



Launch of the Sleep Disorders Inventory for Students-Revised and the Sleep Disorders Inventory for Adults On a New Internet Digital Platform

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Abstract

This is a mini review of two new sleep screening inventories, the Sleep Disorders Inventory for Students-Revised (SDIS-R) and the Sleep Disorders Inventory for Adults (SDI-A). They screen for the major sleep disorders in children and adolescents, and most of the major sleep disorders in adults. The SDIS-R and SDI-A keep with the tradition of having all the strong psychometric strengths, nationwide norming, computerized scoring, and report writing qualities of the original Sleep Disorders Inventory for Students (SDIS), but there are many innovative and improved features added to the SDIS-R and SDI-A. These new features make universal screening of children and adults easy, inexpensive, and more accurate than ever before.

Keywords: Evaluation; Obstructive Sleep Apnea Screening; Pediatrics; Sleep Disorders; Sleep Screening

Universal Screening Needs

Otolaryngologists understand better than probably any other professionals that there are sleep disorders like Obstructive Sleep Apnea (OSA), which cause harmful health problems in children, adolescents and adults. Recent research indicates that sleep disturbances occur in 12-35% of young children and up to 60% of school-age children. [1-3] Some sleep disturbances will gradually resolve themselves without treatment, but many will become major sleep disorders that will not go away without screening, identification and treatment. Many overlooked pediatric sleep disorders like OSA cause cognitive, learning, behavioral/emotional, health and safety problems (based on hundreds of research studies). Consequently, many of these students may be retained in school one or two years, placed in special education, [4] or given incorrect mental health diagnoses [4] and ensuing medications that sometimes illicit problematic side effects. Much of this suffering throughout these students' school years, as well as significantly higher tardiness, truancy and lower graduation rates [5] could be avoided by early universal screening and correction of these sleep disorders. Presently it appears that less than 10% of all children and youth with correctable sleep disorders are being identified and treated. The success and quality of life of the

non-identified children and youth are being seriously impaired as they undergo many years of unnecessary cognitive and academic struggles, frequent behavior problems resulting in recurrent punishment, which leads to low self-esteem or anger, numbing by medications to help regulate emotional instability, later vehicular accidents, relationship problems, and in some cases, even eventual disability or incarceration (based on hundreds of studies).

Unfortunately, these problems continue long into adulthood when professionals use a poor sleep screening process or no screening process. The collateral damage increases significantly the longer sleep disorders are overlooked, especially the health consequences. In 1997, it was reported that 75% of middle-aged adult men and women with SRBD/OSA still remained undiagnosed & untreated. [6] Since then some progress has been made in adult identification of OSA, but it appears that no professional healthcare group is doing universal screenings of children or adults for OSA or other major sleep disorders. The percentage of overlooked adults still may be higher than 60% although there is a great need for more recent epidemiology studies.

A study from 2008 reported that adults with severe OSA have 3.0 times more deaths than controls ($p < .008$) due to all causes of death (car wrecks, Type II diabetes, high blood pressure, strokes, heart attacks, cancer, suicide, ...). [7] Furthermore, adults with severe, untreated OSA had 2.9 times more deaths by cardio-

vascular disease than controls or SRBDs with treatment ($p < .001$). [8] In 1999, the predicted medical costs for untreated Obstructive Sleep Apnea in adults was \$50 billion per year in the USA alone due to higher rates of hypertension, cardiovascular problems, obesity, and strokes. [9] These medical costs have probably doubled or tripled from 1999 to 2019, and they do not include the high costs of vehicular or work accidents, mental health costs, work absences, costs of higher rates of divorce or disability due to unidentified and untreated sleep disorders (many studies).

A Simple and Inexpensive Solution for Universal Sleep Screening of Children and Adults

Many pediatric sleep specialists and other professionals are acquainted with the Sleep Disorders Inventory for Students (SDIS) and have been using it to screen children and adolescents for years with satisfaction. It has been one of the leading pediatric sleep inventories for many reasons: (1) It has high validity and reliability coefficients in the 0.80's and 0.90's, including sensitivity and specificity of the OSA scales for children and adolescents; (2) It is the only existing pediatric sleep inventory that screens for all the major sleep disorders; (3) It is the only one developed by many well-known sleep specialists (17), psychologists (6), and measurement experts (2) and normed and validated throughout the United States at seven leading pediatric sleep clinics and hospitals; (3) It also used a large community sample, whereas the two other leading U.S. pediatric sleep inventories either did not use a true community sample or had poor validity and reliability coefficients for their community samples (this is very important when using a sleep screening instrument because most professionals will be trying to identify sleep problems coming into their practice from the community sample); (4) It is the only sleep inventory worldwide to use a subject population that closely reflects the 2000 and 2010 U.S. Census Demographics, which is also critical if it is to be used nationwide with students from all regions, all races and all socioeconomic level; (5) It is the only sleep screener that provides two inventories: one for children from 2 yrs. through 10.9 yrs. and one for students from 11 yrs. through 18.9 yrs., which ensures greater accuracy for both age groups; and (6) it is the only inventory worldwide that provides quick, accurate computer scoring, a visual graph, and a comprehensive report of results that parents and professionals love (no time-consuming hand scoring-time is money!). While preserving all the strong points of the original SDIS, a new, improved version, the SDIS-Revised, and also the new Sleep Disorders Inventory for Adults (SDI-A) were launched in May, 2019 on a new Internet Digital Platform at: www.SleepInventory.com.

The New SDIS-R and SDI-A Have the Same Sleep Scales as the SDIS:

1. Sleep-Related Breathing Disorders (changed from OSAS and covers a range from severe UARS to OSA);
2. Periodic Limb Movement Disorder (PLMD);
3. Delayed Sleep Phase Syndrome in teens and adults or Behavioral Insomnia of Childhood (BIC) in children;
4. Narcolepsy;
5. Excessive Daytime Sleepiness (EDS); and
6. the Total Sleep Disturbance Index (SDI) (a composite of all sleep scales).

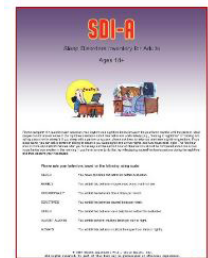
These Inventories Continue to Provide Information and Interventions for Five Parasomnias That Worry People:

- Teeth-grinding (Bruxism);
- Sleep-walking;
- Sleep-talking;
- Sleep or Night Terrors;
- Bed-Wetting .

Innovative and Improved Features of the New SDIS-R and SDI-A:



SDIS-Revised-Children's Inventory



Sleep Disorders Inventory for Adults (SDI-A)

1) The SDIS-R-Children's inventory has the identical 30 sleep-related questions as the old SDIS-C and the newly revised SDIS-R-Adolescent inventory has the same, unchanged 35 questions as the SDIS-A, and so does the Adult version, which have demonstrated high accuracy in the past. However, there are now 24 medical history questions instead of 11, which helps professionals develop strong hypotheses about possible causes of SRBD if the person scores higher than normal on this scale.

2) The SRBD scale has been adjusted slightly to the new and milder children's OSA scoring criteria on PSG adopted recently by the American Academy of Sleep Medicine (AASM) to preserve its high sensitivity or predictive validity.

3) Now these inventories are on a new digital platform, which enables them to be priced very inexpensively, and this also makes it easier for professionals and patients to use. Professionals can decide if they want to (a) purchase a small amount of inventories per month to spread costs over the year, or (b) purchase a bigger amount of inventories at one time as inexpensive as \$0.50 per screening. Purchases are made expediently with any major credit card on the digital platform and there is no cumbersome mailing of record forms, CD Roms, or paperwork. Screening can begin instantly.

4) Professionals have two options for providing their patients/clients a screening link: (a) They can conveniently email their patients a screening link so a parent or adult patient can complete the sleep screening online at home in advance of an appointment, or (b) if the professional practice does not want to email patients a screening link due to time constraints, they can select the "Website Embedded Option", which allows professionals to place the screening link onto their websites and any person coming to the website can click the screening link and instantly access a screening. This last option can help professionals attract more people to their business who have sleep concerns.

5) The instant a parent or adult patient clicks "Finalize Evaluation", not only does the parent or adult patient receive the results within seconds, but the professional practice also receives the results promptly. There is no time-consuming or costly scoring on the part of the professional, an office manager, or a technician; there is no risk that the parent or adult patient loses or forgets to bring the results to their next appointment. It also enables the professional to know the screening results in advance of the appointment and have excellent hypotheses of the nature of the sleep problems. The SDIS-R and SDI-A do NOT make sleep disorder diagnoses (that is left up to PSG and a sleep specialist), but they merely provide good hypotheses of the nature of the child or adult patient's sleep problems or probability of a sleep disorder. If a link is embedded in the website, then the professional can write a line or two making users aware that the results will be provided to them, but also emailed to the professional practice. If the user wants to remain anonymous, they can be instructed to put a series of xxxx's or ooooo's in the fields for last name, address and phone number. If professionals have concerns that they cannot, or do not want to pay for these screenings, most people who have concerns about their own or their child's sleep problems are very willing to pay this small fee for screening.

6) The professional can download and save the results/report into

the patient's file, either electronically or via paper copy. The secured website also stores the reports privately and only the professional can access them to ensure confidentiality. Professionals never have to worry if their computer is reconfigured or crashes, or if there is interference with their software from the cloud or other software programs on their computer. They also don't have to be constantly upgrading to a better inventory because that is done automatically and continuously on the website.

7) Professionals can monitor patients' sleep problems over months or years. If a patient is screened and treatment is undertaken for OSA, a follow-up inventory can be emailed to the patient several weeks or months later to see if treatment was effective. A comparison bar graph can be retrieved comparing the patient's multiple screenings to see if the treatment was successful. This can also be a desirable research tool while monitoring patients' treatment efficacy. When measuring treatment satisfaction in 2004, about 30% of parents reported that they were displeased with the sleep specialist or pediatrician because there was no follow-up by professionals' post-treatment and sleep problems still existed. [4] These monitoring problems are no longer an issue with the SDIS-R and SDI-A.

8) Professionals can also access statistics about their practice concerning the percentage of their patients scoring within the 'caution' or 'high risk' range on the SDIS-R or SDI-A for the five sleep problem scales (in case they need data for hospital statistics, research or insurance companies).

9) Professionals can now screen adults with the new SDI-A (19+years). These three inventories guarantee screening continuity from 2 years through 10.9 yrs. (SDIS-R-Children's form), 11 yrs. through 18.9 yrs. (SDIS-R-Adolescent form) and 19 yrs. through adulthood (SDI-A).

10) In an interview of a leading sleep specialist and OSA expert, Dr. David Gozal, he reported that only about 20-30% of children and adolescents being referred for an overnight sleep study to diagnose Obstructive Sleep Apnea (OSA) were actually found to have OSA based on Polysomnography (PSG). [5] This is not a good accuracy rate, especially considering that these children's parents had been asked many questions by a sleep specialist before being referred for an overnight sleep study with PSG. Why the poor sensitivity when these experts know all the right questions to ask? Because a "Yes" or "No" answer by parents is not specific enough. Both the original SDIS and now the SDIS-Revised-Children's form and the SDIS-Revised-Adolescent form provide a higher accuracy rate of at least 55% by parents who are unaware, unreliable raters of their children's behaviors, and up to an 80-90% hit rate by reliable parents who know their children's daytime and sleep behaviors well. These inventories also provide three-to-seven "lie detector" items so that professionals can determine if the rater is reliable. The

reasons for the higher accuracy of these inventories is twofold: (1) The rating scale is a very exact, well-defined 7-point scale from 1 = No Problems to 7 = Behavior occurs multiple times per hour, and (2) by using meticulous statistical computer analyses, the cut-off scores for each scale are determined with a rigorous mathematical formula that simple “Yes” and “No” answers and hand scoring cannot provide.

11) The comprehensive report that is determined by the combination of item scores for each scale has been developed using content taken from leading pediatric sleep specialists and their painstaking years of research.

Conclusions

Overall, the new SDIS-R-C and SDIS-R-A are equally accurate as the original SDIS and more reasonably priced, convenient, versatile, and maintenance free. For testimonials, psychometric data, research and development information, go to www.SleepInventory.com and see the information under Product Information. If there is interest to do some free trials of the SDIS-R-Children’s form, SDIS-R-Adolescent form, or SDI-Adult form, professionals can go to the website, register their practice, and get 10 free trials using the Promo Code: 10-SDIS-R. This offer is valid through 08/30/2019.

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