can lead to alterations in sleep patterns and chronic sleep deprivation [8].

A methodical, calming pre-sleep routine can signal to the body and mind that it is time to prepare for rest. This may include activities such as bathing, dental care, reading, and dimming lights, as creating a consistent night-time routine reinforces the behavioral link between bed and sleep, potentially reducing sleep-onset latency in young infants [7].

A tranquil, dimly lit, and pleasantly cool sleep setting is crucial for optimal sleep quality, as it minimizes disturbances during the night. Excessive noise, light exposure, or uncomfortable temperatures may lead to repeated awakenings and disrupted sleep. Moreover, the presence of electronic devices in the bedroom has been associated with diminished sleep duration and impaired sleep quality [16].

Using devices such as smartphones, tablets, or televisions 1–2 hours before bed can make it harder to fall asleep because they stimulate the mind and block the body's production of melatonin. Therefore, it is important to restrict screen time before bed. The American Academy of Pediatrics recommends limiting screen time before bed and keeping electronic devices out of the bedroom [17].

4. THE INFLUENCE OF SCREEN TIME ON SLEEP

Recent studies reveal that screen time is a substantial environmental factor affecting sleep disruptions in pediatric populations. The increase in the accessibility and use of electronic devices, such as cell phones, tablets, laptops, and televisions, has been linked to both quantitative and qualitative reductions in sleep in children and adolescents [3]. Screen use adversely affects sleep in several ways, including disrupting circadian rhythms, heightening alertness, and reducing sleep duration.

The blue light emitted by screens, especially during the evening, can inhibit melatonin production, a hormone essential for regulating the sleep-wake cycle. This suppression leads to extended sleep onset, reduced overall sleep length, and decreased sleep efficiency [18]. At the physiological level, blue light wavelengths (approximately 460–480 nm) are particularly potent activators of intrinsically photosensitive retinal ganglion cells (ipRGCs), which project directly to the suprachiasmatic nucleus (SCN) — the brain's master circadian pacemaker. Stimulation of the SCN suppresses pineal melatonin secretion and delays the circadian phase, effectively shifting the internal clock to a later time. Notably, children appear more sensitive to evening light-induced melatonin suppression than adults, with even low-intensity light exposure producing clinically meaningful effects in preschool-aged children [19]. In children and adolescents, whose circadian systems are still maturing and who are inherently predisposed to phase delay, even relatively brief evening screen exposure can produce significant circadian misalignment [18].

Evening screen use has been shown to delay circadian phase and adversely affect both the duration and quality of sleep in school-aged children. Besides influencing melatonin levels, screen content, especially interactive formats such as video games and stimulating social media interactions, can enhance cognitive and emotional arousal. This heightened alertness may prolong the transition from wakefulness to sleep, potentially leading to increased sleep latency [16]. Children can have difficulty falling asleep, especially when exposed to fast-paced, emotionally intense, or violent television content.

Screen time often delays bedtime, leading to a direct reduction in overall sleep duration. Adolescents are particularly prone to sacrificing sleep for late-night screen time, influenced by increased independence, academic demands, and social engagement on digital platforms [8]. In younger children, television exposure at bedtime correlates with increased resistance to sleep and difficulty initiating sleep. The presence of screens in the bedroom is strongly associated with insufficient sleep. Research indicates that children who use televisions or mobile devices in their sleeping environment typically retire later, have reduced sleep duration, and report increased daytime sleepiness compared to their peers without such access [20]. The adverse consequences are exacerbated by media multitasking, which involves the simultaneous use of multiple devices.

The proliferation of social media platforms has introduced additional dimensions to this problem. Adolescents who engage with social media immediately before sleep report significantly higher rates of sleep disturbance, emotional arousal, and nocturnal awakenings. Notification-driven interruptions during the night further fragment sleep architecture, reducing the proportion of restorative slow-wave and REM sleep [21, 22].

In light of these findings, sleep health professionals and pediatric organizations recommend restricting screen usage, particularly 1–2 hours before bedtime, eliminating devices from children's bedrooms, and encouraging screen-free habits to improve sleep quality [17].

5. CLINICAL ASSESSMENT AND FUNCTION OF PEDIATRICIANS

Pediatricians frequently serve as the initial contact for families worried about their child's sleep. Timely identification and intervention of sleep disorders are essential to avert enduring impacts on cognitive, behavioral, and emotional development. A thorough clinical evaluation, incorporating screening instruments, behavioral assessment, and sleep history, is crucial for identifying sleep disruptions and inadequate sleep hygiene in children.

A complete sleep history should include questions about bedtime routines, sleep-onset latency, nocturnal awakenings, snoring, and daytime sleepiness. In infants and toddlers, clinicians should specifically inquire about sleep-onset associations, feeding-to-sleep habits, and co-sleeping arrangements, as these are among the most frequent concerns in early childhood. For younger children, parental observations typically provide the primary source of information, whereas adolescents may provide reliable self-report concerning their sleep patterns. In pediatric outpatient settings, tools such as the BEARS Sleep Screening Tool, which assesses Bedtime difficulties, Excessive daytime drowsiness, Night-time awakenings, sleep regularity and duration, and Snoring, provide an efficient and effective way to identify common sleep disorders [23].

Pediatricians should routinely evaluate a child's access to electronic media and specifically inquire about pre-bedtime screen exposure. The American Academy of Pediatrics supports limits on screen time appropriate for each child's age and encourages parents to discuss how their kids use media during regular health check-ups [17]. Upon their first visit, clinicians should evaluate symptoms suggestive of primary sleep disorders, including obstructive sleep apnea, evidenced by snoring, mouth breathing, or disrupted sleep; restless legs syndrome, marked by leg discomfort and an urge to move; and circadian rhythm disorders, notably delayed sleep phase in adolescents. It may be necessary to refer a patient for polysomnography if additional tests are needed to determine the cause [10].

To address maladaptive sleep behaviors, effective family-centered communication is essential. Pediatricians should provide anticipatory guidance and recommend interventions, including maintaining regular sleep-wake cycles, limiting screen time before bedtime, and establishing a calming night-time routine. Behavioral therapies, including positive reinforcement and extinction techniques, are effective in treating behavioral insomnia in children [7].

6. STRATEGIES FOR PREVENTION AND MANAGEMENT

The management of pediatric sleep problems primarily relies on behavioral and educational strategies, whereas pharmaceutical interventions are used exclusively for specific indications. Preventive strategies aimed at cultivating healthy sleep habits can help mitigate sleep disturbances and improve long-term outcomes. An integrated strategy, encompassing sleep hygiene education, behavioral therapies, and family-oriented interventions, is essential for effective prevention and treatment.

Instructing parents on age-appropriate sleep requirements and healthy sleep practices is a crucial preventive strategy to reduce the risk of sleep disorders. Pediatricians should provide anticipatory guidance during well-child examinations, highlighting the importance of regular bedtime rituals, avoiding screen exposure before sleep, and establishing a conducive sleep environment [24]. In infants, establishing consistent sleep-onset conditions independent of parental presence from early months can prevent the development of behavioral insomnia. Parents should be encouraged to model proper sleep habits and establish consistent routines at home.

Behavioral approaches are the main treatments for many sleep problems in children, including insomnia and difficulty falling asleep. Empirical data support methods such as gradual extinction, pleasurable nightly routines, and bedtime fading [7]. Cognitive-behavioral therapy for insomnia (CBT-I), adapted for older children and adolescents, has been effective in resolving persistent sleep-onset difficulties and sleep concerns related to maintenance [16].

Limiting screen use, especially in the hours before sleep, may significantly improve both the onset and the overall duration of sleep. Parents should be advised to remove electronic devices from children's bedrooms and to encourage media-free relaxation periods before bedtime [3]. Creating a family media strategy that sets limits on what kids can watch and when they can watch it can help them develop good sleep patterns.

Enhancing the child's sleep environment by providing a tranquil, dimly lit, and cool room with minimal distractions will improve sleep quality. In specific instances, the utilization of white noise machines or blackout curtains may

prove advantageous. The child's bed should be utilized just for sleep to preserve robust sleep associations and prevent the transmission of conflicting signals [25]. Specific evidence-based recommendations for improving sleep quality in children and adolescents are summarized in Table 2.

Table 2: Recommendations for Improving Sleep Quality in Children and Adolescents

Category	Recommendation	Implementation Strategy
Sleep Schedule	Maintain consistent bedtime and wake-up times	Keep regular sleep-wake times, even on weekends, to regulate the circadian rhythm.
Screen Time Management	Limit screen exposure 1–2 hours before bedtime	Remove electronic devices (smartphones, tablets, TVs) from the bedroom.
Blue Light Reduction	Minimize blue light exposure in the evening	Use blue light filters on devices if screen use is unavoidable.
Bedtime Routine	Establish a calming pre-sleep routine (20–30 minutes)	Include activities like bathing, reading, gentle music, or relaxation exercises.
Sleep Environment	Create optimal bedroom conditions	Ensure room is cool (18–21°C/65–70°F), dark, and quiet.
Physical Activity	Encourage regular daytime physical activity	Ensure adequate exercise during the day, but avoid vigorous activity within 2–3 hours of bedtime.
Caffeine Avoidance	Eliminate caffeine consumption in the afternoon/evening	Avoid caffeinated beverages at least 6 hours before bedtime. Educate adolescents about hidden caffeine sources.
Stress Management	Address anxiety and stress before bedtime	Implement relaxation techniques. Create a calm, supportive bedtime environment.
Dietary Habits	Avoid heavy meals close to bedtime	Finish dinner 2–3 hours before sleep.

Pharmaceutical intervention may be necessary when behavioral therapy proves insufficient or when primary sleep disorders, such as restless legs syndrome or narcolepsy, are diagnosed. Nonetheless, these medicines are often initiated by specialists and utilized cautiously due to the lack of pediatric-specific evidence and the potential for adverse effects [26].

School-based sleep education programs are effective in increasing knowledge and changing attitudes about sleep, especially in teenagers. When combined with parental involvement and supporting policies, these programs can successfully encourage earlier bedtimes and longer sleep durations [23].

Healthcare practitioners can significantly influence how juvenile sleep disorders are managed and prevented by addressing modifiable risk factors and implementing systematic, evidence-based therapies. Early intervention reduces the risk of long-term sleep issues and the associated developmental, behavioral, and psychological problems.

7. CONCLUSIONS

Pediatric sleep disorders are common, frequently underrecognized, and associated with significant short- and long-term consequences for cognitive, behavioral, and emotional development. This review highlights that sleep disturbances in children arise from a complex interplay of biological, behavioral, and environmental factors — among which excessive screen time and inadequate sleep hygiene have emerged as particularly modifiable determinants in contemporary pediatric practice.

Behavioral interventions remain the cornerstone of management across all age groups. Early establishment of consistent sleep routines, age-appropriate sleep-onset conditions, and screen-free bedtime environments are among the most effective and evidence-based strategies available to clinicians and families alike. Pharmacological treatment should be reserved for specific indications and initiated under specialist supervision.

Pediatricians are uniquely positioned to identify sleep problems early, counsel families, and implement preventive strategies within routine well-child care. Integrating standardized sleep screening into regular pediatric visits, promoting evidence-based behavioral interventions, and advocating for public health policies that support healthy sleep environments are essential steps toward improving sleep health outcomes in children and adolescents.

8. CONFLICT OF INTERESTS

The authors have no conflict of interest to declare. The authors declared that this study has received no financial support.

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