

The Practice of Pediatric Sleep Medicine: Results of a Community Survey

Judith A. Owens, MD, MPH

ABSTRACT. *Objective.* To assess knowledge, screening, evaluation, treatment practices, and attitudes regarding sleep disorders in children and adolescents in a large sample of community-based and academic pediatricians.

Design. Cross-sectional survey.

Participants. Six hundred twenty-six pediatricians in Rhode Island, Massachusetts, and Connecticut.

Instrument. The Pediatric Sleep Survey, a 42-item questionnaire assessing general and specific sleep knowledge categories; clinical screening, diagnostic, and treatment practices for common pediatric sleep disorders; and practitioner attitudes regarding the impact of sleep disorders in the clinical setting and as a public health issue.

Results. On the knowledge section, the mean Total Knowledge score for the respondents was 18.1 ± 3.5 out of 30 items, with 23.5% of the sample responding correctly on half or less of the items. Pediatricians scored highest on items relating to developmental and behavioral aspects of sleep and parasomnias, whereas the mean percentage of correct responses was <50% for items relating to sleep disordered breathing, excessive daytime sleepiness, and sleep movement disorders. Although only 16.5% and 18.2% of the sample reported not screening routinely for sleep disorders in infants and toddlers, this percentage rose to 43.9% in adolescents. Furthermore, only 38.3% regularly question the adolescents themselves about their sleep. Only about one quarter of the respondents screen toddlers and school-aged children for snoring. In evaluating and treating pediatric sleep problems, 53.2% of the sample never or rarely order overnight sleep studies to assess for obstructive sleep apnea and few use alternative treatment strategies, such as continuous positive airway pressure. A quarter of the sample at least occasionally recommends diphenhydramine and almost half suggests a psychological evaluation for children with night terrors. Finally, the percent of pediatricians rating the impact on children of sleep problems in a variety of domains as important or very important ranged from 49.7% (nonintentional injuries) to 92.6% (academic performance). However, only 46% of the sample felt confident or very confident about their own ability to screen for sleep problems, whereas 34.2% and 25.3% similarly rated their ability to evaluate and treat sleep problems in children.

Conclusions. The results of this survey suggest that there are still significant gaps among practicing pediatricians both in basic knowledge about pediatric sleep dis-

orders, and in the translation of that knowledge into clinical practice. Despite their acknowledgment of the importance of sleep problems, many pediatricians fail to screen adequately for them, especially in older children and adolescents. Additional educational efforts regarding pediatric sleep issues are warranted, and should be targeted at the medical school, postgraduate training, and continuing medical education levels. *Pediatrics* 2001; 108(3). URL: <http://www.pediatrics.org/cgi/content/full/108/3/e51>; *pediatrician, sleep knowledge.*

ABBREVIATIONS. OSA, obstructive sleep apnea; ADHD, attention-deficit/hyperactivity syndrome; RLS, restless legs syndrome; PLMD, Periodic Limb Movement Disorders.

Numerous studies have shown that clinical sleep disorders are associated with significant morbidity, functional impairment, decreased quality of life, and substantial direct and indirect economic costs.¹⁻³ Despite this empirical evidence, inadequate attention is often paid by medical professionals to sleep disorders and their serious health consequences.^{4,5} This discrepancy may be, in part, related to the fact that sleep and sleep disorders have traditionally received little attention in medical school curriculae.⁶⁻⁸ Even as recently as 1990, a survey by the National Council on Sleep Disorders Research found that 29% of medical schools offered little to no formal sleep education.⁷ This lack of training has resulted in serious gaps in the knowledge and skills of practicing physicians in recognizing, diagnosing, and treating sleep disorders, and in limited awareness on the part of medical professionals of the diverse etiologic factors and consequences of impaired sleep.^{9,10}

For a number of reasons, this knowledge deficit may have a particularly significant impact in regards to the recognition by primary care physicians of sleep disorders in children and adolescents.¹¹ First, there is considerable evidence that the prevalence of both transient and chronic pediatric sleep disorders is high, increasing the likelihood of the primary care physician encountering sleep problems in the context of daily clinical practice. Numerous epidemiologic studies of sleep disorders from a variety of populations have documented high levels of sleep disturbances in children. These include difficulty settling and frequent night wakings in up to 40% of infants¹²⁻¹⁴; bedtime resistance, delayed sleep onset, and disruptive night wakings in 25% to 50% of preschoolers,¹⁵⁻¹⁸ a 27% prevalence of marked bedtime resistance¹⁹ and a 37% prevalence of parent-reported

From the Division of Pediatric Ambulatory Medicine, Rhode Island Hospital, Providence, Rhode Island.

Received for publication Feb 26, 2001; accepted May 10, 2001.

Address correspondence to Judith A. Owens, MD, MPH, Division of Pediatric Ambulatory Medicine, Rhode Island Hospital, 593 Eddy St, Potter Bldg, Ste 200, Providence, RI 02903. E-mail: jowens@lifespan.org
PEDIATRICS (ISSN 0031 4005). Copyright © 2001 by the American Academy of Pediatrics.

problematic sleep behaviors in school-aged children,²⁰ and significant daytime drowsiness in 10% to 40% of high school students.^{21–23} The prevalence of obstructive sleep apnea (OSA) in toddlers and preschoolers is conservatively estimated to be 1% to 3%²⁴ and the prevalence of partial arousal parasomnias ranges from 3.5% for sleep terrors²⁵ to 15% to 40% for sleepwalking.²⁶

Childhood sleep disorders may also extend their impact by causing increased stress for parents, adding to marital disruption, and resulting in negative effects on parental sleep and daytime function.²⁷ Thus, inadequate recognition and treatment may have significant repercussions not only for the individual child, but also for the family as a whole. In addition, the protean clinical manifestations of sleep disorders in children, which may include mood disturbances and a variety of internalizing and externalizing behavioral problems,^{25,26} increase the possibility of misattribution by physicians of symptoms to other causes, including primary psychiatric diagnoses such as attention-deficit/hyperactivity disorder (ADHD).²⁷ Alternatively, coexisting sleep disorders may contribute significantly to the morbidity experienced by children with a variety of mental health disorders.²⁸

Finally, considerable evidence supports the concept that sleep disorders such as obstructive sleep apnea syndrome in children and adolescents have the potential to result in serious long-term consequences, including cognitive deficits and academic failure.^{29,30} Thus, the application of therapeutic interventions in childhood and adolescence may also represent an important opportunity for primary and secondary prevention of sleep problems.³¹ A considerable body of literature exists that suggests that many sleep disorders described principally in adults have their initial manifestations in childhood, and thus, early identification and secondary prevention could have a significant impact. For example, almost half of the estimated 1 in 20 adults with restless legs syndrome (RLS) and Periodic Limb Movement Disorders (PLMD)³⁵ reported onset of symptoms in childhood and adolescence.³⁶ Recent data suggests that a significant percentage of children presenting with features of ADHD may actually be manifesting symptoms of sleep fragmentation and consequent daytime behavior problems secondary to RLS/PLMD.³⁷ Although several studies have reported on the onset of symptoms of narcolepsy in childhood, symptoms often go unrecognized and untreated³⁴ in this early phase of the disease, resulting in significant additional dysfunction by the time the diagnosis is actually made.

Clearly, then, because of their prevalence and severity, sleep disorders in children and adolescents are critically important to prevent, recognize, and treat, particularly because treatment options for many of these disorders do have proven efficacy.^{31,35,36} Furthermore, at least 1 study¹¹ has suggested that pediatric practitioners do perceive that childhood sleep disorders have a significant impact on children and families. However, this same study also documented that there were specific knowledge

gaps in a sample of practicing pediatricians surveyed about a number of sleep topics.

Thus, an increased understanding of how child health professionals screen for, evaluate, and treat sleep disorders in the practice setting could serve as a “needs assessment” in terms of advocating for and developing pediatric sleep medicine curriculae both at the medical school and residency training levels, as well as in the context of continuing medical education. The purpose of the following study was to survey a large sample of both academic and community-based pediatricians, using a comprehensive tool that assesses knowledge, screening practices, and evaluation and treatment practices regarding sleep disorders in children and adolescents. The survey also assessed practitioners’ attitudes toward the impact of pediatric sleep disorders, both in the clinical setting and in the context of sleep as a public health issue.

METHODS

Participants and Procedure

The Pediatric Sleep Survey (Appendix) was sent to a sample of 2740 practicing pediatricians and family practitioners in Rhode Island, Massachusetts, and Connecticut. The sample consisted of physicians included on a comprehensive, regularly updated continuing medical education mailing list for pediatric practitioners that covered the Southern New England region. The mailing list sample was 39.5% female, and 46.0% were under the age of 45 years. One thousand six hundred fifty-two (60.3%) individuals on the sample mailing list were identified as pediatricians, 36.2% as family practitioners, 2.4% as internists, and 1.1% as adolescent medicine specialists. Fifty-nine percent of the original mailing list sample was practicing in Massachusetts, 30.5% in Connecticut, and 10.5% in Rhode Island.

Instrument

The Pediatric Sleep Survey is a 42-item questionnaire developed by the author to assess the pediatrician’s knowledge base regarding sleep in children; history-taking, diagnostic and treatment practices; and attitudes regarding the impact of pediatric sleep disorders. The instrument was modeled on several previous sleep survey instruments assessing knowledge⁹ and attitudes among trainees and practitioners regarding adult sleep. Answers to all survey questions were based on empirical data and review articles from peer-review journals. In addition, extensive feedback on the questions and corresponding answers was solicited from a panel of pediatric sleep medicine experts in regards to format and accuracy of content. The instrument was then piloted on a small group of local pediatric practitioners, as well as on medical students during their clinical pediatric clerkship. Based on the pilot testing feedback, minor modifications were made in content, wording, and format to enhance clarity.

Knowledge items were selected to tap a core body of empirically-based information reflecting the most common sleep issues encountered in practice: developmental aspects of sleep, behavioral sleep disorders, parasomnias, sleep disordered breathing (OSA), circadian rhythm disorders, sleep movement disorders (RLS, PLMD), and disorders of excessive daytime sleepiness (narcolepsy). The relative number of survey questions in each category were chosen to reflect the relative prevalence of the various sleep disorders in children, as well as to elicit pediatricians’ levels of knowledge about less common sleep disorders, particularly those about which pediatricians had been previously shown to have knowledge deficits.¹¹ All knowledge questions were in a true/false/don’t know format; don’t know responses were coded as incorrect.

The second section of the instrument was designed to assess usual sleep screening practices. The respondent was asked to select those sleep history items (from a list of 26 possible items) that he/she routinely includes greater than 75% of the time as part of a well-child examination in 4 age groups (infant, toddler and

preschool, school-aged, adolescent). The third section, evaluation of sleep disorders, asked practitioners to endorse the frequency with which they would be likely to elicit a given history or use a given diagnostic procedure for 6 common presenting complaints on a 5-point scale (1 = never/rarely to 3 = occasionally to 5 = always). The treatment section of the survey presented 5 brief clinical scenarios representing commonly encountered medical and behavioral sleep disorders in pediatric practice, and respondents were asked to independently rate the frequency (ranging from 1 = never/rarely to 5 = always) with which they would be likely to use 4 to 6 different corresponding treatment modalities in their practice.

The final attitudes section of the survey asked participants to rate the impact of sleep disorders in children on 5 different domains (health, behavior, academics, parental stress, injuries) and the perceived importance of 3 sleep-related public health issues (1 = not important to 5 = very important). Respondents were also asked to rate their own level of confidence in screening, evaluating, and managing children with sleep problems, and the prevalence of sleep problems in their own practice.

Procedure

Two separate mailings of the Pediatric Sleep Survey, accompanying demographics questionnaire, and cover letter were sent to the 2740 practitioners over two 2-month periods in the winter of 1998–1999 and 1999–2000, respectively. Although baseline demographic information was requested, the survey was otherwise anonymous. Participants were offered the opportunity to be included in a drawing for an office television/VCR as an incentive for participation.

RESULTS

Respondent Sample Characteristics

A total of 828 completed usable surveys were received. Twenty-five blank surveys were returned because the practitioners were deceased or no longer in active practice. Five respondents sent back incomplete surveys. Thus, the overall response rate was 30.5%.

The mean age of the total sample respondents was similar to that of the original sample, 47.5 ± 38.6 years, with 48% under the age of 45. Forty-nine and one-tenth percent (49.1%) of the sample were female (compared with 39.5% of the original sample). As might be expected, there was a relative preponderance of pediatricians respondents compared with original sample; 626 (75.6%) endorsed pediatrics as their primary specialty, 151 (18.2%) endorsed family medicine, and 6.2% other (internal medicine, emergency medicine, adolescent medicine, pulmonology, behavioral/developmental pediatrics, occupational medicine, anesthesiology, infectious diseases, gastroenterology, and neonatology). More than 83% (83.6%) of the sample was community-based physicians (defined as in group, solo, health maintenance organization practice, or health center practice) and 16.4% identified themselves as hospital-based and/or academic physicians. The results presented below focus on the 626 pediatricians in the respondent sample only.

Pediatric Sample Characteristics

The response rate for the pediatrician sample was 37.9%. The mean age of the pediatrician respondents was 46.6 ± 11.1 years (range: 29–83 years), and the sample was 49.7% female. Of those 101 respondents (16.1%) who indicated that they had a secondary specialty, 25 (4.0% of the total pediatrician sample)

endorsed adolescent medicine as their subspecialty, and 24 (3.8%) described themselves as specializing in developmental/behavioral pediatrics. Approximately 86% (86.7%) of the pediatric sample was community-based (group or managed care practice, private office, or health center) and 13.4% academic/hospital/medical school-based. Approximately 88% (88.2) responded that greater than 75% of their practice was in primary care. Duration of practice post-residency was fairly evenly distributed as follows: ≤ 5 years: 19.1%, 6 to 10 years: 19.4%, 11 to 15 years: 18.3%, 16 to 20 years: 14.7%, and 20+ years: 28.5%.

The respondents were asked about their personal experiences with sleep problems. The mean reported weeknight sleep duration for the sample was 6.9 ± 1.0 hours on weekdays and 7.6 ± 1.0 hours on weekends. Approximately 29% (29.2%) of the sample reported receiving an average of 6 or less hours of sleep per weekday night. In response to a question regarding amount of sleep needed to feel well rested, the sample mean was 7.7 ± 0.9 . The mean difference for the group between reported sleep needed and sleep actually obtained was 0.9 hours; however, 14.8% of the sample reported an average 2-hour nightly difference between sleep needed and obtained. Approximately 61% (61.2%) reported a personal history of significant sleep problems, with chronic sleep deprivation (29.8% of the sample) and daytime sleepiness (29.4%) being the most prevalent, followed by insomnia (25.0%), restless legs/periodic limb movements (10.2%), and obstructive sleep apnea (3.8%). Most rated adequate sleep as important to their daily function (mean/median scores 4.1/4.0 on a 5-point scale with 5 being “very important”). Of the 84.9% of the sample who had children, 63.4% reported a history of sleep problems in their own children; pediatricians with sleep problems were more likely to have children with sleep problems as well ($\chi^2 = 6.79(1); P < .01$). Mean/median scores for the importance of sleep for the pediatric sample’s own children were 4.4/4.0, respectively.

Respondents were also asked to estimate the percentage of their own patients who have sleep problems. Although most of the respondents (75.4%) estimated that between 0% and 25% of their patients overall have sleep problems, 22.8% estimated that the percentage of sleep problems overall in their practice was between 26% and 50%. For infants (0–2 years), 45% estimated a prevalence of sleep problems of between 0% and 25%, and 41% estimated a quarter to half of their patients have sleep problems. In toddlers (3–6 years), 67.8% estimated that between 0% and 25% of their patients have sleep problems and 29.7% estimated a 25% to 50% prevalence in that age group. In school-aged children, 8.9% estimated that 25% to 50% of their patients had sleep problems; and in adolescents, 18.3% of the pediatricians reported a 25% to 50% prevalence of sleep problems in their practice.

Sleep Knowledge

One of the OSA items was eliminated in the final data analysis because of a concern that ambiguity of wording might yield invalid results, leaving a total of

30 items on the Knowledge section. The mean Total Knowledge score was 18.1 ± 3.5 , with a range of correct scores from 7 to 26. Twenty-three and one half percent of the sample responded correctly on half or less of the items. The mean percentage and standard deviation of correct responses, and percentage with all correct responses for the seven subscales of the Knowledge section are shown in Fig 1.

We also examined the effects of several practitioner characteristic variables with respect to sleep knowledge. To examine the potential impact of both the length of respondents experience in pediatric practice and proximity to medical school and residency training on their sleep knowledge base, the sample was divided into those pediatricians with ≤ 5 years of practice postresidency ($N = 118$) versus >5 years ($N = 500$), and the sample means on both the Total Knowledge score and the 7 subscales were compared. The only mean score that was significantly different was the Obstructive Sleep Apnea subscale score, on which the pediatricians in practice 5 or less years scored higher (3.81 vs 3.49 , $t(578) = 2.11$, $P = .04$) than those in practice >5 years.

Total Knowledge and subcategory scores for academic/hospital-based ($N = 81$) and community-based pediatricians ($N = 524$) were also compared. Similarly, the Obstructive Sleep Apnea subscale score was the only one showing a significant difference between the academic pediatricians (mean: 3.86) and the community-based pediatricians (mean: 3.52 , $t(566) = -1.96$, $P = .05$). Finally, to assess the impact of several other variables, we also compared scores on the Knowledge section for respondents with and without sleep problems themselves, as well as those with and without their own children, and those with and without children with sleep problems. The only significant differences were a higher

score on the Sleep Movement Disorder knowledge subscale in respondents without children (1.06 vs 0.83 , $t(604) = 2.0$, $P = .05$) and a higher score on the Behavioral subscale for respondents whose own children have had sleep problems (3.36 vs 3.15 , $t(505) = -2.0$, $P = .04$).

Sleep Screening Practices

The mean/median number of sleep-related screening questions respondents endorsed asking for each age group were as follows: infants (0–1 year) $4.9 \pm 5.6/4$, toddlers (2–4 years) $5.1 \pm 5.7/6$, school-aged (5–12 years) $5.1 \pm 5.5/3$, and adolescents (13+ years) $3.6 \pm 4.3/2$. Of the 26 possible screening items listed in the survey, the 3 most common sleep-related issues about which practitioners reported routinely asking screening questions for each age group were as follows: for infants: 1) cosleeping, 2) naps, and 3) usual sleep amounts; for toddlers: 1) naps, 2) bedtime resistance, and 3) usual bedtime; for school-aged children: 1) bedwetting, 2) daytime behavior problems, and 3) usual bedtime; and for adolescents: 1) daytime behavior problems, 2) usual bedtime, and 3) usual sleep amount.

However, a significant percentage of the respondents reported that they did not routinely ask any questions about sleep. The percentage of respondents who did not endorse asking any of the 26 items on the screening list greater than 75% of the time during well-child examinations in the 4 age groups are shown in Fig 2. The percentage of respondents who reported asking a single general screening question (such as “Does your child have any sleep problems?”) is also shown in Fig 2.

Of 10 possible choices, the most common reasons for not routinely screening for sleep problems were: 1) that parents would indicate if there was a problem

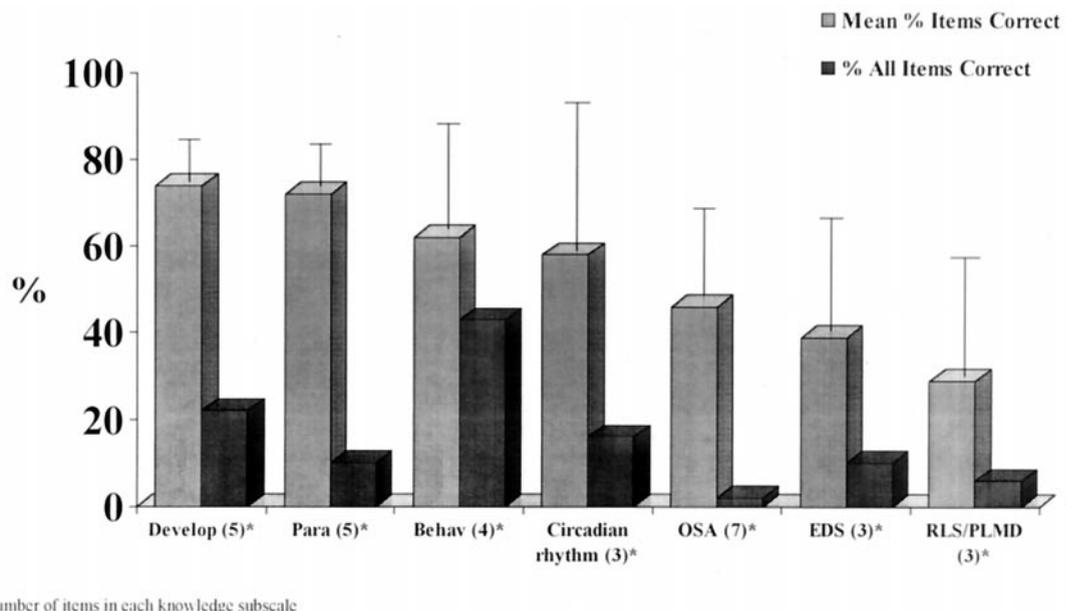


Fig 1. Pediatric Sleep Survey: Knowledge Results. Mean percentage of Sleep Knowledge items answered correctly by pediatrician respondents ($N = 626$) and percentage of respondents answering all items correctly for the 7 Sleep Knowledge subscales. Develop = Developmental Aspects of Sleep subscale, Para = Parasomnias subscale, Behav = Behavioral Sleep Disorders subscale, Circadian Rhythm = Circadian Rhythm disorders, EDS = Disorders of Excessive Daytime Sleepiness subscale.

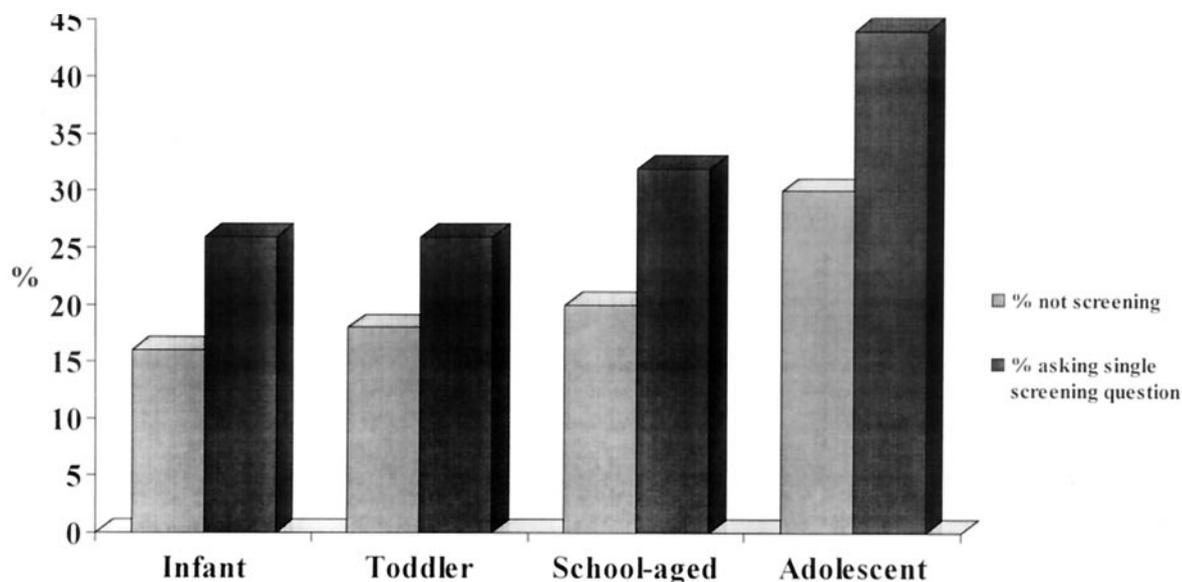


Fig 2. Pediatric Sleep Survey: Screening Practices. Percentage of pediatrician respondents ($N = 626$) reporting routinely asking no sleep screening questions and percentage of respondents reporting asking a single sleep screening question for the 4 patient age groups.

without questioning (21.7%), 2) that screening for sleep problems specifically takes time away from other concerns (9.8%) or takes too much time in general (6.3%), and 3) that respondents did not feel knowledgeable (9.2%) about or comfortable treating (2.7%) sleep problems. Few respondents cited a low prevalence of sleep problems in children (2.3%), lack of importance of sleep issues in children (1.4%), lack of reimbursement (0.8%), or lack of successful treatments (0.6%) as reasons for not screening.

Finally, we also examined several specific respondent screening practices. Regarding sleep disordered breathing, only 7.6% reported routinely screening infants for snoring, only about one-quarter screened toddlers (24.0%) and school-aged children (26.6%), and 15.1% regularly inquired about snoring in adolescents during well-child examinations. Furthermore, less than one third of the respondents (30.5%) reported routinely questioning the school-aged child and only 38.3% questioned adolescents directly about their own sleep habits.

Sleep Evaluation Practices

The percentage of respondents who reported often or always (response of 4 or 5) asking the given specific question as part of their evaluation for each of 5 listed presenting sleep complaints were as follows: 1) in toddlers with frequent night wakings, the majority (80.1%) reported routinely inquiring about the method of falling asleep, 2) in preschoolers with bedtime resistance, 63.3% asked about parental discipline issues, 3) less than half (45.4%) elicited specific information about the timing of night wakings in a child with a possible partial arousal parasomnia 4) only about one-quarter (26.0%) reported routinely inquiring about snoring in a child presenting with secondary enuresis, and 5) only 15.3% routinely screened for other narcolepsy symptoms (cataplexy) in adolescents with profound daytime sleepiness. For the sixth presenting complaint, a patient with suspected OSA, the results are expressed as the per-

centage of respondents reporting never or rarely performing the specific listed diagnostic procedures: 39.1% seldom obtained radiographs, electrocardiograms, or lab tests as part of the evaluation, 28.9% never or rarely referred such patients to a sleep clinic or sleep specialist, and over half (53.2%) never or rarely ordered an overnight sleep study. Almost two thirds of the sample (63.6%) reported often or always referring these patients directly to an otolaryngologist for additional evaluation.

Sleep Treatment Practices

Respondents were asked to rate the frequency with which they would be likely to independently recommend each of several different possible treatments for each of 5 separate clinical sleep problem scenarios described in the survey. Table 1 shows the description of the clinical scenario given in the survey and the percentage of respondents recommending a given treatment at least half of the time (response of 3, 4, or 5), listed in order from the least frequently to the most often recommended treatments, for each of the 5 clinical scenarios. For selected treatment choices, the percent of respondents recommending that treatment at least occasionally is also indicated in Table 1.

Sleep Attitudes

In terms of respondent ratings of the impact of sleep disorders in children, the percentage of respondents rating the impact on each of the listed 5 domains as very important or important (response of 4 or 5) are shown in Fig 3: The percentage of respondents rating the following sleep-related public policy issues as very important or important were: 1) drowsy driving education for adolescents: 82.3%; 2) educating school personnel about children's sleep: 49.8% and 3) delaying high school start times: 37.5%.

Finally, despite acknowledging the importance of sleep problems in children, less than half (46.0%) of the respondents rated themselves as very confident

TABLE 1. Treatment of Sleep Disorders: Percentage of Pediatrician Respondents Reporting Recommending the Given Intervention in Their Clinical Practice at Least Half of the Time

Parameter	Percentage
For frequent night wakings in a 14-month old routinely rocked to sleep at bedtime	
Cosleeping with parents	3.4% (12.1% at least occasionally)
No intervention	13.2%
Increased level of parental intervention at bedtime	24.5%
Graduated extinction (periodic "checks")	90.0%
For bedtime resistance in a preschooler with a sudden onset of nighttime fears	
Television viewing at bedtime	8.0% (13.9% at least occasionally)
Ignoring fears	20.6%
Positive reinforcement	73.5%
Transitional object	83.6%
For weekly night terrors in a 7-year-old	
Diphenhydramine at bedtime	10.6% (25.3% at least occasionally)
Psychological evaluation of child	14.9% (43.1% at least occasionally)
Regular sleep schedule	77.0%
Parental reassurance	83.9%
For insomnia in an adolescent attributable to poor sleep habits	
Prescription of hypnotics	3.0% (11.4% at least occasionally)
Trial of melatonin	5.5% (20.4% at least occasionally)
"Catch-up" sleep on weekends	25.8%
Restricting nonsleep activities in bed	64.8%
Similar sleep-wake schedule on school and nonschool days	85.5%
For a patient with suspected OSA	
Referral for continuous positive airway pressure	9.4% (26.0% at least occasionally)
Observation only	17.8% (44.5% at least occasionally)
Nasal steroids if adenoids enlarged	49.3%
Referral for adenotonsillectomy if tonsils enlarged	83.4%

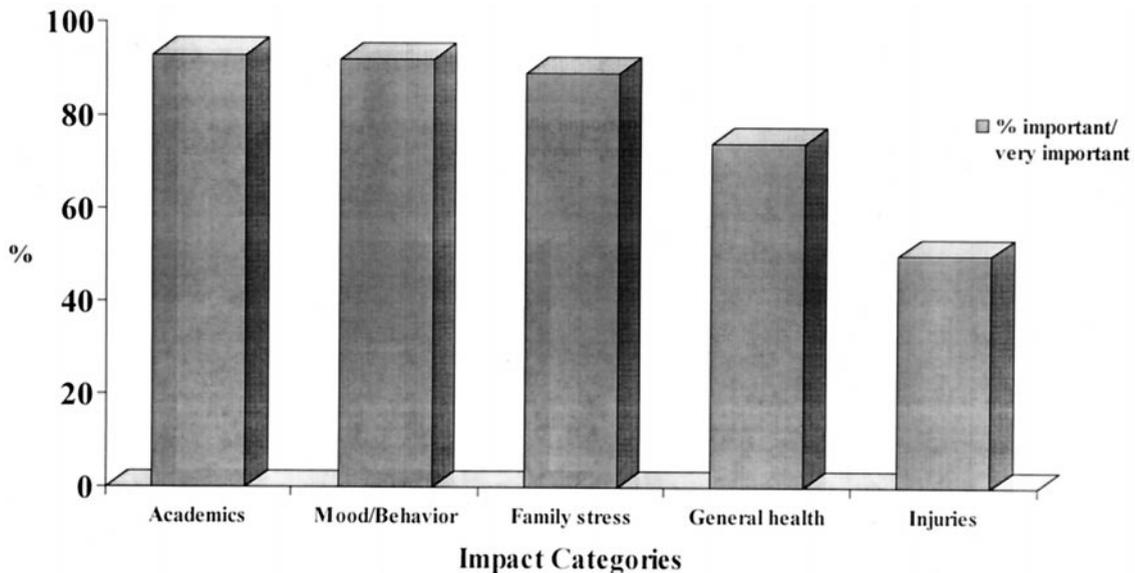


Fig 3. Pediatric Sleep Survey: Attitudes-Impact of Sleep Disorders. Percentage of pediatrician respondents rating the impact of sleep problems on children as important or very important in the 5 categories

or confident in their ability to screen children for sleep problems, less than a third (34.2%) were confident of their own ability to evaluate sleep problems and only one quarter (25.3%) rated themselves as very confident or confident in treating pediatric sleep disorders (Fig 4).

DISCUSSION

The results of this survey of over 600 pediatric practitioners suggest that there still exist significant

gaps both in basic knowledge about pediatric sleep and sleep disorders among pediatricians, and in the translation of that knowledge into clinical practice. The results also suggest that many pediatricians do not adequately screen for sleep problems in the clinical setting, and that this failure to screen is most likely to occur with older children and adolescents. Furthermore, despite the fact that the practitioners in our survey clearly acknowledged the importance of sleep disorders in children and adolescents, and the

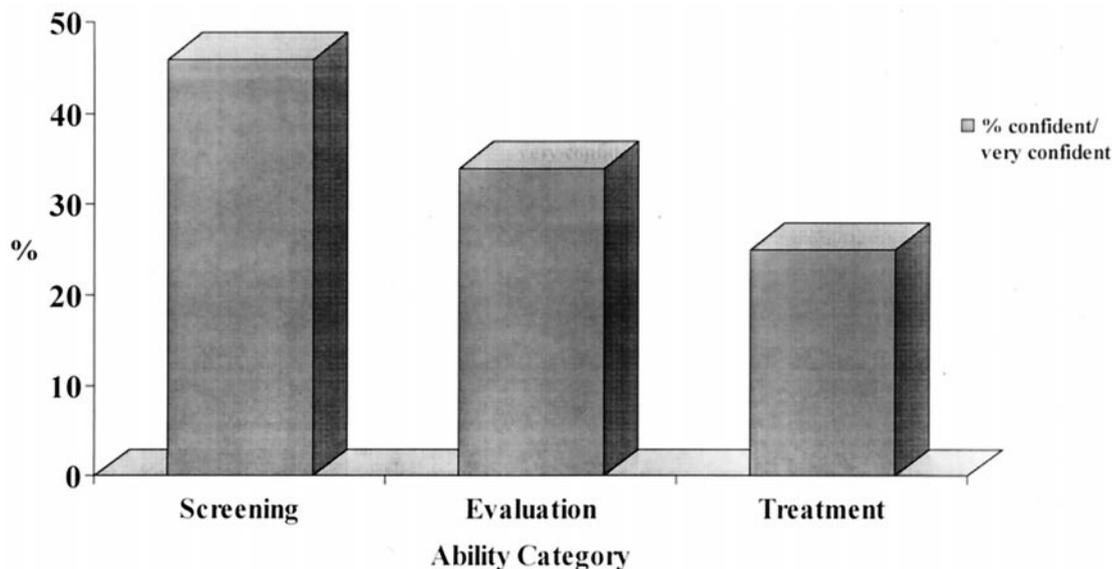


Fig 4. Pediatric Sleep Survey: Attitudes—Practitioner Confidence. Percentage of pediatrician respondents rating themselves in the 3 Ability categories as Confident or Very Confident

significant impact that sleep problems have on the health and well-being of their patients and families, the perceived level of confidence in their own ability to identify and successfully manage these disorders was low.

Despite the level of scientific progress that the field of pediatric sleep medicine has achieved in the last few years and the increased level of public awareness about pediatric sleep disorders, as evidenced by the number of books and articles published in the lay press and the level of media attention to these issues, the results of this survey are quite similar to those found in a comparable pediatric sleep knowledge survey of practicing pediatricians in the United States conducted 8 years before this study.¹¹ In comparing specific knowledge categories, pediatricians in both surveys clearly were most knowledgeable about developmental and behavioral aspects of children's sleep, and less knowledgeable about specific sleep disorders. In particular, the mean percentage of correct responses in our survey was <50% for the sleep disordered breathing, disorders of excessive daytime sleepiness, and sleep movement disorders category items. These findings also parallel those of a survey of Italian pediatricians,³⁷ in which knowledge scores for the categories of sleep apnea and narcolepsy were low compared with developmental sleep issues, as well as several surveys of adult practitioners³⁸ in which knowledge about disorders of excessive daytime sleepiness was also deficient. In no knowledge category did >50% of the pediatricians in our survey correctly respond to all the items, and the behavioral sleep knowledge category was the only one in which more than a quarter of the respondents answered all the items correctly. Interestingly, years of practice experience or proximity to training and academic versus community practice setting overall did not seem to significantly affect knowledge level; the exception was for the OSA subcategory, in which pediatricians who were more recently trained or

practiced in academic settings appeared to be more knowledgeable.

Although a number of studies have demonstrated that pediatricians often fail to screen adequately for behavioral problems in general,^{39–41} to our knowledge, ours is the only study which has specifically examined screening practices for sleep problems among a large sample of pediatricians. Although the majority of pediatricians in the survey did report routinely asking something about sleep issues in the context of the well-child examination, a significant percentage of those respondents asked only a single question for each age group, a practice that recent evidence suggests may be inadequate to identify all children with significant sleep problems.⁴² Furthermore, the combined percentage of pediatricians who did not screen or asked only a single question, ranging from 42% in infants to 52% in school-aged children to 74% in adolescents, is especially concerning in light of a number of recent studies documenting not only a high prevalence of sleep problems, particularly in adolescents,²³ but also resulting serious consequences on mood, behavior, and academic performance.^{21,43} Given the results of several studies suggesting that parents may underestimate the presence or magnitude of sleep problems in older children and adolescents,^{20,27} the impact of this age discrepancy is likely to be magnified by the fact that a low percentage of respondents also failed to ask the older child and adolescent directly about their own sleep habits.

Thus, as is the case with many behavioral concerns,⁴⁴ sleep problems are likely to be underidentified by pediatric practitioners despite the prevalence and acknowledged importance of these disorders in children. A number of the reasons cited for underidentification of behavioral problems,⁴⁵ involving both practical considerations and issues related to practitioners' behavior and beliefs, may also apply to sleep problems as well. Contrary to surveys of pedi-

atricians regarding other behavioral concerns such as ADHD,⁴⁶ in terms of more concrete concerns, our results indicated that lack of reimbursement did not play a major role in preventing pediatricians from asking screening questions about sleep. Similar to what has been reported in some surveys with adult primary care practitioners and sleep concerns,⁴⁷ however, time constraints were cited as an obstacle by a somewhat larger percentage (16%). Our results did not suggest that perceived low prevalence or lack of efficacy of available treatments for sleep problems are important deterrents to screening. Because we did not list the lack of available diagnostic and/or treatment services for pediatric sleep disorders as a reason for not screening, no specific conclusions can be drawn about this issue; however, the relatively high percentage of respondents in our survey who reported never or rarely referring patients to a sleep clinic or to a sleep lab for polysomnography suggests that relative lack of availability of such facilities might play a role.

Overall, our survey results suggest that a combination of practitioners' perceived low knowledge and comfort levels regarding sleep issues, and their beliefs, may have a relatively more important influence on screening practices. In particular, the assumption that parents will spontaneously raise concerns about sleep if they exist was cited as a reason for not screening for sleep problems. However, a number of studies which have examined this issue in regards to other types of behavioral problems have suggested that this assumption on the part of physicians about parents spontaneously raising concerns is often erroneous.^{48,49} Because studies of sleep screening practices of adult practitioners have also suggested that physicians tend to wait until the patient initiates discussion about sleep concerns,⁴⁷ it may be particularly important to directly address this potential miscommunication when educating both practitioners and parents about the identification of sleep problems in children.

Clearly one of the most important influences on physician knowledge levels, as well as beliefs and behavior in the practice setting, is previous exposure to both didactic instruction and role modeling during training. Previous studies have documented the scarcity of both didactic and alternative forms of instruction about sleep in general and pediatric sleep, in particular, during medical school and residency training. For example, a 1993 survey of medical school curricula found that only 0.38 clinical teaching hours on average were devoted to pediatric sleep issues, the smallest time period of any surveyed topic.⁷ One study¹¹ that specifically investigated the level of pediatric residency education about sleep disorders in children and adolescents found that the mean number of hours of instruction on pediatric sleep was only 4.8 hours over 3 years. Fewer than one third of the programs offered didactic instruction on any of the basic pediatric sleep topics surveyed other than apnea and general sleep information.

In addition to these educational gaps, there is a relative lack of emphasis on sleep issues, especially

screening for sleep problems, in many pediatric textbooks and other resources. For example, although "Bright Futures"⁵⁰ recommends screening and includes trigger questions for sleep problems during well-child examinations in younger children, there is very little emphasis on both screening and anticipatory guidance regarding sleep issues, especially in comparison to other health issues such as nutrition and tobacco use, in older children and adolescents. We recently performed an informal survey of 8 of the most popular pediatric textbooks in current use which revealed that a range of only 0.3% to 2.0% of the total texts was devoted to pediatric sleep topics, and of that sleep information, on average, about 50% was devoted specifically to the topics of infantile sleep apnea and colic (compared to an average of 4% to OSA).

Finally, it should be noted that pediatricians' personal experience with and beliefs about sleep and sleep problems may have a potential impact on their level of understanding about their patients' sleep problems, as well as their ability to manage them. As might have been predicted, for example, pediatricians whose own children have had sleep problems had higher scores on the Behavioral Sleep items. The physicians in this survey reported personal sleeping habits, especially amount of sleep, that were very similar to what has been reported both in other primary care physicians⁴⁷ and in the general public,⁵¹ although there was somewhat of a discrepancy in this sample between the acknowledged need for and perceived importance of sleep in their own lives, and their actual sleep behavior. The combination of a high percentage of respondents who reported a personal history of sleep problems, and the almost one third of the sample who are potentially chronically sleep deprived (6 hours or less of sleep per night) suggests that there may be a significant degree of inadequate and/or disrupted sleep in this population.

The issue of the low level of screening for snoring found in this study, even in the age groups in which OSA is most prevalent, combined with the findings regarding knowledge levels, evaluation, and treatment practices for OSA, deserves additional comment. Numerous studies have not only documented a variety of clinical sequelae related to OSA in children, ranging from growth failure⁵¹ to a host of behavioral and academic problems,³⁰ but have also suggested that many of the neuropsychological consequences, in particular, are reversible with treatment.^{31,52} Thus, early identification, particularly in high risk groups such as children with Down syndrome, repaired cleft palate, and obese children, and prompt and appropriate treatment should be a priority. Furthermore, because clinical symptoms alone have been repeatedly demonstrated overall to have poor predictive validity for OSA in children,^{53,54} familiarity with and access to appropriate diagnostic tools (ie, overnight sleep studies) once symptoms have been identified are also key factors. Clearly, additional research is needed to understand the barriers that exist or are perceived to exist by practitioners in regards to using polysomnography diagnos-

tically, given that half of our sample rarely or never did so. Finally, the treatment practices in regards to OSA reported in our study suggest that although pediatricians are knowledgeable about surgical and weight loss management options for children, they may not be as familiar with alternative treatments that are more commonly used in adults with OSA, such as continuous positive airway pressure.

In terms of other evaluation and treatment practices for sleep problems in children reported in this study, most of the pediatricians were aware of risk factors and seemed comfortable recommending behavioral management strategies for sleep problems in younger children with primarily behavioral issues. As a group, they were less appropriate in their evaluation and treatment of partial arousal parasomnias such as night terrors and sleepwalking. For example, they often failed to recognize potential diagnostic clues such as the timing of the nocturnal events,²⁴ and seemed to attribute considerable etiologic significance to psychological factors. A significant percentage also recommended treating night terrors with diphenhydramine, a medication with no demonstrated efficacy in this disorder.⁵⁵ Inappropriate use of or inadequate knowledge about sleep medications is also suggested by the 20% of respondents who had recommended melatonin, a hormone which has its' primary effect on circadian processes,⁵⁶ for adolescents with poor sleep hygiene. The majority of respondents, however, did recognize the value of basic sleep hygiene principles such as a regular sleep schedule, "stimulus control" (restricting in-bed activities), and sleep restriction in addressing adolescent insomnia.⁵⁷ Finally, as might have been predicted by the low level of knowledge about disorders of excessive daytime sleepiness, most respondents failed to recognize a significant risk for narcolepsy in the profoundly sleepy adolescent.⁵⁸

Because the survey was anonymous, we were not able to obtain information on the nonresponders. This, coupled with the limitation of a <50% response rate, although commensurate with other similar physician surveys,⁵⁹ may limit the generalizability of the results. It is possible that physicians who are more interested in and knowledgeable about sleep in children may have been more likely to complete the survey, skewing the results toward overestimating the knowledge base of pediatricians in the sample. This was also a survey of pediatricians in a single region of the country, and thus the findings may not be representative of pediatricians in the United States as a whole. Furthermore, all of the data collected was self-report and not accompanied by behavioral observations, and thus we could not validate the clinical practices reported by the respondents. However, because physicians are more likely to overestimate desirable practices such as preventive screening,⁶⁰ it is unlikely that the survey results represent a significant underestimation of what actually occurs in the clinical setting. Although every attempt was made to devise a survey instrument that would have adequate content and construct validity, formal psychometric assessment of the instrument itself was not done. Furthermore, the forced choice

format we elected to use to enhance ease of completion, and thus increase response rate, may not accurately reflect actual clinical practice as regards evaluation and management of sleep problems.

CONCLUSION

The results of this study reinforce the need to develop new, and continue existing, educational efforts regarding sleep and sleep disorders in children and adolescents at the medical school, postgraduate training, and continuing medical education levels. National efforts, such as the National Heart, Lung, and Blood Institute-funded Sleep Academic Award program, are important vehicles through which faculty development programs, model curriculum, educational tools such as web-based modules, and sleep screening instruments can be developed and disseminated. Preliminary data on a simple, five-item sleep screening tool, the BEARS⁴² (Appendix), for example, suggests that it is both effective in identifying sleep problems compared with standard screening procedures, and acceptable to practitioners in the clinical setting. Additional research is clearly needed to identify factors that may impede, as well as those that enhance, practitioners' learning regarding sleep disorders in children, as well as those variables that may significantly impact on pediatric sleep diagnostic and treatment practices.

ACKNOWLEDGMENTS

This study was supported by a grant from the National Heart, Lung, and Blood Institute of the National Institutes of Health Grant Number K07 HL03896-03 (Sleep Academic Award).

REFERENCES

1. Dement WC, Mitler MM. Waking up to the importance of sleep disorders: A commentary. *JAMA*. 1993;269:1548-1550
2. Young T, Paulta M, Dempsey J, Weber S, Badr S. The occurrence of sleep-disordered breathing among middle-aged adults. *N Engl J Med*. 1993;328:1230-1235
3. Leger D. Public health and insomnia: economic impact. *Sleep*. 2000; 23(suppl 3):S69
4. Wake Up America. *A National Sleep Alert. Vol. 1 of the Report of the National Commission on Sleep Disorders Research*. Washington, DC: US Department of Health and Human Services; 1993
5. Meissner HH, Riemer A, Santiago SM, Stein M, Goldman MD, Williams AJ. Failure of physician documentation of sleep complaints in hospitalized patients. *West J Med*. 1998;169:146-149
6. Orr WC, Stahl ML, Dement WC, Reddington D. Physician education in sleep disorders. *J Med Educ*. 1980;55:367-369
7. Rosen RC, Rosekind M, Rosevear C, Cole WE, Dement WC. Physician education in sleep and sleep disorders: a national survey of US medical schools. *Sleep*. 1993;16:249-254
8. Rosen R, Mahowald M, Chesson A, et al. The Taskforce 2000 survey on medical education in sleep and sleep disorders. *Sleep*. 1998;21:235-238
9. Rosen R, Zozula, R Development of a brief, self-administered instrument for assessing sleep knowledge in medical education: the ASKME survey. *Sleep*. 2001;24:227-233
10. Haponik EF, Frye AW, Richards B, et al. Sleep history is neglected diagnostic information. *J Gen Intern Med*. 1996;11:759-761
11. Mindell JA, Moline ML, Zendell SM, Brown LW, Fry JM. Pediatricians and sleep disorders: training and practice. *Pediatrics*. 1994;94:194-200
12. Anders TF. Night waking in infants during the first year of life. *Pediatrics*. 1979;64:860-864
13. Carey W. Breast feeding and night waking. *J Pediatr*. 1975;87:327-329
14. Carey W. Night waking and temperament in infancy. *J Pediatr*. 1974;84: 756-758
15. Anders TF, Carskadon MA, Dement WC, Harvey K. Sleep habits of

- children and the identification of pathologically sleepy children. *Child Psychiatry Hum Dev.* 1978;9:56–63
16. Lozoff B, Wolf AW, Davis NS. Sleep problems seen in pediatric practice. *Pediatrics.* 1985;75:477–483
 17. Richman N, Douglas J, Hunt H, Lansdown R, Levere R. Behavioural methods in the treatment of sleep disorders—a pilot study. *J Child Psychol Psychiatry.* 1985;26:581–590
 18. Lavigne JV, Arend R, Rosenbaum, D, et al. Sleep and behavior problems among preschoolers. *Dev Behav Pediatr.* 1999;20:164–170
 19. Blader JC, Koplewicz HS, Abikoff H, Foley C. Sleep problems of elementary school children: a community survey. *Arch Pediatr Adolesc Med.* 1997;151:473–480
 20. Owens JA, Spirito A, McGuinn M, Nobile C. Sleep habits and sleep disturbance in elementary school-aged children. *J Dev Behav Pediatr.* 2000;21:27–36
 21. Wolfson AR, Carskadon MA. Sleep schedules and daytime functioning in adolescents. *Child Dev.* 1998;69:875–887
 22. Carskadon MA. Adolescent sleepiness: increased risk in a high-risk population. *Alcohol, Drugs and Driving.* 1990;5/6:317–328
 23. Morrison DN, McGee R, Stanton WR. Sleep problems in adolescence. *J Am Acad Child Adolesc Psychiatry.* 1992;31:94–98
 24. Owens JA. Obstructive sleep apnea in children and adolescents. *Sem Respir Crit Care Med.* 1998;19:185–197
 25. Klackenberg G. Incidence of parasomnias in children in a general population. In: Guilleminault C, ed. *Sleep and its Disorders in Children.* New York, NY: Raven Press; 1987:99–113
 26. Mehlenbeck R, Spirito A, Owens J, Boergers J. The clinical presentation of childhood partial arousal parasomnias. *Sleep Med.* 2000;1:307–312
 27. Mindell JA, Owens JA, Carskadon MA. Developmental features of sleep. *Child Adolesc Psychiatric Clin North Am.* 1999;8:695–725
 28. Dahl RE. The impact of inadequate sleep on children's daytime and cognitive function. *Semin Pediatr Neurol.* 1996;3:44–52
 29. Hansen DE, Vandenberg B. Neurophysiological features and differential diagnosis of sleep apnea syndrome in children. *J Clin Child Psychol.* 1997;26:304
 30. Chervin RD, Dillon JE, Bassetti C, Ganoczy DA, Pituch KJ. Symptoms of sleep disorders, inattention, and hyperactivity in children. *Sleep.* 20; 1185–1192
 31. Dahl RE. Sleep in behavioral and emotional disorders. In: Ferber R, Kryger M, eds. *Principles and Practice of Sleep Medicine in the Child.* Philadelphia, PA: WB Saunders; 1995:147
 32. Guilleminault C, Winkle R, Korobkin R, et al. Children and nocturnal snoring: evaluation of the effects of sleep related respiratory resistive and daytime function. *Eur J Pediatr.* 1982;139:165–171
 33. Ali NJ, Pitson DJ, Stradling DJ. Snoring, sleep disturbance, and behaviour in 4–5 year olds. *Arch Dis Child.* 1993;68:360–366
 34. Ali NJ, Pitson D, Stradling JR. Sleep disordered breathing: effects of adenotonsillectomy on behavior and psychological functioning. *Eur J Pediatr.* 1996;155:56–62
 35. Chokroverty S, Jankovic J. Restless legs syndrome. *Neurology.* 1999;52: 907–910
 36. Picchiatti DL, Waters AS. Restless legs syndrome and periodic limb movement disorder in children and adolescents: comorbidity with attention-deficit hyperactivity disorder. *Child Adolesc Psychiatr Clin North Am.* 1996;6:729–740
 37. Walters AS, Mandelbaum DE, Lewin DS, et al. Dopaminergic therapy in children with restless legs/periodic limb movements in sleep and ADHD. *Pediatr Neurol.* 2000;22:182–186
 38. Dahl RE, Holtum J, Trubnick L. A clinical picture of child and adolescent narcolepsy. *J Am Acad Child Adolesc Psychiatry.* 1994;6:834–841
 39. Mindell JA, Durand VM. Treatment of childhood sleep disorders: generalization across disorders and effects on family members. *Pediatr Psychol.* 1993;18:731–750
 40. Minde K, Faucon A, Falkner S. Sleep problems in toddlers: effects of treatment on their daytime behavior. *J Am Acad Child Adolesc Psychiatry.* 1994;33:1114–1121
 41. Bruni O, Luchetti A, Ottaviano S, Gianotti F, Cortesi F. Pediatricians and child neuropsychiatrists: Who knows more about sleep? Association of Professional Sleep Services (APSS) 11th Annual Meeting, San Francisco, CA, June 10–15, 1997
 42. Kales JD, Kales A, Bixler EO, Soldatos CR. Resources for managing sleep disorders. *JAMA.* 1979;241:2413–2416
 43. Costello EJ, Edelbrock CS. Detection of psychiatric disorders in pediatric primary care: a preliminary report. *J Am Acad Child Psychiatry.* 1985;24:771–774
 44. Costello EJ. Primary care pediatrics and child psychopathology: a review of diagnostic, treatment, and referral practices. *Pediatrics.* 1986;78: 1044–1051
 45. Costello EJ, Costello AJ, Edelbrock C, et al. Psychiatric disorders in pediatric primary care: prevalence and risk factors. *Arch Gen Psychiatry.* 1988;45:1107–1116
 46. Owens JA, Dalzell V. Use of a pediatric sleep screening tool in the primary care setting: a pilot study. *J Dev Behav Pediatr.* 2000;21:389–390
 47. Randazzo AC, Muehlback MJ, Schweitzer PK, Walsh JK. Cognitive function following acute sleep restriction in children ages 10–14. *Sleep.* 1998;21:861–868
 48. Lavigne JV, Binns HJ, Christoffel KK, et al. Behavioral and emotional problems among preschool children in pediatric primary care: prevalence and pediatricians' recognition. *Pediatrics.* 1993;91:649–655
 49. Stancin T, Mizell Palermo T. A review of behavioral screening practices in pediatric settings: Do they pass the test? *Dev Behav Pediatr.* 1997;18: 183–192
 50. Kwasman A, Tinsley BJ, Lepper HS. Pediatricians' knowledge and attitudes concerning diagnosis and treatment of attention deficit and hyperactivity disorders. *Arch Pediatr Adolesc Med.* 1995;149:1211
 51. The National Sleep Foundation. *Omnibus Sleep in America Poll.* Report prepared by the National Sleep Foundation. Washington, DC: NSF; 1999
 52. Hickson GB, Altemeier WA, O'Connor S. Concerns of mothers seeking care in private pediatric offices: opportunities for expanding services. *Pediatrics.* 1983;72:619–624
 53. Garrison WT, Bailey ED, Garb J, Ecker B, Spencer P, Sigelman D. Interactions between parents and pediatric primary care physicians about children's mental health. *Hosp Community Psychiatry.* 1992;43: 489–493
 54. Bright Futures. *Guidelines for Health Supervision of Infants, Children and Adolescents.* Green M, ed. Arlington, VA: National Center for Education in Maternal and Child Health; 1994
 55. Guilleminault C, Korobkin R, Winkle R. A review of 50 children with obstructive sleep apnea syndrome. *Lung.* 1981;159:275
 56. Owens J, Spirito A, Marcotte A, McGuinn M, Berkelhammer L. Neuro-psychological and behavioral correlates of obstructive sleep apnea syndrome in children: a preliminary study. *Sleep and Breathing.* 2000;4:67–77
 57. Carroll JL, McColley SA, Marcus CL, et al. Inability of clinical history to distinguish primary snoring from obstructive sleep apnea in children. *Chest.* 1995;108:610–618
 58. Rosen CI. Obstructive sleep apnea syndrome (OSAS) in children: diagnostic challenges. *Sleep.* 1996;19:S274–S277
 59. Reite ML, Nagel KE, Ruddy JR. *Concise Guide to Evaluation and Management of Sleep Disorders.* Washington, DC: American Psychiatric Press; 1990
 60. Gavallo A. Melatonin: myth vs. fact. *Contemp Pediatr.* 1997;71–84
 61. Mellinger GD, Balter MB, Eberhard H, Uhlenhuth MD. Insomnia and its treatment. *Arch Gen Psychiatry.* 1985;42:225–232
 62. Kotagal S, Hartse KM, Walsh JK. Characteristics of narcolepsy in pre-teenaged children. *Pediatrics.* 1990;85:205
 63. Asch DA, Christakis NA, Ubel PA. Conducting physician mail surveys on a limited budget: a randomized trial comparing \$2 versus \$5 bill incentives. *Med Care.* 1998;36:95–99
 64. Perez-Stable EJ, Juarez-Reyes M, Kaplan C, et al. Counseling smoking parents of young children. *Arch Pediatr Adolesc Med.* 2001;155:25–31

PEDIATRIC SLEEP SURVEY

I. The purpose of this section of the survey is to gather information about how familiar practicing physicians are with sleep and sleep disorders in children and adolescents. Your answers are anonymous. This is not a test.

Please circle the correct response -True/False/Don't Know

- | | | | |
|---|------|-------|------------|
| 1) There is a physiologically-based increase in daytime alertness in adolescents around the time of puberty. | True | False | Don't Know |
| 2) Children with delayed sleep phase ("Night Owls") may present with bedtime resistance. | True | False | Don't Know |
| 3) The incidence of Obstructive Sleep Apnea Syndrome (OSAS) in pre-schoolers is less than 1%. | True | False | Don't Know |
| 4) Night terrors and sleepwalking often have a familial component. | True | False | Don't Know |
| 5) Please read the following statements in regards to Narcolepsy in children and circle the correct response for each item: | | | |
| a. Does not occur in pre-pubertal children | True | False | Don't Know |
| b. Requires an overnight sleep study and Multiple Sleep Latency Test (MSLT) to diagnose | True | False | Don't Know |
| c. Psychostimulants are usually the treatment of choice | True | False | Don't Know |
| 6) Bright light phototherapy with a light box may be helpful for children with a delayed sleep phase. | True | False | Don't Know |
| 7) Children with ADHD seldom have sleep onset difficulties unless they are on psychostimulant medication. | True | False | Don't Know |
| 8) It is normal for school-aged children to take naps up to several times a week. | True | False | Don't Know |
| 9) Breast-fed babies usually sleep through the night at an earlier age than bottle-fed babies. | True | False | Don't Know |
| 10) Hyperactivity is a common presenting complaint in pediatric OSAS. | True | False | Don't Know |
| 11) Amnesia for the episode is not helpful in distinguishing night terrors from nightmares. | True | False | Don't Know |
| 12) Children with severe developmental delays have an increased risk of developing sleep schedule disturbances. | True | False | Don't Know |
| 13) Average 24-hour total sleep duration for a 3-year old is about 8 hours. | True | False | Don't Know |
| 14) Health care providers should not recommend temporary establishment of a later bedtime as an intervention for a child with difficulty falling asleep. | True | False | Don't Know |
| 15) No combination of clinical symptom severity and physical findings reliably predicts disease severity in children with OSAS. | True | False | Don't Know |
| 16) Nocturnal bedwetting occurs almost exclusively during deep or slow-wave sleep. | True | False | Don't Know |

- 17) School avoidance makes a sleep phase delay in adolescents more difficult to treat. True False Don't Know
- 18) It is normal for young children to awaken briefly during the night at the end of a sleep cycle (every 60-90 minutes). True False Don't Know
- 19) "Learned Hunger" resulting from frequent night feedings can lead to increased nocturnal awakenings in infants. True False Don't Know
- 20) Children from which of the following groups are at increased risk for **Obstructive Sleep Apnea Syndrome** (Please circle the correct response for each item):
- a. Prader-Willi Syndrome True False Don't Know
 - b. Down Syndrome True False Don't Know
 - c. Repaired Cleft Palate True False Don't Know
 - d. Achondroplasia True False Don't Know
- 21) Bruxism (teeth grinding) is uncommon in children. True False Don't Know
- 22) Head banging in infants at bedtime is usually associated with developmental delay. True False Don't Know
- 23) Please read the following statements in regards to **Restless Legs Syndrome/ Periodic Leg Movement Disorder** and circle the correct response for each item:
- a. Does not occur in children under 12 years True False Don't Know
 - b. May be linked to symptoms of Attention Deficit Hyperactivity Disorder True False Don't Know
 - c. May be cause of "growing pains" in children True False Don't Know

II. The purpose of this next section of the survey is to assess how physicians screen, evaluate, and treat childhood sleep disorders in their own practices. Please answer based on what you actually do, rather than what you think you should do for the following:

- A. **SCREENING** for sleep problems: - In the context of a **Well Child Exam**, which sleep history questions do you include **greater than 75% of the time** in the following age groups? (Please check all that apply):

	INFANTS (0-1 YRS)	TODDLERS/ PRE-SCHOOL (2-4 YRS)	SCHOOL- AGED (5-12 YRS)	ADOLESCENTS (13+ YRS)
a. do not screen for sleep problems in this age group				
b. generally ask single question only about general sleep problems				
c. usual bedtime				
d. usual wake time				
e. usual sleep amount				
f. naps				
g. regularity of sleep-wake schedule				
h. co-sleeping				
i. bedtime resistance				
j. sleep onset delay				
k. night wakings				
l. nighttime fears				
m. sleepwalking				
n. night terrors				
o. nightmares				
p. bedwetting				
q. teeth grinding				
r. frequent leg kicking or twitching during sleep				
s. snoring				
t. breathing pauses				
u. restless sleep				
v. difficulty am waking				
w. daytime sleepiness				
x. daytime behavior problems				
y. family history of sleep problems				
z. question child about sleep habits				

2) If you **do not** routinely screen for sleep problems, please indicate the reason(s). (Check all that apply):

- Sleep problems not important
- Takes too much time
- Lack of reimbursement
- Not necessary because of low incidence of problems
- Takes time away from asking about other health concerns
- Do not feel comfortable asking questions about sleep
- Do not feel knowledgeable about sleep problems
- Sleep problems generally not treatable
- Parent will indicate if there is a problem anyway, even without screening
- Other (Please explain): _____

- B. **EVALUATION** of sleep disorders: For the following **presenting sleep complaints**, indicate how often **you do the following** in your practice: (Please circle the appropriate response:)

1 = NEVER/RARELY
2 = OCCASIONALLY
3 = ABOUT HALF
4 = OFTEN
5 = ALWAYS

- | | | | | | |
|--|---|---|---|---|---|
| 1) In toddlers with frequent night wakings , focus on the method of falling asleep. | 1 | 2 | 3 | 4 | 5 |
| 2) In a pre-schooler with bedtime resistance , ask about parental disciplinary style. | 1 | 2 | 3 | 4 | 5 |
| 3) In school-aged children with secondary enuresis , inquire about a history of snoring. | 1 | 2 | 3 | 4 | 5 |
| 4) Ask about the timing of the night wakings in evaluating a child for parasomnias . | 1 | 2 | 3 | 4 | 5 |
| 5) Routinely inquire about symptoms of cataplexy in adolescents with profound daytime sleepiness . | 1 | 2 | 3 | 4 | 5 |
| 6) Of the following options for further evaluation of a patient in whom you suspect Obstructive Sleep Apnea on clinical grounds: | | | | | |
| a. obtain x-rays, EKG, or lab tests: | 1 | 2 | 3 | 4 | 5 |
| b. refer to a sleep subspecialist or sleep clinic for evaluation: | 1 | 2 | 3 | 4 | 5 |
| c. refer for an in-hospital overnight sleep study: | 1 | 2 | 3 | 4 | 5 |
| d. refer directly to an otolaryngologist | 1 | 2 | 3 | 4 | 5 |

- C. **TREATMENT** of sleep disorders: In the treatment of the following sleep disorders, indicate how often **you do the following** in your practice (please circle the appropriate response):

- | | | | | | |
|---|---|---|---|---|---|
| 1) Frequent night wakings in a 14-month old who is routinely rocked to sleep at bedtime: | | | | | |
| a. suggest co-sleeping with parents | 1 | 2 | 3 | 4 | 5 |
| b. advise increasing the level of parental intervention at bedtime | 1 | 2 | 3 | 4 | 5 |
| c. advise gradually increasing time intervals between "checking on" child ("Ferber Method") | 1 | 2 | 3 | 4 | 5 |
| d. advise parents that problem will resolve without intervention | 1 | 2 | 3 | 4 | 5 |
| 2) Bedtime resistance in a pre-schooler due to sudden onset of nighttime fears: | | | | | |
| a. advise ignoring fears and setting firm limits at bedtime | 1 | 2 | 3 | 4 | 5 |
| b. suggest transitional object | 1 | 2 | 3 | 4 | 5 |

c. encourage bedtime television viewing “to relax” child	1	2	3	4	5
d. utilize positive reinforcement (sticker chart) for staying in bed	1	2	3	4	5
3) Weekly night terrors in a 7-year old:					
a. suggest diphenhydramine (Benadryl) at bedtime	1	2	3	4	5
b. advise parents about safety issues, but basically just reassure	1	2	3	4	5
c. suggest psychological evaluation for child	1	2	3	4	5
d. encourage regular sleep-wake schedule	1	2	3	4	5
4) Insomnia in an adolescent due to poor sleep habits:					
a. suggest trial of melatonin	1	2	3	4	5
b. encourage “catch-up” sleep on weekends	1	2	3	4	5
c. prescribe hypnotics at bedtime	1	2	3	4	5
d. suggest maintaining a similar sleep-wake schedule on weekdays and weekends	1	2	3	4	5
e. discourage using bed for activities other than sleep	1	2	3	4	5
5) Of the following treatment options for a patient in whom you suspect Obstructive Sleep Apnea on clinical grounds:					
a. If tonsils are enlarged, refer directly to an otolaryngologist for adenotonsillectomy	1	2	3	4	5
b. If obese, refer to a nutritionist, or weight loss program	1	2	3	4	5
c. Prescribe nasal steroids if adenoidal hypertrophy is present	1	2	3	4	5
d. Refer for Continuous Positive Airway Pressure (CPAP)	1	2	3	4	5
e. Refer to orthodontist for oral appliance	1	2	3	4	5
f. Clinical observation only	1	2	3	4	5

III. This final section of the survey asks you for your opinion about several different aspects of sleep disorders in children.

Please rate the following statements, on a scale of 1 (not important) to 3 (somewhat important) to 5 (very important):

A. The **impact** of sleep problems on children's: (Please mark an "X" on the appropriate response:)

	<u>Not Important</u>		<u>Somewhat Important</u>		<u>Very Important</u>
1) general health	1	2	3	4	5
2) mood and behavior	1	2	3	4	5
3) academic performance	1	2	3	4	5
4) parental stress	1	2	3	4	5
5) non-intentional injury rates (falls, burns, etc.)	1	2	3	4	5

B. The **importance** of the following sleep-related public health issues:

	<u>Not Important</u>		<u>Somewhat Important</u>		<u>Very Important</u>
1) educating adolescents about drowsy driving	1	2	3	4	5
2) delaying high school start times	1	2	3	4	5
3) educating school personnel about children's sleep	1	2	3	4	5

Please rate the following on a scale of 1 (not confident) to 3 (somewhat confident) to 5 (very confident): (Please mark an "X" on the appropriate response)

	<u>Not Confident</u>		<u>Somewhat Confident</u>		<u>Very Confident</u>
C. Your ability to screen children for sleep problems	1	2	3	4	5
D. Your ability to evaluate children for sleep problems	1	2	3	4	5
E. Your ability to manage children with sleep problems	1	2	3	4	5

Please estimate the following: (Circle one)

F. **Overall** percentage of patients in your practice with **sleep problems**: 0-25% 51-75%
26-50% 76-100%

G. Percentage of patients in your practice with **sleep problems** in the **following age groups**: (Circle one)

1) 0-2 years	0-25%	26-50%	51-75%	76-100%
2) 3-6 years	0-25%	26-50%	51-75%	76-100%
3) 7-12 years	0-25%	26-50%	51-75%	76-100%
4) 13+ years	0-25%	26-50%	51-75%	76-100%

THANK YOU VERY MUCH FOR YOUR TIME!

If you would like assistance or consultation regarding any of your pediatric patients' sleep problems or would like to set up an appointment for a patient, please call us at the Pediatric Sleep Disorders Clinic, Hasbro Children's Hospital, (401) 444-8815.

The Practice of Pediatric Sleep Medicine: Results of a Community Survey

Judith A. Owens

Pediatrics 2001;108;e51

DOI: 10.1542/peds.108.3.e51

Updated Information & Services

including high resolution figures, can be found at:
<http://pediatrics.aappublications.org/content/108/3/e51>

References

This article cites 53 articles, 9 of which you can access for free at:
<http://pediatrics.aappublications.org/content/108/3/e51#BIBL>

Subspecialty Collections

This article, along with others on similar topics, appears in the following collection(s):
Administration/Practice Management
http://www.aappublications.org/cgi/collection/administration:practice_management_sub
For Your Benefit
http://www.aappublications.org/cgi/collection/for_your_benefit

Permissions & Licensing

Information about reproducing this article in parts (figures, tables) or in its entirety can be found online at:
<http://www.aappublications.org/site/misc/Permissions.xhtml>

Reprints

Information about ordering reprints can be found online:
<http://www.aappublications.org/site/misc/reprints.xhtml>

American Academy of Pediatrics

DEDICATED TO THE HEALTH OF ALL CHILDREN®



PEDIATRICS[®]

OFFICIAL JOURNAL OF THE AMERICAN ACADEMY OF PEDIATRICS

The Practice of Pediatric Sleep Medicine: Results of a Community Survey

Judith A. Owens

Pediatrics 2001;108;e51

DOI: 10.1542/peds.108.3.e51

The online version of this article, along with updated information and services, is located on the World Wide Web at:

<http://pediatrics.aappublications.org/content/108/3/e51>

Pediatrics is the official journal of the American Academy of Pediatrics. A monthly publication, it has been published continuously since 1948. Pediatrics is owned, published, and trademarked by the American Academy of Pediatrics, 345 Park Avenue, Itasca, Illinois, 60143. Copyright © 2001 by the American Academy of Pediatrics. All rights reserved. Print ISSN: 1073-0397.

American Academy of Pediatrics

DEDICATED TO THE HEALTH OF ALL CHILDREN[®]

