

9

Assessment of Sleep Problems in a School Setting or Private Practice

Marsha Luginbuehl^a and Kathy L. Bradley-Klug^b

^a*Lincoln County School District #2, Afton*

^b*University of South Florida, Tampa*

INTRODUCTION

One out of every three elementary school age children suffers serious sleep problems (1). While some of these may disappear during childhood, 12–15% of all students may have a sleep problem impacting their daytime functioning that will not disappear without treatment (2). These sleep problems can impact the social, emotional, neurocognitive, and academic performance of these children. Because sleep problems are not typically considered a possible cause for school-related issues such as poor academic performance or behavioral concerns, many children with sleep problems may never be identified or may be mislabeled.

The focus of this chapter is to provide clinical professionals with an overview of the most current research regarding the link between sleep problems and educational outcomes for children and adolescents. Screening of sleep disorders is discussed within the context of a prevention to intervention continuum. The chapter will introduce clinical professionals to new instruments available for assessing children with suspected sleep disorders as part of their problem solving evaluation process. Finally, the importance of collaboration between school-based, community, and medical professionals is discussed with regard to identifying children with sleep problems and providing them with interventions that will allow them to experience positive educational outcomes.

LINK BETWEEN SLEEP, LEARNING, AND BEHAVIOR

Sleep problems in children can result in poor cognitive and academic performance (3) in addition to associated poor performance on tasks measuring working memory (4). For example, Gozal found a relationship between first-grade children identified with sleep-disordered breathing and their poor academic performance (5). Sleep deprivation alone limits overall cognitive efficiency (6). Specifically, inadequate sleep may lead to excessive daytime sleepiness which impacts one's overall functioning.

The impact of sleep problems may also be manifested by the child in the form of overactivity, irritability or depressive tendencies, oppositional behavior, and/or poor impulse control. Research has shown that a relationship exists between sleep disordered breathing (SDB), periodic limb movement disorder (PLMD) and symptoms of attention-deficit/hyperactivity disorder (ADHD) (7). Additionally, a relationship has been shown between sleep disorders and challenging behavior/conduct disorder (8). Specifically, Chervin found that bullying and other

aggressive types of behaviors were generally two to three times more frequent among children at high risk for SDB than among other children. Researchers have also found that children with sleep problems experience reduced quality of life which also impacts psychological well-being (9).

A meta-analysis was conducted on 17 research studies published between 1966 and 2001 exploring the effects of obstructive sleep apnea syndrome (OSAS) or SDB on children (10). This study reported that the children with OSAS or SDB had significantly more problems than children in control groups without these sleep disorders in the areas of cognition, behavior (irritability, hyperactivity, etc.), academic performance, and daytime sleepiness. Furthermore, results of this meta-analysis indicated that there were significant improvements in those areas post-treatment of the OSAS or SDB.

RECENT SLEEP SCREENING RESULTS IN THE SCHOOLS AND PRIVATE PRACTICES

Recent educational screening research provides prevalence rates of sleep problems in pediatric populations and reports further evidence of the impact of these problems on educational outcomes. Luginbuehl screened 595 students from across school and clinical settings for sleep problems using the Sleep Disorders Inventory for Students (SDIS) (11). Parents were asked to rate their child's behaviors, and report information on their child's grade point average (GPA), educational placement, and any formally identified diagnoses. Significant relationships were found between sleep problems, lower GPA, and problem behaviors. Students with multiple sleep problems or a diagnosed sleep disorder had a much higher rate of placement in special education than peers without sleep problems/disorders. These students also had significantly higher rates of diagnoses such as depression, bi-polar disorder, conduct disorder, oppositional defiant disorder, and ADHD, than students without sleep problems. Forty-nine percent of students with a medically diagnosed sleep disorder were receiving special education services compared to the national average of approximately 12–14%. Students' GPAs and behaviors improved significantly post-treatment.

Witte investigated the relationship between children who were at risk for sleep problems and their subsequent development in pre-academic and behavior skills (12). Eighty-six at-risk preschool children ranging in age from three to five years were screened as part of school district Child Find effort. Data were collected on the children's sleep using the SDIS-C (11), pre-academic skills, and internalizing and externalizing behaviors. Results demonstrated that 33% of the sample of children was rated as high risk in at least one category of sleep disorder on the SDIS-C. Additionally, another 10% of the sample scored in the cautionary range for a sleep disorder. There was a significant inverse relationship found between scores on the SDIS-C and pre-academic performance, indicating that children at risk for a sleep disorder had fewer of the skills required for success in kindergarten (i.e. skills in language, motor, and conceptual knowledge). Children with high SDIS-C scores also had significantly higher externalizing and internalizing scores than their at risk peers.

Ax investigated the prevalence of sleep problems/disorders in 216 second- and third-grade students attending a school district in the northeast (13). This study also investigated the relationship between students with and without symptoms of

sleep disorders on the following variables: classroom behavior, academic achievement in reading and math, quality of life, and life satisfaction. Symptoms of sleep disorders were measured by parent completion of the SDIS-C. Symptoms of sleep disorders occurred in almost one-fifth (17%) of the sample. Results supported an overall difference in school behavior and reading between students with and without symptoms of sleep disorders. Students with symptoms of sleep disorders performed significantly worse in reading achievement and exhibited significantly more internalizing and externalizing behaviors than students without symptoms of sleep disorders. There were no significant differences found between the children with and without symptoms of sleep disorders on measures of quality of life and life satisfaction.

Similarly, a study conducted with a clinic-referred sample of 104 children ages two to five years found that a significant number of young children are at risk for at least one type of sleep disorder (14). In this study, 31% of the children were found to be at high-risk for at least one type of sleep disorder and an additional 10% were found to be at cautionary risk for at least one sleep disorder. Young children displaying symptoms of a sleep disorder also were reported by parents as demonstrating higher rates of externalizing and internalizing behaviors.

Clearly, the research has established a relationship between sleep problems and difficulties with learning and behavior. Furthermore, studies have demonstrated significant improvements in students' cognition, learning, and behaviors after sleep disorders are treated and corrected. The high incidence rate and negative effects of sleep problems/disorders on children's behaviors and academic performance warrants the use of a thorough screening process to identify and correct sleep problems before they significantly impair children's daytime functioning. Implementation of a comprehensive screening process in all schools and pediatric practices could ensure that the majority of children with sleep disorders are identified early and receive appropriate treatment.

COMPREHENSIVE CARE FOR CHILDREN WITH SLEEP PROBLEMS: PROGRAMMING ACROSS THE PREVENTION-INTERVENTION CONTINUUM

Treatment of children with health issues has changed over the past 10 years. Historically, in the school setting targeted children were those who were already identified and school personnel took on the roles of problem solving and intervention implementation (15). A more contemporary approach focuses on prevention and intervention, incorporating a public health model that includes all children. The emphasis is on building resources to help all children and solving problems before they become critical (16). This more contemporary approach results in an expanded model that addresses a continuum of need.

Applying this more contemporary approach to pediatric sleep disorders requires school personnel and professionals in private practice to take on a more proactive role in the prevention of and intervention for sleep problems. The Institute of Medicine (IOM) categorical framework of prevention can be applied to sleep disorders (Table 1) (17). For example, at the level of *universal prevention*, strategies are applied to all populations in an effort to prevent the development of sleep problems. Within this level of prevention, school personnel may decide to screen for sleep problems all children entering kindergarten. Those children who appear at risk for sleep problems would be targeted for further assessment and intervention development.

TABLE 1 Levels of prevention related to sleep problems

Level of prevention	Recommended for screening
Universal	<ul style="list-style-type: none"> • All students entering kindergarten • Children referred for well child visits
Selective	<ul style="list-style-type: none"> • Children referred to Child Find Screenings • Students with learning problems • Students with behavior problems • Students described as lethargic, tired, or unmotivated to work
Indicated	<ul style="list-style-type: none"> • Students with DSM-IV-R diagnoses • Middle and high school students with frequent tardies or truancies • All students with identified drug or alcohol problems

At the *selective prevention* level, a subset of children who may be at higher risk for a sleep disorder due to membership in a particular group (i.e. students with identified learning and behavior problems) would be targeted for screening. Finally, the *indicated prevention* level is for students who may or may not meet diagnostic criteria for a sleep disorder but who are displaying characteristics of a sleep disorder such as falling asleep in class, frequent tardies or truancies, and experimentation with drugs or alcohol. This focus on prevention serves to screen for sleep problems and disorders, and target students before the disorder significantly and negatively impacts the development of academic and behavior skills.

Clearly, screening and assessment for sleep disorders is necessary within the school setting, pediatric, and mental health private practices. The following section will review screening and assessment tools developed for research or screening children and adolescents for sleep disorders. Each instrument is reviewed with respect to its intended use, psychometric properties, strengths, limitations, and implications for screening. The purpose of this chapter is not to recommend a particular instrument, but to offer the reader an objective overview of these measures and provide more than one inventory choice, depending on the professionals' needs.

Phase I Screening

It is critical that all pediatric professionals recognize the major warning signs of a possible pediatric sleep disorder and ask parents the right questions to identify these problems. It is not enough to ask parents if their child has trouble sleeping because more than half the parents who have a child with a sleep disorder will answer this question "No" (11). Inquiries about a child exhibiting excessive daytime sleepiness (EDS), difficulty falling asleep, or frequent nighttime awakenings are more specific and may identify about 25–30% of the children with sleep problems/disorders. However, these questions alone are still insufficient. Young children with sleep disorders like OSA rarely exhibit EDS until they reach adolescence (18) or have a more serious sleep disorder or early onset narcolepsy (19). Due to the high incidence rate of sleep problems/disorders in children with learning, behavior, or emotional problems, professionals should ask the parents of all of these

children some poignant questions regarding their child's sleep habits. In Phase I, the professional only needs to ask 5–10 questions to pinpoint some of the characteristics of the major pediatric sleep disorders that impair children's daytime performance: (1) Obstructive Sleep Apnea Syndrome (OSAS), (2) Periodic Limb Movement Disorder (PLMD); (3) Restless Legs Syndrome (RLS); (4) Behavioral Insomnia of Childhood (BIC); (5) Delayed Sleep Phase Syndrome (DSPS); and (6) narcolepsy. By asking these initial questions, the professional will rule out a sleep disorder in approximately 60% of the children/youth they screen. If parents respond in the affirmative to some of these initial questions, then the professional should proceed to Phase II, which would involve a more in depth sleep screening inventory.

Bears

Owens and Dalzell recommended that pediatric professionals begin by screening all children between 2 and 12 years with a simple 5-question screening tool referred to as the BEARS.⁽²⁰⁾ Mindell and Owens stated that it could also be used to screen adolescents through 18 years (1). This initial screener inquires about (1) **B**edtime problems, (2) **E**xcessive daytime sleepiness, (3) **A**wakenings during the night, (4) **R**egularity of evening sleep time and morning awakenings, and (5) **S**leep-related breathing problems or snoring (20). Owens and Dalzell also reported that almost twice as many children's sleep problems were identified when the BEARS was used as a brief screener in a clinical setting than when it was left up to the pediatricians to ask questions on their own about sleep. However, less than a third of these pediatricians rated themselves as self-confident enough about sleep disorders to know how to evaluate a pediatric sleep disorder even if parents answered any of these questions in the affirmative, and only one quarter of them reported that they knew enough to treat sleep disorders. It is even less likely that school professionals or psychologists know what to do or how to assess and treat sleep problems. Therefore, a Phase I screener like the BEARS would merely alert professionals, if parents answer "yes" to any of these questions, that they need to proceed to screening with a more comprehensive inventory that can provide them with more accurate assessment information and treatment possibilities.

Strengths of the BEARS

This measure is a quick, simple screener for pediatricians and other pediatric professionals to use universally for all children from 2 through 18 years in large screenings to determine if a child needs to be administered a more comprehensive sleep disorders screening inventory (Phase II). Professionals can easily remember these brief questions using the "BEARS" acronym.

Limitations of the BEARS

This measure was designed to be used by pediatricians and other medical professionals in Well Clinic Checks. However, it appears that any professional could use it due to its simplicity. It does not ask information about excessive leg movements or other movements in sleep and may miss children who have PLMD, RLS, or other parasomnias. No validity or reliability studies were reported on the BEARS in the literature. The BEARS is designed as a Phase I screener to give professionals enough information to determine if they should give a more extensive sleep screening measure.

Tiss

The Ten Item Sleep Screener (TISS) is another Phase I screener for pediatric and school professionals to use. It takes a small sampling of 10 questions from the more comprehensive SDIS (11) and can be easily integrated into all pediatric and adolescent screenings. Questions on the TISS include the following: (1) Does the child/adolescent snore lightly or loudly at night? (2) Does the child/adolescent exhibit excessive daytime sleepiness? (3) Does the child/adolescent have difficulty falling asleep at night? (4) Does the child/adolescent roll, kick, or move around frequently in sleep? (5) Wake up frequently in the night? (6) Is s/he difficult to awaken in the morning? (7) Does child/teen gasp, choke, or snort in sleep? (8) Stop breathing during sleep? (9) Does the child get enough sleep at night compared to peers of the same age? and (10) Does the child have a difficult temperament (irritable or easily frustrated)?

Strengths of the TISS

This screener is quick and simple to administer and is designed for use by all school and pediatric professionals working with children and adolescents. It provides one or two questions on most of the major pediatric sleep disorders, including OSAS, PLMD, RLS, DSPS, and narcolepsy. The results can assist in determining the necessity of Phase II screening.

Limitations of the TISS

No validity or reliability studies have been conducted on the TISS. It is only designed as a Phase I screener, but does not give enough information to know with confidence if a child should be referred to a pediatric sleep specialist.

If parents answer "Yes" to any of the BEARS or the TISS questions, then the professional should proceed to Phase II screening, which is a more in-depth sleep screening capable of predicting more accurately if a child has a strong probability of sleep disorder and needs to be referred to a pediatric sleep specialist.

Phase II Screening

This more comprehensive screening should enable the school or pediatric professional to determine with confidence one of three things about a child/youth's sleep: (1) The child's sleep is normal or typical for a child of the same age; (2) the child/adolescent has significant sleep problems and/or a strong probability of a major sleep disorder and needs to be referred to a pediatrician or a pediatric sleep specialist; (3) the child has significant sleep problems that probably can be corrected by a psychologist, psychiatrist, pediatrician, or school professional working together with the parent and child/youth. For example, if a child appears to have BIC or an adolescent appears to have DSPS, both of which can often be improved by teaching good sleep habits/hygiene, then the professional can give the parents and child/adolescent a list of recommendations and work with them to decrease or correct their sleep problems.

However, if there is a good probability that the child or adolescent has OSAS, PLMD, RLS, or narcolepsy, then these children need to be referred to a pediatric sleep specialist to ensure the proper identification, treatment and correction of these sleep disorders. The following section reviews three measures that professionals may consider using for Phase II screening. When considering the quality of screening instruments, it is important to note that desirable validity, internal consistency

(reliability), and test–retest reliability coefficients range from 0.70 to 0.79, good coefficients range from 0.80 to 0.89, and high coefficients are 0.90+(22).

Children's Sleep Habits Questionnaire – Abbreviated Form (CSHQ)

(see Appendix A)

Developer: Judith A. Owens, MD (21).

Setting: At three elementary schools and a Pediatric Sleep Disorders Clinic at Rhode Island Hospital, all in southeastern New England.

Participants: 623 students in total: 469 children ages 4 through 10 years without sleep disorders (community sample) and 154 children diagnosed with a sleep disorder (clinical sample).

Demographics: The community and clinical samples did not differ by gender, but the community sample was significantly older and had a higher socioeconomic status (SES) than the clinical sample; both samples were predominantly white, middle-income English-speaking suburban families that did not reflect the 2000 U.S. census demographics.

Questionnaire Qualities: The CSHQ is a 33-item parent questionnaire for children aged from 4 to 10 years, which is rated on a three-point scale (“usually”, meaning behavior occurred 5–7 times per week; “sometimes”, or 2–4 times per week; “rarely”, or 0–1 time per week). It is available in English. The CSHQ yields a Total Score and eight sleep domain scale scores: (1) Bedtime Resistance, (2) Sleep Duration, (3) Parasomnias, (4) Sleep-disordered Breathing, (5) Night Awakenings, (6) Daytime Sleepiness, (7) Sleep Anxiety, and (8) Sleep Onset Delay. The developer of this questionnaire reported that the CSHQ's primary purpose is for research by pediatric sleep specialists, not for screenings by clinicians. She also stated that there is a longer, more comprehensive CSHQ version, but it has not been validated.

Sleep Problems Measured and Results: Using the CSHQ, it was possible to distinguish between the community sample and children with sleep disorders on each subscale and also using the total score. The CSHQ had an overall sensitivity of .80, meaning that 80% of the clinical group with the sleep problems/disorders that the CSHQ measures would have been correctly identified, which is the major purpose of any sleep screening instrument. Children in the clinical sample diagnosed with a sleep problem/disorder scored significantly higher on that sleep scale than other sleep scales of the CSHQ. Internal consistency for the total CSHQ was 0.68 for the community sample and 0.78 for the clinical sample. The eight subscales varied in their psychometric qualities based on the reported validity and reliability coefficients. Six of the eight sleep scales had internal consistency coefficients below 0.70 for the community sample, and three scales were below 0.70 for the clinical sample. Internal consistency was not reported for the Sleep Onset Delay Scale because it consisted of only one item. Seven of the eight sleep scales had Test–Retest Reliability coefficients below 0.70. A few of the scales fell below the adequate range on some of the reliability coefficients (Table 2).

Strengths

The CSHQ was developed by a leading pediatric sleep specialist. The rating scale is well-defined, which helps to prevent misinterpretation by parents. The cut-off score

TABLE 2 Summary of the Empirical Features of the Children's Sleep Habits Questionnaire (CSHQ)

Inventory and subscales	Sample size	Age range	Content validation	Hit rate	Sensitivity	Specificity	EFA	CFA	Mann-Whitney U	Internal consistency	Test retest	Computer score/report
CSHQ Total	0 623	4-10 yr	No	?	0.80	0.72	No	No	P<.001	0.68	?	No
Bedtime Resistance	Comm. 382 Clinical 128	4-10 yr 4-10 yr	No No	?	Not reported	Not reported	No No	No No	P<.001	0.70 0.83	N=56 0.68	No
Sleep Onset Delay	Comm. 403 Clinical 128	4-10 yr 4-10 yr	No No	?	Not reported	Not reported	No No	No No	P<.001	None None	N=60 0.62	No
Sleep Duration	Comm. 398 Clinical 122	4-10 yr 4-10 yr	No No	?	Not reported	Not reported	No No	No No	P<.001	0.69 0.80	N=60 0.40	No
Sleep Anxiety	Comm. 374 Clinical 119	4-10 yr 4-10 yr	No No	?	Not reported	Not reported	No No	No No	P<.001	0.63 0.68	N=56 0.79	No
Night Wakings	Comm. 384 Clinical 120	4-10 yr 4-10 yr	No No	?	Not reported	Not reported	No No	No No	P<.001	0.54 0.44	N=56 0.63	No
Parasomnias	Comm. 371 Clinical 117	4-10 yr 4-10 yr	No No	?	Not reported	Not reported	No No	No No	P<.001	0.36 0.56	N=57 0.62	No
Sleep Disorder Breathing	Comm. 382 Clinical 117	4-10 yr 4-10 yr	No No	?	Not reported	Not reported	No No	No No	P<.001	0.51 0.93	N=58 0.69	No
Daytime Sleepiness	Comm. 381 Clinical 119	4-10 yr 4-10 yr	No No	?	Not reported	Not reported	No No	No No	P<.001	0.65 0.70	N=56 0.65	No

Note 1. CSHQ=Children's Sleep Habits Questionnaire; EFA=Exploratory Factor Analysis; CFA=Confirmatory Factor Analysis
 Note 2. Adequate Validity & Reliability Coefficients are 0.70-0.79; Good Coefficients are 0.80-0.89; High Coefficients are 0.90+

for referring children for further evaluation is clearly delineated. It can be used to predict that a child has some of the pediatric sleep disorders such as SDB and various nighttime behavioral problems. It has adequate internal consistency reliability on the Bedtime Resistance subscale for both the community and clinical samples and adequate internal consistency for the clinical sample for Sleep Duration, SDB, and Daytime Sleepiness, but not for the community sample. This is the only pediatric sleep inventory to date that screens for sleep anxiety, which many young children experience. Therefore, if parents are mentioning these specific sleep problems to the professional, the CSHQ may be a helpful tool to use. The abbreviated and comprehensive versions of the CSHQ can be downloaded from Dr. Owens' website and used. There are also a variety of other sleep surveys on the website for parents and the child/adolescent, as well as sleep logs and sleep diaries that can be helpful in gathering information about a child's sleep problems. The website also has many journal articles posted on pediatric sleep problems.

Limitations

The CSHQ was normed and validated in only one sleep clinic and three schools in the nation. There were significant differences in age and SES between the community and clinical samples, which may have confounded the results. The CSHQ participant demographics do not reflect the 2000 U.S. census demographics, which poses concerns about nationwide use of the CSHQ with children from differing race, ethnic backgrounds, or regions of the U.S.A. All of the subscales, except Bedtime Resistance, had an internal consistency alpha coefficient score < 0.70 for the community sample, which is somewhat problematic if a professional wants to screen community populations. Therefore, as recommended by the developer, the CSHQ might be more appropriate for use by sleep specialists in clinical or research settings with predominantly white, English-speaking patients.

Only one subscale (Sleep Anxiety) had a test-retest reliability coefficient of > 0.70 . The Sleep Onset Delay Scale cannot constitute a scale because a scale consists of a minimum of three items (22). The Sleep-Disordered Breathing scale, which is the most important pediatric sleep disorder to identify, has the minimum requirement of three items, but this small amount of items may explain why the internal consistency for the community sample and test-retest reliability coefficients are lower than desirable for this scale. Although the CSHQ gives valuable and comprehensive information about a variety of sleep problems that young children may experience, it was not designed for use with adolescents or use by most pediatric professionals in clinical practice or school settings.

For Further Information: see Owens, Spirito, and McGuinn (21) or website: www.kidzzzsleep.org

Pediatric Sleep Questionnaire (PSQ) (Appendix B)

Developer: Ronald Chervin, M.D. (23–25).

Participants: In the initial validation, participants included 162 children from 2 through 18 years of age: 108 were patients at two general pediatric clinics without sleep disorders (quasi-community sample) and 54 children were diagnosed with a Sleep-Related Breathing Disorder (SRBD) (clinical sample). Validation of a Periodic Limb Movement Disorder (PLMD) scale was conducted on a sample of 113 children

from 2.8 to 18.0 years between 1996 and 2000; 29 children had PLMD and 84 did not (24). A further validation of the 22-item SRBD scale was completed on 105 children between 5.0 to 12.9 years of age.

Demographics: Specific demographic characteristics for the community and clinical samples were not available.

Questionnaire Qualities: The PSQ was initially a 22-item parent questionnaire for children from 2 through 18 years, and rated on a simple 3-point scale (“yes”, “no”, or “don’t know”) for all items except the inattention/hyperactivity items that are rated on a 4-point Likert scale. The PSQ provides an overall Total Score and five sleep scales: (1) Sleep-Related Breathing Disorder (SRBD), (2) Snoring, (3) Sleepiness, (4) Behavior, and (5) PLMD. The questionnaire is in English.

Sleep Problems Measured and Results: Exploratory factor analysis was used in the first validation study to determine the need for the four specific sleep scales on this measure. Using these PSQ scales and a total score, the PSQ distinguished the children with a diagnosis of SRBD 85% of the time (sensitivity of 0.85) for Group A and 81% for Group B. It had a specificity of 0.87 for both groups ($n=54$). The subscales had fairly good internal consistency reliability coefficients ranging from 0.66 to 0.89, as well as test–retest reliability ranging from .66 to .92; the Sleepiness Scale had slightly lower than desirable reliability. In the second validation of the PSQ for SRBD, it had an overall hit rate of 74%, a sensitivity of 0.78, and a specificity of 0.72. The PSQ SRBD scale also had moderate to low correlations ($p<.001$ to 0.06) with the polysomnographic measures. The overall predictive validity hit rate for the PLMD scale was 62%, the sensitivity was 79%, and the specificity was 56%. Internal consistency reliability was 0.71 and test–retest reliability was .62 (see Table 3 for a summary of the PSQ psychometric qualities).

Strengths: The PSQ was developed by a leading pediatric sleep specialist. It has good structural validity and the ability to predict SRBD (sensitivity), as well as distinguish the community sample from the clinical sample. It has fair predictive validity for PLMD. It has good internal consistency reliability for the SRBD, Snoring, and Behavior scales. The scoring cut-off for recommended referral is clearly delineated for SRBD. The PSQ: SRBD scale has been validated in numerous other sleep research studies and has proven its screening benefits in that capacity.

Limitations: It does not appear that the PSQ has been normed and validated on samples that reflect the 2000 U.S. census demographics, resulting in some concern about its use for children of different races and ethnic backgrounds. Furthermore, it was reported that the sample sizes of young children and older adolescents were too small in the validation studies to accurately determine differences in age groups, which suggests that more validation studies need to be conducted specifically on young children and adolescents and from varying ethnic and SES levels. The sleepiness scale had somewhat weak internal consistency and the sleepiness and PLMD scales had slightly lower than desirable test–retest reliability. However, the PSQ gives valuable information about SRBD and PLMD and can identify many of the children with these disorders. If pediatricians, psychologists, psychiatrists, and other professionals are going to take the time to screen children or adolescents for sleep problems/disorders, then it would be beneficial to add PSQ screening items for other pediatric sleep disorders negatively impacting daytime performance such as BIC, DSPS, and narcolepsy.

Table 3 Summary of the Empirical Features of the Pediatric Sleep Questionnaire (PSQ)

Inventory and subscales	Sample size	Age range	Content validation	Hit rate	Sensitivity	Specificity	EFA	CFA	Mann-Whitney U	Internal consistency	Test retest	Computer score/report
PSQ Total	162	2–18 yr	Not reported	Not reported	Grp A=0.85 Grp B=0.81	Grp A=0.87 Grp B=0.87	Yes- Good	No	Logistic Regress	No report	No report	No
Sleep Related Breathing	Grp A=116 Grp B=154	2–18 yr	Not reported	Not reported	0.85	0.87	Good	No	0.92 <.0001	Grp A=0.89 Grp B=.88	N=21 0.75	No
Snoring	Grp A=116 Grp B=154	2–18 yr	Not reported	Not reported	Not reported	Not reported	Good	No	0.85 <.0001	Grp A=0.86 Grp B=0.86	N=21 0.92	No
Sleepiness	Grp A=116 Grp B=154	2–18 yr	Not reported	Not reported	Not reported	Not reported	Good	No	0.77 0.0016	Grp A=0.66 Grp B=0.77	N=21 0.66	No
Behavior	Grp A=116 Grp B=154	2–18 yr	Not reported	Not reported	Not reported	Not reported	Good	No	0.79 0.0017	Grp A=0.84 Grp B=0.83	N=21 0.83	No
PLMD	N=113	2.,8–18 yrs	Not reported	0.62	0.79	0.56	None	None		0.71	0.62	No

Note 1. PSQ=Pediatric Sleep Questionnaire; EFA=Exploratory Factor Analysis; CFA=Confirmatory Factor Analysis
 Note 2. Adequate Validity & Reliability Coefficients are 0.70–0.79; Good Coefficients are 0.80–0.89; High Coefficients are 0.90+

Contact Information: Ronald D. Chervin, M.D., M.S. Michael S. Aldrich, Sleep Disorders Laboratory, C734 Med Inn Building, 1500 E. Medical Center Drive, Ann Arbor, MI 48109, U.S.A.

Sleep Disorders Inventory for Students (SDIS) (Appendix C)

Developer: Marsha Luginbuehl, Ph.D.; assisted by W. McDowell Anderson, M.D., George Batsche, Ed.D., Selim R. Benbadis, M.D., Kathy L. Bradley-Klug, Ph.D., John Ferron, Ph.D., Trevor Stokes, Ph.D., University of South Florida (11).

Setting: The SDIS was validated and standardized on children and adolescents from 45 schools, two psychology private practices, and seven pediatric sleep centers nationwide, six of which were American Academy of Sleep Medicine (AASM) accredited.

Participants: There were 821 total children; 602 were in the school/community sample and had not undergone a sleep evaluation of any kind; 219 were in the clinical sample and were undergoing a comprehensive sleep evaluation at a sleep center or had already been diagnosed with a sleep disorder at a pediatric sleep center.

Demographics: The main study samples of 595 children and their family demographics for ethnicity, SES, parents' education, and primary language closely reflected the 2000 U.S. Census demographics.

Questionnaire Qualities: The SDIS has two inventories: (1) the SDIS-Children's Form (SDIS-C) for children from 2 through 10 years and (2) the SDIS-Adolescent Form (SDIS-A) for youth from 11 through 18 years. The SDIS-C has 25 items measuring four sleep scales and the SDIS-A has 30 items measuring five sleep scales. The SDIS-C has the following scales: Obstructive Sleep Apnea Syndrome (OSAS), Periodic Limb Movement Disorder (PLMD), Delayed Sleep Phase Syndrome (DSPS), and Excessive Daytime Sleepiness (EDS). The SDIS-A has the same scales plus some Restless Legs Syndrome questions added to the PLMD scale and a narcolepsy scale. Both inventories have five items measuring five parasomnias, as well as 11 general health questions written in a "yes" or "no" format. Both inventories also yield a total Sleep Disturbance Index and are available in English and Spanish. The items are written on a well-defined 7-point Likert scale to provide more sensitivity, and the reading level for items ranges from third to fifth grade. The inventories also have computer scoring that produces a comprehensive report and graph with standard T-scores, percentiles, and three sleep classifications ("Normal Sleep", "Caution" range, and "High Risk" of a sleep disorder).

Sleep Problems Measured and Results: The SDIS has high content validity of 0.94, construct or structural validity indicating good exploratory factor analysis factor loadings for the scales and good fit indices for the SDIS-C and SDIS-A confirmatory factor analyses. Predictive validity for the SDIS-C was 0.86 and 0.96 for the SDIS-A; Sensitivity for the SDIS-C was 0.82 and 0.81 for the SDIS-A; Specificity for the SDIS-C was 0.91 and 0.95 for the SDIS-A; internal consistency for the total SDIS-C was 0.91 and 0.92 for the total SDIS-A; test-retest reliability for the total SDIS-C was 0.97 and 0.86 for the SDIS-A.

The subscales of the SDIS-C and SDIS-A had good predictive validity coefficients ranging from 0.72 to 1.0; sensitivity ranged from a low of 0.50 and 0.55 for the

PLMD/RLS scales to a high of 1.0 for two other scales; specificity ranged from 0.62 to 0.98; and internal consistency ranged from 0.71 to 0.92. Test-retest reliability was only calculated for the overall SDIS-C and SDIS-A (see Table 4 for a summary of the SDIS qualities).

Strengths: The SDIS was developed with the assistance of many leading pediatric sleep specialists. It was validated on a relatively large sample, and the main study samples closely reflected the 2000 U.S. census demographics. It uses a broad, well-defined rating scale, which enables professionals to determine the severity of the various sleep problems. Both the SDIS-C and SDIS-A have good predictive validity, structural validity, and sensitivity for all subscales except the PLMD/RLS scales. However, PLMD is difficult to accurately diagnose using a one-night sleep study because nighttime inconsistencies of leg movements are frequently noted in children with PLMD, and the PLMD scale sensitivity might be higher if the hospital cases were measured with actigraphy over 4–5 nights. Similar problems were noted when validating the PLMD scale on the PSQ. The PLMD scales have good specificity. Both SDIS inventories have good internal consistency and test-retest reliability, and are available in both English and Spanish. Computer scoring is available and generates a graph and report that provides recommendations and interventions when any sleep scale or parasomnia is rated higher than normal. Finally, the SDIS-C and SDIS-A were validated on community, school, private practice, and hospital populations with the purpose of using these inventories for any pediatric population in any setting, even if the professionals conducting the screenings had limited knowledge about sleep disorders. Furthermore, if professionals do not want to do a comprehensive screening for pediatric sleep disorders, but parents have mentioned some sleep concerns in Phase I questioning, the professional can refer these parents to the SDIS website: www.Sleepdisorderhelp.com where the parents can click onto the “Screening by Parents” to quickly screen their child on line with SDIS and immediately download the results with graph and report. This on-line report provides parents with a website where they can obtain the names and addresses of sleep clinics in their local area. This website also provides a great deal of information about the major pediatric sleep disorders and related problems, and how they negatively impact a child’s daytime performance and health.

Limitations: It would be beneficial for more hospital validation studies to be conducted on larger populations of children and adolescents, including larger samples of narcolepsy, DSPS, PLMD/RLS, and Spanish-speaking families. However, no differences were noted between responses of the Spanish-speaking and English-speaking parents in the initial validation study. When a child has severe OSAS, it negatively impacts and escalates all of the SDIS sleep scales, making it appear on the graph that the child has four or five sleep disorders. In this case, the report states that the child rarely has all of these sleep disorders, but it is most likely that s/he has OSAS, which should be ruled out first because severe OSAS escalates all scales.

For Further Information: see Luginbuehl (11) or contact: Child Uplift, Inc., PO Box 146; Fairview, WY 83110; Phone: 307-886-9096; Email: Childuplift@aol.com or contact: www.Sleepdisorderhelp.com or Harcourt Assessment, Inc. at www.PsychCorp.com, the national distributor of the SDIS.

Table 4 Summary of the Empirical Features of the Sleep Disorders Inventory for Students (SDIS)

Inventory/ subscale	Sample size	Age range	Content validation	Hit rate	Sensitivity	Specificity	EFA	CFA	Internal consistency	Test retest	Computer score/report
SDIS Total	821	2-18 yrs	Total=0.94				Good	Good			Yes
SDIS-Child	412	2-10 yrs		86%	0.82	0.91	Good	>0.90 Fit	0.91	0.97	Yes
OSAS	412	2-10 yrs		72%	0.91	0.62	Good	>0.90 Fit	0.90	Not done	Yes
PLMD	412	2-10 yrs		77%	0.50	0.93	Good	>0.90 Fit	0.85	Not done	Yes
BIC/DSPS	412	2-10 yrs		100%	1.0	0.98	Good	>0.90 Fit	0.76	Not done	Yes
EDS	412	2-10 yrs		80% NAR	N/A	N/A	Good	>0.90 Fit	0.84	Not done	Yes
SDIS-Adol.	180	11-18 yrs		96%	0.81	0.95	None	>0.90 Fit	0.92	0.86	Yes
OSAS	180	11-18 yrs		100%	1.0	0.92	None	>0.90 Fit	0.88	Not done	Yes
PLMD/RLS	180	11-18 yrs		78%	0.55	0.91	None	>0.90 Fit	0.85	Not done	Yes
DSPS	180	11-18 yrs		100%	1.0	0.98	None	>0.90 Fit	0.71	Not done	Yes
NARC	180	11-18 yrs		100%	0.88	0.97	None	>0.90 Fit	0.92	Not done	Yes
EDS	180	11-18 yrs		80% NAR	N/A	N/A	None	>0.90 Fit	0.83	Not done	Yes

Note 1. EFA=Exploratory Factor Analysis, CFA=Confirmatory Factor Analysis, OSAS=Obstructive Sleep Apnea Syndrome, PLMD= Periodic Limb Movement Disorder, DSFS=Delayed Sleep Phase Syndrome, EDS=Excessive Daytime Sleepiness, RLS=Restless Legs Syndrome, NARC=Narcolepsy

CONCLUSIONS

Having some tools to screen for sleep disorders is vital, but is only one part of the process in working with children to prevent and monitor the development of sleep problems. In order to provide the most appropriate services for children and families with sleep problems, professionals must engage in a structured problem-solving process that incorporates collaboration and communication among professionals (26). Problem identification is the most important step of the problem-solving process, followed by problem analysis, which involves a comprehensive assessment of the child's needs and factors within the ecology. For many children, this problem identification involves a comprehensive assessment that should include data collection with a sleep-screening inventory and a discussion with parents about the child's sleep hygiene. If the screening and data collection indicate a high risk of a sleep disorder, then interdisciplinary collaboration between professionals becomes crucial. This includes communication among all of the individuals involved, including the child, family, pediatrician and/or sleep specialist, school psychologist, teachers, school nurse, and other professionals in the community working with the student. These professionals should discuss with the parents the importance of follow through with a visit to the pediatrician to pursue a comprehensive sleep evaluation. It often requires follow-up with the parents a month or two later to inquire about the status of the referral. The parents must be educated as to the serious health and educational consequences if the child's sleep disorder is not corrected.

Screening for sleep problems/disorders at the universal, selective, and indicated levels may prevent students from experiencing the collateral academic and/or behavioral problems often associated with these disorders. Correct identification and treatment of the sleep disorder may significantly improve a child's learning and behaviors post treatment. When considering the negative impact sleep disorders have on learning, behaviors, health, career, and safety throughout a lifetime, pediatric professionals in our society cannot afford to neglect early and regular screening of children for these disorders. It may violate the child's rights and Professional Best Practices if one avoids carrying out a sleep screening while conducting an evaluation for learning, behavioral, or emotional concerns.

REFERENCES

1. Mindell JA, Owens JA. *A Clinical Guide to Pediatric Sleep: Diagnosis and management of sleep problems*. Philadelphia: Lippincott Williams & Wilkins, 2003.
2. National Institute of Health. *Wake Up America: A national sleep alert*, Vol. 1. Washington, DC: Government Printing Office, 2001:1-76.
3. Montgomery-Downs HE, Crabtree VM, Gozal D. Cognition, sleep and respiration in at-risk children treated for obstructive sleep apnea. *European Respiratory Journal* 2005; 25:336-42.
4. Steenari M. Working memory and sleep in 6- to 13-year old children. *Journal of the American Academy of Child and Adolescent Psychiatry* 2003; 42:85-92.
5. Gozal D. Sleep-disordered breathing and school performance in children. *Pediatrics* 1998; 102:616-20.
6. Mitru G, Millrood D, Mateika J. The impact of sleep on learning and behavior in adolescents. *Teachers College Record*, 2002; 104:704-26.
7. Chervin RD, Dillon J, Bassetti C, et al. Symptoms of Sleep disorders, inattention, and hyperactivity in children. *Sleep* 1997; 20(12):1185-92.

8. Chervin RD, Archbold KH, Dillon JE, et al. Inattention, hyperactivity, and symptoms of sleep-disordered breathing. *Pediatrics* 2002; 109:449–56.
9. Crabtree V, Ivanenko A, O'Brien L, et al. Periodic limb movement disorder of sleep in children. *Journal of Sleep Research* 2003; 12:73–81.
10. Ebert CS, Drake AF. The impact of sleep-disordered breathing on cognition and behavior in children: A review and meta-synthesis of the literature. *Otolaryngology-Head and Neck Surgery* 2004; 131:814–26.
11. Luginbuehl ML. The initial development and validation study of the Sleep Disorders Inventory for Students. *Dissertation Abstracts International Section A: Humanities & Social Sciences* 2004; 64(12-A):4376.
12. Witte R. The relationship between sleep disorders, behaviors, and pre-academic skills in pre-kindergarteners. Unpublished educational specialist thesis, Tampa, Florida: University of South Florida, 2007.
13. Ax EA. Effect of Sleep Disorders on School Behavior, Academic Performance and Quality of Life. Unpublished doctoral dissertation, Tampa, Florida: University of South Florida, 2006.
14. Popkave KM. The relationship between parent identified sleep problems, internalizing behaviors, externalizing behaviors, and adaptive functioning in a pediatric population. Unpublished educational specialist thesis, Tampa, Florida: University of South Florida, 2007.
15. Power TJ, DuPaul GJ, Shapiro ES, et al. Pediatric school psychology: The emergence of a subspecialty. *School Psychology Review* 1995; 24:244–57.
16. Power TJ, DuPaul GJ, Shapiro ES, et al. *Promoting Children's Health: Integrating school, family, and community*. New York: Guilford Press 2003.
17. Institute of Medicine. *Reducing Risks For Mental Disorders: Frontiers for preventive intervention research*. Washington, DC: National Academy Press 1994.
18. Carroll, JL & Loughlin, GM. Obstructive Sleep Apnea Syndrome in infants and children: Clinical features and pathophysiology. In Ferber, R. & Kryger, M. (eds.), *Principles and Practices of Sleep Medicine in the Child*. Philadelphia: W.B. Saunders Company, 1995: pp. 163–91.
19. Rosen, RC, Zozula, R., Jahn, EG, & Carson, JL. Low rates of recognition of sleep disorders in primary care: Comparison of a community-based versus clinical academic setting. *Sleep Medicine*, 2001; 2(1):47–55.
20. Owens JA, Dalzell V. Use of the 'BEARS' sleep screening tool in a pediatric residents' continuity clinic: A pilot study. *Sleep Medicine* 2005; 6:63–9.
21. Owens JA, Spirito A, McGuinn M. The Children's Sleep Habits Questionnaire (CSHQ): Psychometric properties of a survey instrument for school-aged children. *Sleep* 2000; 23(8):1043–51.
22. Crocker L, Algina J. *Introduction to classical modern test theory*. New York: Holt, Rinehart and Winston.
23. Chervin RC, Hedger K, Dillon JE, et al. Pediatric Sleep Questionnaire (PSQ): Validity and reliability of scales for sleep-disordered breathing, snoring, sleepiness, and behavioral problems. *Sleep Medicine* 2000; 1:21–32.
24. Chervin RD, Hedger KM. Clinical prediction of periodic leg movements during sleep in children. *Sleep Medicine* 2001; 2:501–10.
25. Chervin RD, Weatherly RA, Garetz SL, et al. Pediatric Sleep Questionnaire. *Arch Otolaryngol. Head Neck Surg.* 2007; 133:216–22.
26. Bradley-Klug KL, Grier EC, Ax EE. Chronic illness. In Bear, GG & Minke, KM. eds. *Children's needs III: Development, prevention, and intervention*. Bethesda, MD: National Association of School Psychologists, 2006: pp. 857–69.

Appendix A

The following statements are about your child's sleep habits and possible difficulties with sleep. Think about the past week in your child's life when answering the questions. If last week was unusual for a specific reason (such as your child had an ear infection and did not sleep well or the TV set was broken), choose the most recent typical week. Answer **USUALLY** if something occurs **5 or more times** in a week; answer **SOMETIMES** if it occurs **2–4 times** in a week; answer **RARELY** if something occurs **never or 1 time** during a week. Also, please indicate whether or not the sleep habit is a problem by circling "Yes," "No," or "Not applicable (N/A)".

Bedtime

Write in child's bedtime: _____

	3 Usually (5–7)	2 Sometimes (2–4)	1 Rarely (0–1)	Problem?
1) Child goes to bed at the same time at night (R)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Yes No N/A
2) Child falls asleep within 20 minutes after going to bed (R)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Yes No N/A
3) Child falls asleep alone in own bed (R)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Yes No N/A
4) Child falls asleep in parent's or sibling's bed	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Yes No N/A
5) Child needs parent in the room to fall asleep	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Yes No N/A
6) Child struggles at bedtime (cries, refuses to stay in bed, etc.)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Yes No N/A
7) Child is afraid of sleeping in the dark	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Yes No N/A
8) Child is afraid of sleep alone	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Yes No N/A

Sleep Behavior

Child's usual amount of sleep each day: _____ hours and _____ minutes
(combining nighttime sleep and naps)

Sleep Behavior (continued)

	3 Usually (5-7)	2 Sometimes (2-4)	1 Rarely (0-1)	Problem?
9) Child sleeps too little	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Yes No N/A
10) Child sleeps the right amount (R)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Yes No N/A
11) Child sleeps about the same amount each day (R)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Yes No N/A
12) Child wets the bed at night	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Yes No N/A
13) Child talks during sleep	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Yes No N/A
14) Child is restless and moves a lot during sleep	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Yes No N/A
15) Child sleepwalks during the night	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Yes No N/A
16) Child moves to someone else's bed during the night (parent, brother, sister, etc.)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Yes No N/A
17) Child grinds teeth during sleep (your dentist may have told you this)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Yes No N/A
18) Child snores loudly	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Yes No N/A
19) Child seems to stop breathing during sleep	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Yes No N/A
20) Child snorts and/or gasps during sleep	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Yes No N/A
21) Child has trouble sleeping away from home (visiting relatives, vacation)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Yes No N/A
22) Child awakens during night screaming, sweating, and Inconsolable	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Yes No N/A
23) Child awakens alarmed by a frightening dream	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Yes No N/A

Waking During the Night

	3 Usually (5-7)	2 Sometimes (2-4)	1 Rarely (0-1)	Problem?
24) Child awakes once during the night	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Yes No N/A
25) Child awakes more than once during the night	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Yes No N/A

Write the number of minutes a night waking usually lasts: _____

Morning Waking/Daytime Sleepiness

Write in the time of day child usually wakes in the morning: _____

	3 Usually (5-7)	2 Sometimes (2-4)	1 Rarely (0-1)	Problem?
26) Child wakes up by him/herself (R)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Yes No N/A
27) Child wakes up in negative mood	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Yes No N/A
28) Adults or siblings wake up child	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Yes No N/A
29) Child has difficulty getting out of bed in the morning	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Yes No N/A
30) Child takes a long time to become alert in the morning	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Yes No N/A
31) Child seems tired	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Yes No N/A

Child has appeared very sleepy or fallen asleep during the following (check all that apply):

	3 Not Sleepy	2 Very Sleepy	1 Falls Asleep
32) Watching TV	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
33) Riding in car	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Appendix B

PEDIATRIC SLEEP QUESTIONNAIRE

Version 991207

Child's Name: _____
(Last) (First) (M.I.)

Name of Person Answering Questions: _____

Relation to Child: _____

Your phone number, days: _____, and evenings: _____
Area Code Number Area Code Number

Relative's name and number in case we cannot reach you: _____
Area Code Number

Instructions:

Please answer the questions on the following pages regarding the behavior of your child during sleep and wakefulness. The questions apply to how your child acts in general, not necessarily during the past few days since these may not have been typical if your child has not been well. If you are not sure how to answer any question, please feel free to ask your husband or wife, child, or physician for help. You should circle the correct response or *print* your answers neatly in the space provided. A "Y" means "yes," "N" means "no," and "DK" means "don't know." When you see the word "usually" it means "more than half the time" or "on more than half the nights."

GENERAL INFORMATION ABOUT YOUR CHILD:

Today's Date: _____
Month Day Year

Where are you completing this questionnaire? _____

Date of Child's Birth: _____
Month Day Year

Sex: Male or Female? _____

Current Height (feet/inches): _____

Current Weight (pounds): _____

Grade in school (if applicable): _____

Racial/Ethnic Background of your Child (please circle):

- | | |
|------------------------|----------------------|
| 1.) American Indian | 2.) Asian-American |
| 3.) African-American | 4.) Hispanic |
| 5.) White/not Hispanic | 6.) Other or unknown |

Office
use only

GI1

GI2

GI3

GI4

GI5

GI6

GI7

GI8

GI9

A. Nighttime and sleep behavior:		Office use only
WHILE SLEEPING, DOES YOUR CHILD ...		
... ever snore?	Y N DK	A1
... snore more than half the time?	Y N DK	A2
... always snore?	Y N DK	A3
... snore loudly?	Y N DK	A4
... have "heavy" or loud breathing?	Y N DK	A5
... have trouble breathing, or struggle to breathe?	Y N DK	A6
HAVE YOU EVER ...		
... seen your child stop breathing during the night?	Y N DK	A7
If so, please describe what has happened:		
... been concerned about your child's breathing during sleep?	Y N DK	A8
... had to shake your sleeping child to get him or her to breathe, or wake up and breathe?	Y N DK	A9
... seen your child wake up with a snorting sound?	Y N DK	A11
DOES YOUR CHILD ...		
... have restless sleep?	Y N DK	A12
... describe restlessness of the legs when in bed?	Y N DK	A13
... have "growing pains" (unexplained leg pains)?	Y N DK	A13a
... have "growing pains" that are worst in bed?	Y N DK	A13b
WHILE YOUR CHILD SLEEPS, HAVE YOU SEEN ...		
... brief kicks of one leg or both legs?	Y N DK	A14
... repeated kicks or jerks of the legs at regular intervals (i.e., about every 20 to 40 seconds)?	Y N DK	A14a
AT NIGHT, DOES YOUR CHILD USUALLY ...		
... become sweaty, or do the pajamas usually become wet with perspiration?	Y N DK	A15
... get out of bed (for any reason)?	Y N DK	A16
... get out of bed to urinate?	Y N DK	A17
If so, how many times each night, on average?	_____	A17a
Does your child usually sleep with the mouth open?	Y N DK	A21
Is your child's nose usually congested or "stuffed" at night?	Y N DK	A22
Do any allergies affect your child's ability to breathe through the nose?	Y N DK	A23
DOES YOUR CHILD ...		
... tend to breathe through the mouth during the day?	Y N DK	A24
... have a dry mouth on waking up in the morning?	Y N DK	A25
... complain of an upset stomach at night?	Y N DK	A27

... get a burning feeling in the throat at night?	Y N DK	A29
... grind his or her teeth at night?	Y N DK	A30
... occasionally wet the bed?	Y N DK	A32
Has your child ever walked during sleep ("sleep walking")?	Y N DK	A33
Have you ever heard your child talk during sleep ("sleep talking")?	Y N DK	A34
Does your child have nightmares once a week or more on average?	Y N DK	A35
Has your child ever woken up screaming during the night?	Y N DK	A36
Has your child ever been moving or behaving, at night, in a way that made you think your child was neither completely awake nor asleep?	Y N DK	A37
If so, please describe what has happened:		
Does your child have difficulty falling asleep at night?	Y N DK	A40
How long does it take your child to fall asleep at night? (a guess is O.K.)	_____	A41
At bedtime does your child usually have difficult "routines" or "rituals," argue a lot, or otherwise behave badly?	Y N DK	A42
DOES YOUR CHILD ...	Y N DK	A43
... bang his or her head or rock his or her body when going to sleep?		
... wake up more than twice a night on average?	Y N DK	A44
... have trouble falling back asleep if he or she wakes up at night?	Y N DK	A45
... wake up early in the morning and have difficulty going back to sleep?	Y N DK	A46
Does the time at which your child <i>goes to bed</i> change a lot from day to day?	Y N DK	A47
Does the time at which your child <i>gets up from bed</i> change a lot from day to day?	Y N DK	A48
WHAT TIME DOES YOUR CHILD USUALLY ...		
... go to bed during the week?		A49
... go to bed on the weekend or vacation?		A50
... get out of bed on weekday mornings?		A51
... get out of bed on weekend or vacation mornings?		A52

B. Daytime behavior and other possible problems:		Office Use Only
DOES YOUR CHILD ...		
... wake up feeling <i>unrefreshed</i> in the morning?	Y N DK	B1
... have a problem with sleepiness during the day?	Y N DK	B2
... complain that he or she feels sleepy during the day?	Y N DK	B3
Has a teacher or other supervisor commented that your child appears sleepy during the day?	Y N DK	B4
Does your child usually take a nap during the day?	Y N DK	B5
Is it hard to wake your child up in the morning?	Y N DK	B6
Does your child wake up with headaches in the morning?	Y N DK	B7
Does your child get a headache at least once a month, on average?	Y N DK	B8
Did your child stop growing at a normal rate at any time since birth?	Y N DK	B9
If so, please describe what happened:		
Does your child still have tonsils?	Y N DK	B10
If not, when and why were they removed?:		
HAS YOUR CHILD EVER ...		
... had a condition causing difficulty with breathing?	Y N DK	B11
If so, please describe:		
... had surgery?	Y N DK	B12
If so, did any difficulties with breathing occur before, during, or after surgery?	Y N DK	B12a
... become suddenly weak in the legs, or anywhere else, after laughing or being surprised by something?	Y N DK	B13
... felt unable to move for a short period, in bed, though awake and able to look around?	Y N DK	B15
Has your child felt an irresistible urge to take a nap at times, forcing him or her to stop what he or she is doing in order to sleep?	Y N DK	B16
Has your child ever sensed that he or she was dreaming (seeing images or hearing sounds) while still awake?	Y N DK	B17
Does your child drink caffeinated beverages on a typical day (cola, tea, coffee)?	Y N DK	B18
If so, how many cups or cans per day?	_____	B18a
Does your child use any recreational drugs?	cups	
If so, which ones and how often?:	Y N DK	B19
Does your child use cigarettes, smokeless tobacco, snuff, or other tobacco products? If so, which ones and how often?:	Y N DK	B20
Is your child overweight?	Y N DK	B22
If so, at what age did this first develop?	_____	B22a
	years	
Has a doctor ever told you that your child has a high-arched palate (roof of the mouth)?	Y N DK	B23

Has your child ever taken Ritalin (methylphenidate) for behavioral problems?	Y N DK	B24
Has a health professional ever said that your child has attention-deficit disorder (ADD) or attention-deficit/hyperactivity disorder (ADHD)?	Y N DK	B25

C. Other Information

1. If you are currently at a clinic with your child to see a physician, what is the problem that brought you?

2. If your child has long-term medical problems, please list the three you think are most significant.

_____.

_____.

_____.

3. Please list any medications your child currently takes:

Medicine	Size (mg) or amount per dose	Taken when?
_____	_____	_____
Effect: _____	_____	_____.
_____	_____	_____
Effect: _____	_____	_____.
_____	_____	_____
Effect: _____	_____	_____.
_____	_____	_____
Effect: _____	_____	_____.

4. Please list any medication your child has taken in the past if the purpose of the medication was to improve his or her behavior, attention, or sleep:

Medicine	Size (mg) or amount per dose	Taken how often?	Dates Taken
_____	_____	_____	_____
Effect: _____	_____	_____	_____.
_____	_____	_____	_____
Effect: _____	_____	_____	_____.
_____	_____	_____	_____
Effect: _____	_____	_____	_____.
_____	_____	_____	_____
Effect: _____	_____	_____	_____.

5. Please list any sleep disorders diagnosed or suspected by a physician in your child. For each problem, please list the date it started and whether or not it is still present.

6. Please list any psychological, psychiatric, emotional, or behavioral problems diagnosed or suspected by a physician in your child. For each problem, please list the date it started and whether or not it is still present.
7. Please list any sleep or behavior disorders diagnosed or suspected in *your child's* brothers, sisters, or parents:

Relative	Condition
_____	_____
_____	_____
_____	_____

D. Additional Comments:

Please use the space below to print any additional comments you feel are important. Please also use this space to describe details regarding any of the above questions.

Instructions: Please indicate, by checking the appropriate box, how much each statement applies to this child:

This child often ...	Does not apply 0	Applies just a little 1	Applies quite a bit 2	Definitely applies most of the time 3
... does not seem to listen when spoken to directly.				
... has difficulty organizing tasks and activities.				
... is easily distracted by extraneous stimuli.				
... fidgets with hands or feet or squirms in seat.				
... is "on the go" or often acts as if "driven by a motor".				
... interrupts or intrudes on others (e.g., butts into conversations or games).				

THANK YOU

Appendix C

SLEEP DISORDERS INVENTORY FOR STUDENTS – CHILDREN'S FORM (SDIS - C)

Ages 2 through 10 years

© 2004 Marsha Luginbuehl, Ph.D., Child Uplift, Inc.

Student's Name: _____ Parent/Guardian: _____

Address: _____

Street / Apt #

City

State

Zip

Date of Birth: __/__/__ Today's Date: __/__/__ Age: _____

School: _____ Grade: ____ Sex: M / F Home Phone: (____) _____

Thank you for agreeing to complete this inventory. It is important that you answer *every question* to the best of your abilities based on your child's behaviors *only over the past 6–12 months*. If possible, rate your child's behaviors when s/he is not taking medication. If you are not sure how to mark some questions, observe your child sleep on two different nights for two hours, beginning approximately 1–2 hours after s/he falls asleep, and again for 60 minutes around 5:00 a.m.

Please rate your child/teen's behaviors based on the following rating scale:

- 1 = **NEVER:** The student *never* exhibited this behavior immediately before evaluation.
- 2 = **RARELY:** The student exhibited the behavior maybe **once every month or two**.
- 3 = **OCCASIONALLY:** Student exhibited the behavior **3-to-4 times per month**.
- 4 = **SOMETIMES:** The student exhibited the behavior **several times per week**.
- 5 = **OFTEN:** Student exhibited this behavior on a **daily basis** before the evaluation.
- 6 = **ALMOST ALWAYS:** Student exhibited behavior **multiple times per day or night**.
- 7 = **ALWAYS:** Student exhibited this behavior *multiple times per hour daily or nightly*.
- 1 = Never 2 = Rarely 3 = Occasionally 4 = Sometimes 5 = Often 6 = Almost Always 7= Always

Behaviors

Ratings

- | | |
|---|---------------|
| 1. Child stops breathing for 5 or more seconds while sleeping | 1 2 3 4 5 6 7 |
| 2. Breathes through the mouth while awake | 1 2 3 4 5 6 7 |

- | | |
|---|---------------|
| 3. Breathes through the mouth while asleep | 1 2 3 4 5 6 7 |
| 4. Appears sleepy more often in daytime than other children of the same age | 1 2 3 4 5 6 7 |
| 5. Makes repeated leg or arm jerking movements during sleep. | 1 2 3 4 5 6 7 |
| 6. Child has raspy breathing or snores lightly at night | 1 2 3 4 5 6 7 |
| 7. Snores <i>loudly</i> at night | 1 2 3 4 5 6 7 |
| 8. Shows confusion or disorientation when awakened | 1 2 3 4 5 6 7 |
| 9. Child rolls or moves around the bed when sleeping | 1 2 3 4 5 6 7 |
| 10. Gasps, snorts, or chokes for breath during sleep | 1 2 3 4 5 6 7 |
| 11. Sweats a lot while asleep | 1 2 3 4 5 6 7 |
| 12. Is irritable | 1 2 3 4 5 6 7 |
| 13. Child is very tired during the morning in school between 8:00 and 12:00, but alert in the afternoon and evening
(Check with teachers if unsure) | 1 2 3 4 5 6 7 |
| 14. Sleeps in strange positions such as cocking the head backwards or sleeping while sitting upright on pillows or kneeling | 1 2 3 4 5 6 7 |
| 15. Exhibits heavy breathing without exercising | 1 2 3 4 5 6 7 |
| 16. Wakes up during the night | 1 2 3 4 5 6 7 |
| 17. Seems tired after getting plenty of sleep | 1 2 3 4 5 6 7 |
| 18. Takes more than 30 minutes to fall asleep once child is in bed and attempts to sleep | 1 2 3 4 5 6 7 |
| 19. Student's attempts to change bedtime from a post-midnight to a pre-midnight pattern on school nights are unsuccessful because the student is unable to fall asleep earlier | 1 2 3 4 5 6 7 |
| 20. Falls asleep more during the daytime than other children of the same age | 1 2 3 4 5 6 7 |
| 21. Has a high activity level and has difficulty sitting still | 1 2 3 4 5 6 7 |
| 22. Student is often touchy or loses temper | 1 2 3 4 5 6 7 |
| 23. Actively defies or refuses to comply with adults' requests | 1 2 3 4 5 6 7 |
| 24. Has difficulty falling asleep on <i>school nights</i> before
(circle one answer below):
(1) No Difficulty (2) 10:00 p.m. (3) 11:00 p.m. (4) 12:00 a.m.
(5) 1:30 p.m. (6) 3 a.m. (7) 4 a.m. | |
| 25. Has difficulty falling asleep on weekend nights before
(circle one answer below):
(1) No Difficulty (2) 10:00 p.m. (3) 11:00 p.m. (4) 12 a.m.
(5) 1:30 a.m. (6) 3 a.m. (7) 4 a.m. | |
| 26. Does child grind teeth while sleeping? | 1 2 3 4 5 6 7 |
| 27. Does child sleep-walk? | 1 2 3 4 5 6 7 |
| 28. Does child talk in sleep? | 1 2 3 4 5 6 7 |
| 29. Does child awaken with night terrors (wild-eyed, crying or screaming; unresponsive to parent comforting and cannot remember the night terror the following morning)? | 1 2 3 4 5 6 7 |
| 30. Does child have bed-wetting episodes? | 1 2 3 4 5 6 7 |

**SLEEP DISORDERS INVENTORY FOR STUDENTS – ADOLESCENT
FORM (SDIS – A)**

(Ages 11 through 18 years)

© 2004, Marsha Luginbuehl, Ph.D., Child Uplift, Inc.

(SDIS-A asks for the same demographic information and has the same rating scale as seen on the SDIS-C so it will not be repeated again.)

1 = Never 2 = Rarely 3 = Occasionally 4 = Sometimes 5 = Often 6 = Almost Always 7 = Always

<u>Behaviors</u>	<u>Ratings</u>
1. Student stops breathing for 5 or more seconds while sleeping.	1 2 3 4 5 6 7
2. Breathes through the mouth while asleep	1 2 3 4 5 6 7
3. Appears sleepy more often in daytime than other of the same age	1 2 3 4 5 6 7
4. When student is awakened on school days by parent or alarm clock, s/he arises within 5 to 10 minutes and begins the daily routine	1 2 3 4 5 6 7
5. Is unable to talk or move for seconds to minutes when awakened by parent	1 2 3 4 5 6 7
6. Makes repeated leg or arm jerking movements during sleep	1 2 3 4 5 6 7
7. Student has raspy breathing or snores lightly at night	1 2 3 4 5 6 7
8. Snores <i>loudly</i> at night	1 2 3 4 5 6 7
9. Shows confusion or disorientation when awakened	1 2 3 4 5 6 7
10. Stays up <i>past 1:00 a.m. on school nights</i> (playing video/computer games, watching T.V., talking on the phone, or partying with friends)	1 2 3 4 5 6 7
11. Gasps, snorts, or chokes for breath during sleep	1 2 3 4 5 6 7
12. Is irritable	1 2 3 4 5 6 7
13. Student reports an urge to move legs or an uncomfortable crawling feeling in legs or arms when resting or laying down to sleep	1 2 3 4 5 6 7
14. Student is very tired during the morning in school between 8:00 and 12:00, but alert in the afternoon and evening (Check with teachers if unsure)	1 2 3 4 5 6 7
15. Sleeps in strange positions such as cocking the head backwards or sleeping while sitting upright on pillows or kneeling	1 2 3 4 5 6 7
16. Has attacks of extreme muscular weakness or loss of muscle function (such as limpness in the neck, knees, or limbs, inability to speak clearly, and/or falling down) that occurs <i>only when laughing, surprised, fearful, or angry</i>	1 2 3 4 5 6 7
17. Wakes up during the night	1 2 3 4 5 6 7
18. Seems tired after getting plenty of sleep	1 2 3 4 5 6 7
19. Student has complained of vivid, often frightening dreams or hallucinations when <i>drifting into sleep or awakening</i>	1 2 3 4 5 6 7
20. Skips or is late for early classes due to difficulty waking up (Check report card for attendance if unsure)	1 2 3 4 5 6 7

21. Takes more than 30 minutes to fall asleep once student is in bed and attempts to sleep 1 2 3 4 5 6 7
22. Falls asleep while talking to others or while standing up 1 2 3 4 5 6 7

1 = Never 2 = Rarely 3 = Occasionally 4 = Sometimes 5 = Often 6 = Almost Always 7 = Always

<u>Behaviors</u>	<u>Ratings</u>
23. Student's attempts to change bedtime from a post-midnight to a pre-midnight pattern on school nights are unsuccessful because the student is unable to fall asleep earlier	1 2 3 4 5 6 7
24. Performs some strange automatic behaviors (i.e. like putting a jacket in the refrigerator), and does not remember doing them	1 2 3 4 5 6 7
25. Falls asleep more during the daytime than other students of the same age	1 2 3 4 5 6 7
26. Student is often touchy or loses temper	1 2 3 4 5 6 7
27. Actively defies or refuses to comply with adults' requests	1 2 3 4 5 6 7
28. Has difficulty falling asleep on <i>school nights</i> before (circle one answer below): (1) No Difficulty (2) 10:00 p.m. (3) 11:00 p.m. (4) 12:00 a.m. (5) 1:30 p.m. (6) 3 a.m. (7) 4 a.m.	
29. Has difficulty falling asleep on <i>weekend nights</i> before (circle one answer below): (1) No Difficulty (2) 10:00 p.m. (3) 11:00 p.m. (4) 12 p.m. (5) 1:30 a.m. (6) 3 a.m. (7) 4 a.m.	
30. Circle the average amount of time your child takes daytime naps : (1) No Naps (2) Naps 2-3 times a wk. (3) 30 min. per day (4) 1 hr/day (5) 1 ½ hrs/day (6) 2 hrs/day (7) 3+ hrs/day	
31. Does adolescent grind teeth while sleeping?	1 2 3 4 5 6 7
32. Does adolescent sleep-walk?	1 2 3 4 5 6 7
33. Does s/he talk in sleep?	1 2 3 4 5 6 7
34. Does s/he awaken with night terrors (wild-eyed, crying or screaming; unresponsive to parent comforting and cannot remember the night terror the following morning)?	1 2 3 4 5 6 7
35. Does s/he have bed-wetting episodes?	1 2 3 4 5 6 7

BOTH THE SDIS-C AND SDIS – A ASK THE FOLLOWING HEALTH QUESTIONS:

Please circle either "Yes" or "No" for the following questions:

1. Was your adolescent underweight as an infant or preschool-aged child? Yes / No
If yes, circle one: a) mildly underweight
b) moderately c) severely
2. Is your adolescent underweight now? Yes / No
If yes, circle one: a) mildly underweight
b) moderately c) severely

3. Is your adolescent overweight now? Yes / No
If yes, circle one: a) mildly overweight
b) moderately c) severely
4. Was adolescent under normal height as an infant or preschool-aged child? Yes / No
If yes, circle one: a) mildly under height
b) moderately c) severely
5. Is adolescent under normal height for his/her age now? Yes / No
If yes, circle one: a) mildly under height
b) moderately c) severely
6. Does your adolescent have multiple ear infections per year? Yes / No
7. Does your adolescent have multiple respiratory infections per year? Yes / No
8. Has a physician ever reported that your child has large tonsils? Yes / No
9. Have your adolescent's tonsils been removed? Yes / No
10. Has a physician ever reported that your adolescent has enlarged adenoids? Yes / No
11. Have your adolescent's adenoids been removed? Yes / No

Child Uplift, Inc.

To Purchase the SDIS, submit your requests to: www.SleepDisorderHelp.com

or write to the following address:

Child Uplift, Inc., P.O. Box 146, Fairview, WY 82119