Accuracy of the Pediatric Sleep Questionnaire for Diagnosing Sleep-Related Breathing Disorders: An Umbrella Review

Farnaz Shahraki, DDS, Oghenerukevwe Erhenede, DDS, Qaiser Ahmed, DDS, Rachel Patenaude, DMD, Amir Yavari, DDS, Amanda Newcity, DMD, David Okuji, DDS, MBA, MS, Alberta Twi-Yeboah, MS, MPH, Richard McGowan, MLS
NYU Langone Hospitals-Advanced Education in Pediatric Dentistry, Brooklyn, NY

NYU Langone Health

NYU Langone Dental Postdoctoral Residency Programs

INTRODUCTION

Sleep related breathing disorders include sleep issues that meet diagnostic criteria for obstructive sleep apnea, parasomnia, narcolepsy, and insomnia[1].

Pediatric sleep disordered breathing includes habitual snoring, excessive day time sleepiness, disturbed sleep and daytime neurobehavioral problems. It has been reported that up to 40% of children experience a sleep problem sometime between infancy and adolescence[2].

Pediatric dentists are able to identify patients at greatest risk for sleep related breathing disorders. The American Academy of Pediatrics recommends polysomnography be performed in Children and adolescents with snoring or signs of OSA[3].

Studies have shown that the pediatric sleep questionnaire (**PSQ**) is a valid and reliable instrument with the best diagnostic capacity to screen for sleep disordered breathing when compared to alternative diagnostic tests[4].

PURPOSE

- The purpose of this study is to conduct an umbrella systematic review to determine the predictive accuracy of the pediatric sleep questionnaire for diagnosing sleep related breathing disorders in children
- The rationale for this study is to be able to help the pediatric dentist use the PSQ as a screening tool to screen children for sleep related breathing disorders
- The main research question for this umbrella review, for children ages 2 to 18 years-old, is the pediatric sleep questionnaire (PSQ) screening tool able to predict sleep related breathing disorders when compared to the gold standard polysomnography test (**PSG**)

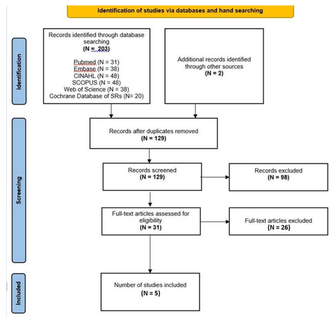
METHOD

Relevant systematic reviews and meta-analysis up to June 01, 2022 were searched. The reviewed articles included the PSQ as a screening tool and/or the PSG as a diagnostic tool. The subjects included in the study were children and infants less than 18 years old. The subjects included had to be healthy children without special healthcare needs.

Articles that were not a systematic review or meta-analysis were excluded from the study even if they utilized PSQ as a screening tool or PSG as a diagnostic tool. Any children with special needs or a complex medical history were also not included in the study. The final review included 5 articles.

FIGURES

Figure 1: Literature search strategy



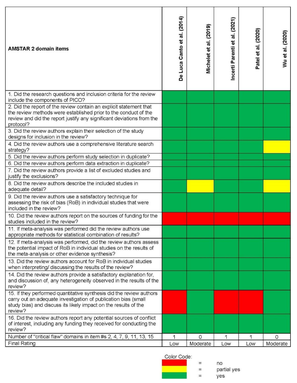


Figure 3: Diagnostic test metrics

	Overall			De Luca Canto et al. (2014)	Michelet et al. (2018)	Incerti Parenti et al. (2021)	Patel et al. (2020)	Wu et al. (2020)	
N (primary studies)	55			2	13	12	5	23	
n (total subjects, primary studies)	5697			183	1162	861	508	2983	
-Variable (mean (SD))	Mean (SD)	95% CI Lower Bound	95% CI Upper Bound						p-value
Prevalence	50.58 (23.28)	44.29	56.87	56.00 (41.01)	51.91 (25.32)	58.30 (21.24)	47.00 (19.46)	46.11 (23.44)	0.671
Sensitivity	74.97 (14.78)	70.97	78.96	65.50 (21.92)	68.55 (19.28)	78.56 (10.45)	73.18 (13.88)	77.93 (13.14)	0.295
Specificity	49.68 (22.42)	43.62	55.74	71.20 (22.35)	57.17 (21.35)	51.29 (24.30)	41.84 (25.74)	44.44 (20.66)	0.268
Positive predictive value	58.16 (25.62)	51.23	65.08	63.50 (47.66)	60.09 (26.57)	65.96 (23.09)	54.28 (18.77)	53.37 (26.97)	0.715
Negative predictive value	62.24 (21.65)	56.39	68.09	59.65 (21.14)	61.59 (20.01)	58.76 (18.64)	59.20 (25.45)	65.32 (24.51)	0.929
Positive likelihood ratio	2.08 (1.70)	1.62	2.54	3.65 (3.61)	2.37 (1.91)	2.31 (1.95)	1.46 (0.78)	1.79 (1.42)	0.468
Negative likelihood ratio	0.57 (0.33)	0.48	0.66	0.55 (0.50)	0.59 (0.33)	0.51 (0.26)	0.80 (0.42)	0.55 (0.34)	0.582
Diagnostic Odds Ratio	6.94 (9.66)	4.30	9.58	14.85 (19.30)	8.55 (11.65)	8.78 (12.00)	2.96 (3.51)	5.17 (6.76)	0.457
Youden's Index	0.25 (0.23)	0.24	0.25	0.37 (0.44)	0.26 (0.26)	0.30 (0.25)	0.15 (0.22)	0.22 (0.20)	0.704
True positive	35.22 (32.39)	26.38	44.06	35.0 (29.69)	32.46 (20.10)	31.50 (16.09)	34.60 (18.37)	39.05 (46.33)	0.970
False positive	29.20 (37.31)	19.11	39.29	17.50 (21.92)	19.77 (20.98)	15.33 (11.66)	31.20 (24.28)	42.35 (51.27)	0.237
False negative	12.13 (15.80)	7.86	16.40	13.50 (0.71)	11.77 (10.80)	8.50 (3.99)	10.80 (3.12)	14.39 (22.94)	0.893
True negative	24.78 (26.66)	17.58	31.99	26.00 (21.21)	25.31 (27.22)	12.83 (8.98)	25.00 (18.86)	30.57 (33.19)	0.049

RESULTS

- Based on the literature search, 5 articles were selected to be included in the present review (figure 1)
- Between the 5 selected systematic reviews, there were a total of 55 primary studies and 5,697 subjects included in the present umbrella review
- According to the AMSTAR assessment the selected studies ranged from low to moderate quality (figure 2)
- The overall sensitivity and specificity of the Pediatric Sleep Questionnaire were 74.97 and 49.68, respectively (figure 3)
- The diagnostic odds ratio was determined to be 6.94 (figure 3) shows that the PSQ is able to accurately predict and diagnose OSA

CONCLUSIONS

- The AAPD guidelines recommend that all children be screened for obstructive sleep apnea. The Pediatric Sleep Questionnaire in a valuable screening tool that can be implemented by pediatric dentists, along with the clinical examination to assess patients for OSA.
- The high prevalence of OSA in children and the potential barriers to evaluation by polysomnography, necessitate a screening tool to aid in diagnosis and, subsequently, treatment of OSA.
- The PSQ can help to facilitate interdisciplinary communication with medical colleagues regarding patients suspected of having OSA.

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