



## CLINICAL REVIEW

## Sleep in pediatric primary care: A review of the literature

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## SUMMARY

Primary care is a critical setting for screening and management of pediatric sleep difficulties. This review summarizes studies examining the prevalence of sleep problems in primary care settings as well as current practices in screening, diagnosis, and management, including behavioral recommendations and medications. Potential barriers to effectively addressing sleep are also reviewed. Despite the high prevalence of pediatric sleep problems in primary care, rates of screening and management are low. Primary care providers receive minimal sleep training and have resulting gaps in knowledge and confidence. Parents similarly have gaps in knowledge and many factors contribute to their identification of sleep as problematic. Recommendations to improve the provision of sleep services in pediatric primary care are made in the areas of research, practice, and education.

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## Introduction

A wealth of evidence supports the importance of sleep for optimal child and family functioning, and has identified the myriad of negative outcomes associated with insufficient or disrupted sleep [1,2]. Yet sleep issues, including sleep disorders, insufficient sleep, and poor sleep habits, are widespread in youth. Prevalence rates for pediatric sleep disorders range from 1–3% for obstructive sleep apnea to as high as 20–30% for pediatric insomnia [3]. Furthermore, insufficient sleep is the norm in adolescence, with the majority of US adolescents sleeping less than recommended on school nights [2,4]. Although there are a number of effective interventions (including prevention and education) to address sleep issues across development, for many youth sleep issues are not regularly identified or treated.

Almost all children have regularly scheduled well-child visits with a primary health care provider, usually a pediatrician or family practice physician. With regular access to families and scheduled health supervision visits, primary care represents an important setting for the screening and management of sleep issues in infants, children, and adolescents. A number of studies, however, have raised questions about the effectiveness of current practices addressing sleep in pediatric primary care [5,6].

While collectively the sleep field has a wealth of knowledge about sleep problems and sleep disorders, there remains a relatively small number of trained pediatric sleep providers. Since 2007 the American Board of Pediatrics and the American Board of Family Medicine have certified only 251 and 138 sleep sub-specialists, respectively, compared to a population of more than 100,000 general pediatricians and more than 75,000 general family practitioners in the United States [7,8]. Further, pediatric sleep professionals tend to reside in major urban areas (often within academic institutions), and/or require a specialty referral, limiting access for a large portion of the general population. In order to better disseminate the knowledge and expertise of sleep professionals to pediatric primary care providers it is essential to better understand existing practices in pediatric primary care.

*Abbreviations:* CPAP, continuous positive airway pressure; ICD-9, International Classification of Diseases, 9th Edition; OSA, obstructive sleep apnea; PC, primary care; PCP, primary care provider; PLMD, periodic limb movement disorder; RLS, restless legs syndrome; US, United States.

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Thus the goal of this paper is to summarize the literature on current sleep-related practices in pediatric primary care settings, with the hope that this will facilitate the development and implementation of much needed education and tools for pediatric health care providers. The first part of this review will focus on prevalence rates, current screening and identification processes, and the treatment or management of sleep issues in pediatric primary care. The second part of the review will discuss barriers for addressing sleep in pediatric primary care practice. Finally, we will discuss what has been learned from this review and how that should influence the next steps for clinical practice and research.

## Methods

Articles that focused on sleep in pediatric primary care were identified through searches in PubMed, PsycINFO, and CINAHL databases using the search terms “primary health care” and “sleep,” limiting results to children ages 0–18 y, and peer-review journal articles written in English.

The following inclusion criteria were used for all studies included in the section on current practices. First, the study described prevalence rates, guidance, screening, and management of pediatric sleep disorders or problems in primary care settings. Second, the patient population was pediatric (18 and under) or the pediatric data were presented separately from the adult data. Third, the data were collected in a primary care setting, and included a sample that was generally representative of all patients within the practice or in a certain age group (e.g., all children under the age of five was included, but a special population within the practice such as only children with intellectual disabilities was excluded). Additional exclusion and inclusion criteria were applied for each topic area of interest, as seen in [Table 1](#).

A total of 424 abstracts published between 1985 and September 2014 were identified with the initial search criteria. Most of these were excluded because they did not meet inclusion criteria, resulting in 12 papers for review. An additional 18 papers were identified through the examination of the reference lists for identified articles. This resulted in a total of 30 papers included in our review.

## Sleep in pediatric primary care

### Prevalence rates of sleep problems

[Table 2](#) highlights significant variability in prevalence rates of sleep problems in pediatric primary care depending on the data collection method.

**Table 1**

Additional inclusion and exclusion criteria for studies included in the review.

If health care providers subject of interest:
- The study included practice within pediatric primary care
- Family medicine providers included if responding about only pediatric patients
- Studies with multiple provider types (e.g., pediatricians and neurologist) included only if PCP information identifiable separately or more than 75% of sample
For provider training experiences:
- Both individual provider and training program surveys included
- Subspecialty training (e.g., child psychiatry) excluded
For sleep prevention and intervention studies:
- Intervention delivery occurred within a primary care setting
- Interventions delivered by phone or internet excluded if not initiated in primary care setting
For parental knowledge studies:
- Data were collected within a primary care setting

Abbreviations: PCP = primary care provider.

### Sleep problem prevalence based on provider report

In three studies of pediatricians in the United States and Italy, most providers reported fewer than 25% of their patients had sleep problems [6,9,10]. When providers were queried directly about the frequency of encounters with behavioral sleep problems (e.g., bedtime resistance, difficulty falling asleep), more than half reported either daily or weekly encounters [11]. Across five studies, encounters with significant sleep problems were most common among the youngest patients (0–4 y old) [6,9,10,12,13]. Compared to other problems encountered in pediatric primary care, sleep always fell within the top half of concerns, following issues such as growth, and physical illness [9,10,14,15].

### Sleep problem prevalence based on parent report

Using measures of global sleep problems within primary care, parents in two studies identified a prevalence rate of 11–12% in children [16,17], a rate similar to that of community surveys conducted in other settings (e.g., [3] [18]). When queried about specific sleep concerns, prevalence rates reported included 11–17% for snoring or sleep disordered breathing, 0.4–29% for various parasomnias, 16% for daytime sleepiness, and up to 41% for symptoms of insomnia [16,17,19]. Notably one study found that more than 20% of parents reported a specific sleep abnormality occurring at least weekly [17].

### Documentation of sleep problem prevalence

Not surprisingly, the documentation of sleep disorders is even lower than both reports of sleep problems and estimates of community prevalence rates when examined by medical record review. In a review of diagnostic codes generated for a large primary care network, only 3.7% of children received an International Classification of Diseases, 9th Edition (ICD-9) sleep diagnosis [20], with diagnostic rates for insomnia (0.05%) particularly low. Another study that used a parent-reported screening questionnaire to identify sleep problems found that only two children (out of 86) with a parent-reported sleep problem had a sleep disorder diagnosis documented that day, and only 10% of children with a parent-reported sleep problem had a diagnosis documented in any of the chart notes over the previous two years [16].

### Summary of sleep problem prevalence

Overall, primary care providers (PCPs) report their perception that sleep difficulties occur in approximately 20% of young children (6 mo–4 y). However, diagnosed sleep disorders in general, as well as sleep problems in older children and adolescents were less commonly recognized. Further, prevalence rates of sleep problems reported by PCPs reports are lower than those reported by parents.

It is notable that for both parent and PCP-report, the highest frequencies of problems were identified in infants and toddlers, with behaviorally-based sleep disorders (e.g., pediatric insomnia) seen more often than physiologically-based sleep disorders (e.g., obstructive sleep apnea, sleep terrors) across all age groups. As we will review later, however, the use of interventions to address these behavioral sleep concerns remains limited in primary care.

### Practices related to screening and documentation

[Table 3](#) summarizes studies that have examined practices pertaining to the screening and documentation of sleep problems in pediatric primary care.

### PCP report of screening practices

Two studies asked primary care pediatricians about their practices screening for sleep problems [6,21]. While both studies found

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