



Sleep Disordered Breathing Risk in Children: PSQ-SRBD Scale Evaluation

Regina Yang, DDS, James Yun, Cindy Qiang, Rose J. Amable, DDS, Courtney Chinn, DDS, MPH

Department of Pediatric Dentistry, New York University College of Dentistry, NY

Introduction/Background

Sleep disordered breathing (SDB) consists of a wide continuum of sleep related conditions that range from mouth breathing, noisy breathing, snoring to sleep apnea (OSA).¹ Early diagnosis is necessary as undiagnosed SDB can lead to cardiovascular disease, stroke, hypertension, diabetes, dementia, and sleepiness related accidents. Epidemiologic data on SDB in children is limited, and its prevalence varies widely from 7% to 22%.³

Polysomnography (PSG) is the gold standard for diagnosing patients with SDB. However, there are many limitations in research regarding PSG due to its extensive time, cost, and effort, and thus, SDB remains markedly underdiagnosed.⁵ Sleep questionnaires, such as the Pediatric Sleep Questionnaire (PSQ) comprising of 22 symptom items, have been widely utilized to screen for SDB.⁴ There is little literature that assesses the prevalence of SDB risk factors in children using these questionnaires.

Objectives

The objectives of this study were 1) to determine the prevalence of SDB determinants in children up to 12 years old using the PSQ-SRBD Questionnaire 2) to evaluate associations between SDB and gender, ethnicity, specific medical conditions, and age 3) to assess the utility of PSQ-SRBD as a screening tool

Methods

A cross-sectional study was conducted in a population based cohort of 118 children up to 12 years of age. Anonymous surveys using REDCap were completed by the patients' caretakers who presented to the Pediatric Dental Department at NYU College of Dentistry for appointments and who were willing to participate in this study. Surveys comprised of the 22 item PSQ and of questions regarding demographics and medical conditions. SDB score was calculated by taking the average of responses (yes =1, no =0, don't know =not scored) of the PSQ. *Children with average scores >0.33 were considered at risk of SDB.* Multivariate analyses using SAS software were applied to identify significant determinants. This study was approved as an exempt study by the NYU IRB (FY2023-7920).



Figure 1: QR code for survey completed by patient's caretakers

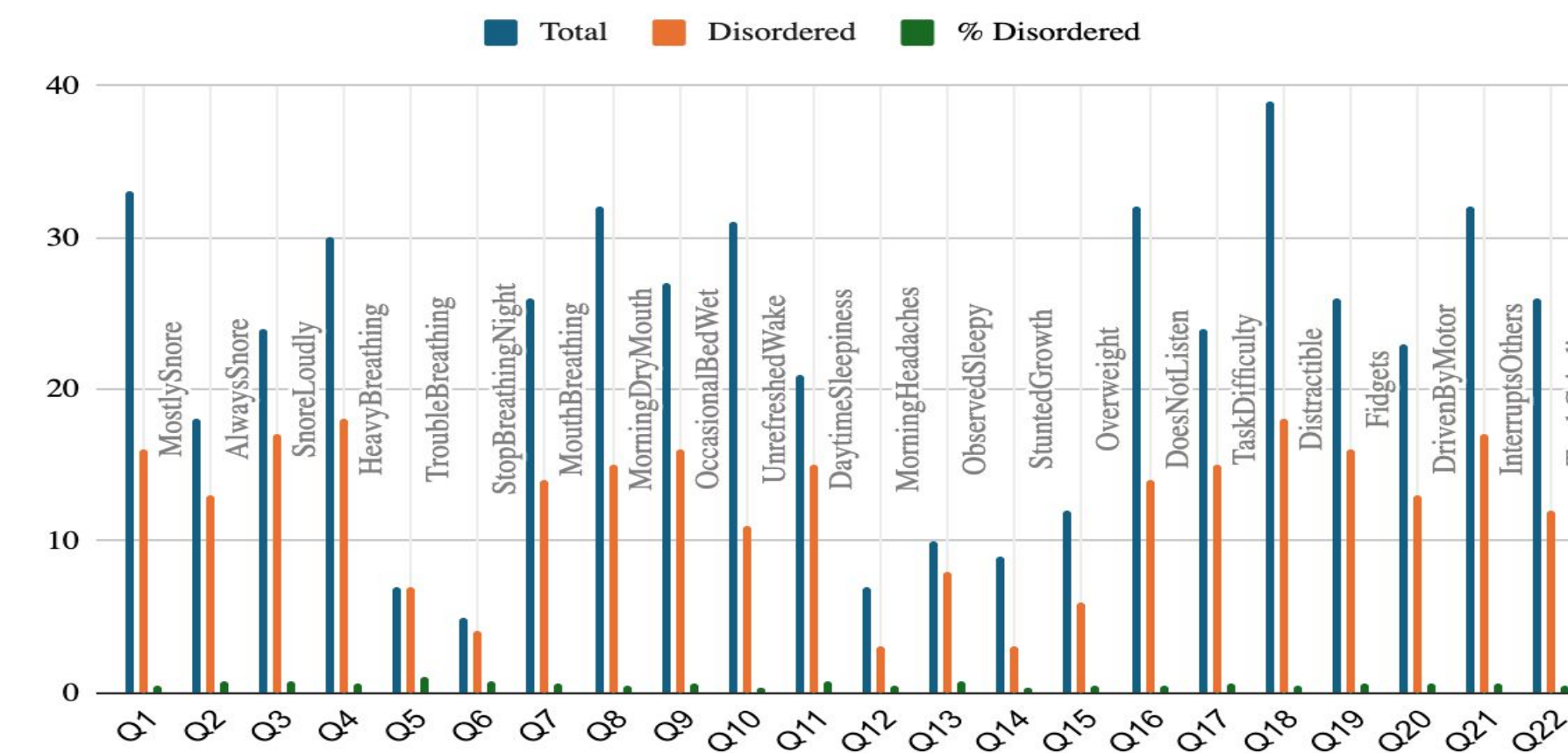


Figure 2: Scores for each question answered on PSQ-SRBD Questionnaire

	Total number of children	Number of children at risk	Unadjusted OR	95% CI	P-Value
Gender	Male: 61 Female: 57	Male: 14 Female: 14	1.246	0.512, 3.028	0.6279
Age	1-3 years: 7 4-6 years: 39 7-12 years: 72	1-3 years: 2 4-6 years: 8 7-12 years: 15	0.9	0.439, 1.845	0.7741
American Indian/ Alaska Native	1	0	<0.001	<0.001, >999.999	0.9895
Asian	9	1	0.443	0.053, 3.717	0.4529
Black/ African American	30	11	3.06	1.199, 7.809	0.0193
Hispanic	71	12	0.532	0.218, 1.297	0.1649
Native Hawaiian/ Pacific Islander	1	0	<0.001	<0.001, >999.999	0.9895
White	16	3	0.839	0.219, 3.208	0.7978
Asthma	10	4	2.9	0.748, 11.246	0.1236
Autism	11	9	26.988	5.306, 137.273	<0.0001
ADHD	8	5	8.431	1.839, 38.664	0.0061

Figure 3: Multivariate analyses of those at risk of SDB

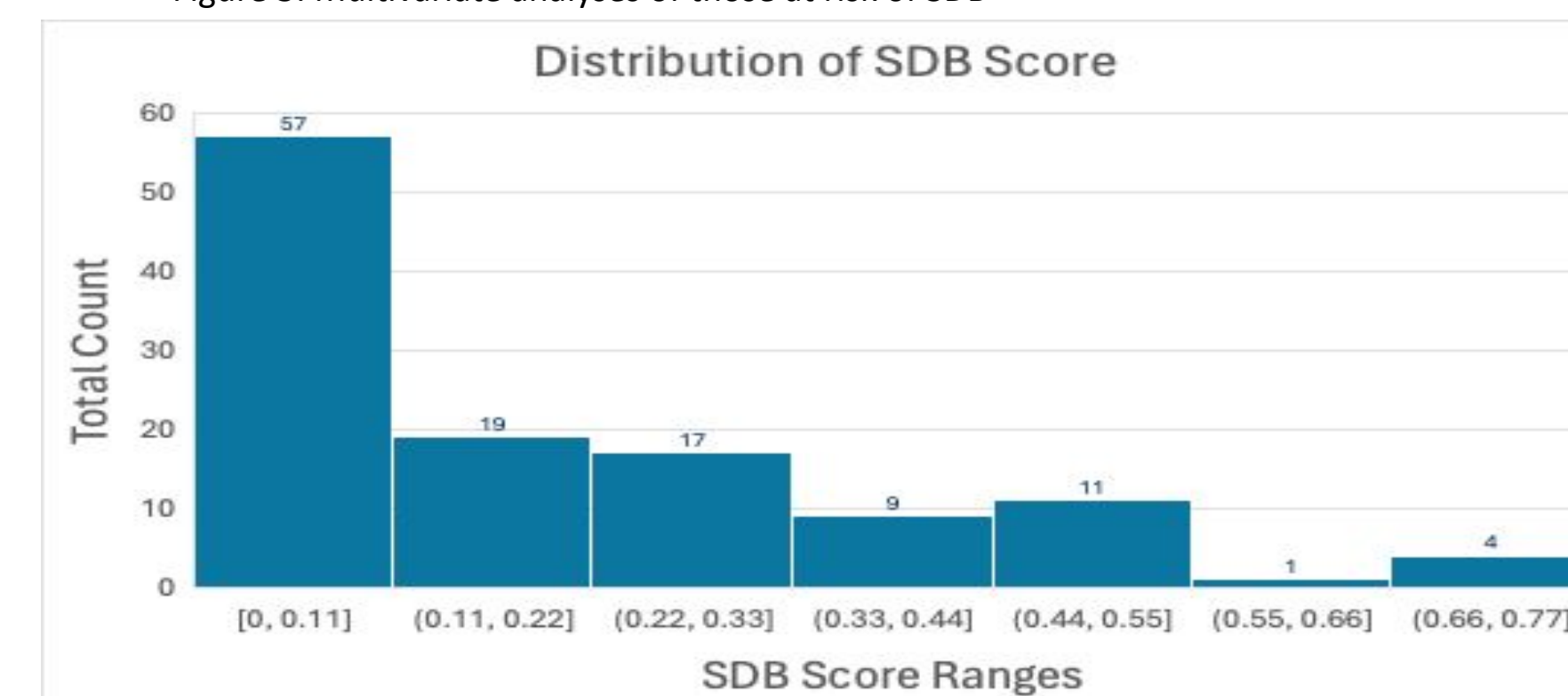


Figure 4: Distribution of SDB Score amongst school age children up to 12 years old.

Results

- The prevalence of SDB determinants was 21.1% and was detected in 25 participants (n=118)
- 61/118 (51%) were male and 57/118 (49%) were female
- Easily distracted (n=39) was the most common symptom reported from the survey, followed by mostly snore (n=33), and morning dry mouth (n=32)
- 100% of children who reported to have trouble breathing were at risk of SDB (n=7), followed by children who stopped breathing at night at 80% (n=4)
- No significant differences between males and females (P=0.6279) and between age groups (P=0.7741) were noted in the prevalence of SDB symptoms
- Asthma (P=0.1236) is not significantly associated with increased risk of SDB
- Autism (P<0.001) and ADHD (P=0.0061) are significantly associated with increased risk of SDB
- Black/African Americans are significantly associated with increased risk of SDB (P=0.0193)

Discussion/Conclusion

This research illuminates the underdiagnosed issue of SDB in children, highlighting the necessity for efficient screening tools and the importance of conducting screenings for SDB with these tools in a clinical setting. The identified determinants provide valuable insights for developing practical methods of early detection, enabling pediatric dentists to contribute to the timely diagnosis and management of sleep disordered breathing in their young patients. Limitations of this study included small sample size and that the results of this study are based on the subjective reports of parents. Further studies need to be conducted in conjunction with objective tests such as the PSG or with clinical examinations.

References

1. American Academy of Pediatric Dentistry. Policy on obstructive sleep apnea (OSA). The Reference Manual of Pediatric Dentistry. Chicago, Ill.: Academy of Pediatric Dentistry; 2021;137-40
2. Baidas L, Al-Jobair A, Al-Kawari H, AlShehri A, Al-Madani S, Al-Balbeesi H. Prevalence of sleep-disordered breathing and associations with orofacial symptoms among Saudi primary school children. BMC Oral Health. 2019 Mar 12;19(1):43. doi: 10.1186/s12903-019-0735-3. PMID: 30866906; PMCID: PMC6417016.
3. Bonuck KA, Chervin RD, Cole TJ, Emond A, Henderson J, Xu L, Freeman K. Prevalence and persistence of sleep disordered breathing symptoms in young children: a 6-year population-based cohort study. Sleep. 2011 Jul 1;34(7):875-84. doi: 10.5665/SLEEP.1118. PMID: 21731137; PMCID: PMC3119829.
4. Chervin RD, Hedger K, Dillon JE, Pituch KJ. Pediatric sleep questionnaire (PSQ): validity and reliability of scales for sleep-disordered breathing, snoring, sleepiness, and behavioral problems. Sleep Med. 2000 Feb 1;1(1):21-32. doi: 10.1016/s1389-9457(99)00009-x. PMID: 10733617.
5. Robillard R, Chase T, Courtney D, Ward M, De Koninck J, Lee EK. Sleep-related breathing disturbances in adolescents with treatment resistant depression. Sleep Med. 2019 Apr;56:47-51. doi: 10.1016/j.sleep.2018.12.010. Epub 2018 Dec 25. PMID: 30648538.