

PEDIATRIC OBSTRUCTIVE SLEEP APNEA (POSA): PROPOSED ABBREVIATED SCREENING QUESTIONNAIRE

Gabriella K. Quevedo¹, Leda M. Mugayar¹, Scott L. Tomar¹, Polina Voronov²

¹ Department of Pediatric Dentistry, College of Dentistry, UIC Chicago, IL; ² Department of Anesthesiology, UI Health, Chicago, IL

Background

- POSA is the most common sleep-related breathing disorder in the pediatric population
- It may impact oral, systemic, cognitive, and behavioral health, as well as increases risk of complications from general anesthesia
- The American Academy of Pediatrics (AAP) recommends screening of all pediatric patients for POSA
- Existing POSA screening instruments are often long and inefficient
- Short questionnaires have varied reports of validity, sensitivity, and specificity
- Many questionnaires have sample bias, with validation performed among individuals at sleep study centers

Hypothesis and Objective

- **Objective:** To determine the predictive utility of a 5-item POSA screening questionnaire in establishing appropriate sleep-study referrals
- **Null Hypothesis:** There is no significant association between positive answers to proposed UIC abbreviated screening questionnaire and POSA diagnosis from referral

Methods

- Electronic health records were reviewed for children seen at UIC Pediatric Dentistry Clinic
- Included patients ages 0 months – 12 years who were seen during 09/02/2020 – 05/20/2022 and had a completed Pediatrics Exam form
- Data included information from the POSA questionnaire, medical alerts/history, chart notes, consultations and demographic information
- Data analysis included bivariate analysis and Mantel-Haenszel chi-squared test
- A POSA Index was created and measured our questionnaire's sensitivity and specificity for predicting POSA diagnosis, using weighting based on bivariate strength of association
- The maximum score on our POSA Index was 11 points

Obstructive Sleep Apnea Assessment	
1. Does your child snore loudly when sleeping? a. More than twice per week?	1
2. Does your child have trouble breathing while sleeping?	3
3. Does your child stop breathing during sleep? a. Less than twice per week?	3
4. Does your child tend to breathe through his/her mouth during the day? a. Does this also occur during sleep?	3
5. Have you or the teacher noticed that your child appears sleepy during the day?	1

Fig. 1 UIC 5-item POSA Screening Questionnaire

Item	Score ¹
Q1: Does your child snore loudly when sleeping?	1
Q2: Does your child have trouble breathing while sleeping?	3
Q3: Does your child stop breathing during sleep? Q3a: Less than twice per week?	3
Q4: Does your child tend to breathe through his/mouth during the day?	1

Figure 5: UIC 4-Item Weighed POSA Questionnaire and Scale

¹A score of 3+ indicates referral is recommended

Fig. 2 UIC 4-Item Weighed POSA Questionnaire and Index

References

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Results

Questionnaire item	Number ¹	Referral ²		POSA diagnosis	
		Number (%) referred	P-value ³	Number (%) positive diagnosis	P-value ³
Snores loudly when sleeping					
Yes	531	58 (11.2)	.017	33 (6.2)	.020
No	115	3 (2.6)		1 (0.9)	
> Twice per week					
Yes	333	52 (16.2)	<.0001	31 (9.3)	.0001
No	314	8 (2.6)		3 (1.0)	
Trouble breathing while sleeping					
Yes	73	37 (54.4)	<.0001	20 (27.4)	<.0001
No	560	24 (4.3)		14 (2.5)	
Stop breathing during sleep					
Yes	32	22 (73.3)	<.0001	10 (31.3)	<.0001
No	604	37 (6.2)		23 (3.8)	
<Twice per week?					
Yes	20	14 (73.7)	<.0001	7 (35.0)	<.0001
No	621	42 (6.9)		26 (4.2)	
Breathe through mouth during day					
Yes	188	30 (16.1)	.0015	14 (7.5)	.124
No	450	30 (6.8)		20 (4.4)	
Also occurs during sleep					
Yes	114	22 (19.6)	<.0001	11 (9.7)	.020
No	474	31 (6.7)		20 (4.2)	
Child appears sleepy during day					
Yes	48	11 (22.9)	.0037	4 (8.3)	.310
No	586	48 (8.4)		29 (5.0)	

¹Responses may not total to 648 due to missing data

²Excludes children diagnosed with POSA before questionnaire administration (n=12).

³Chi-square test

Table. 1 Frequency. Distribution of Responses

- A total of 648 patients met the inclusion criteria
- A positive (yes) answer to any item in the POSA questionnaire was significantly associated with referrals for POSA evaluation
- Individuals who answered positively on snoring ≥ 2 times/ week, trouble breathing, stop breathing, or mouth breathing during sleep were significantly more likely to be diagnosed with POSA
- Sleepiness during the day was not significantly associated with POSA diagnosis and was therefore eliminated from our POSA Index
- An overall POSA Index score of ≥ 3 had sensitivity of 68.2% and specificity of 94.0%

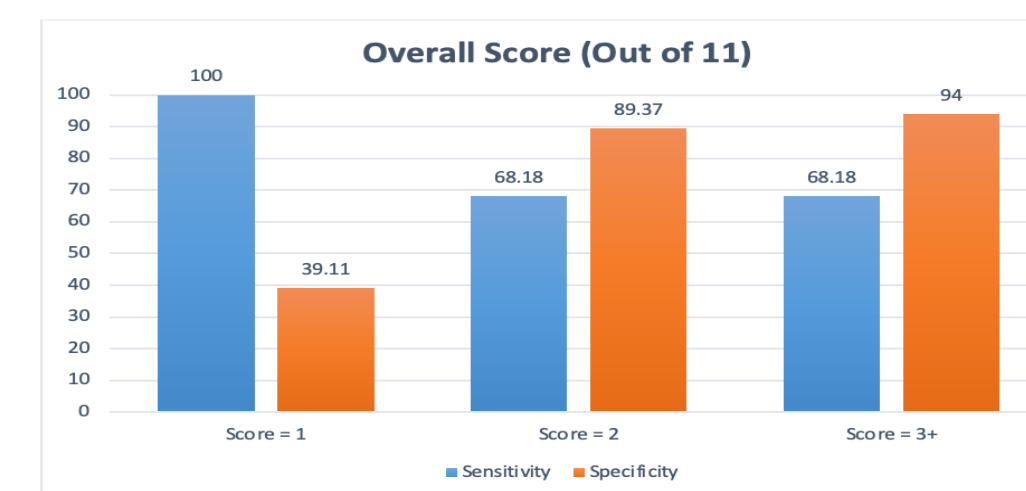


Fig. 3 Relation of Sensitivity and Specificity with Overall Score

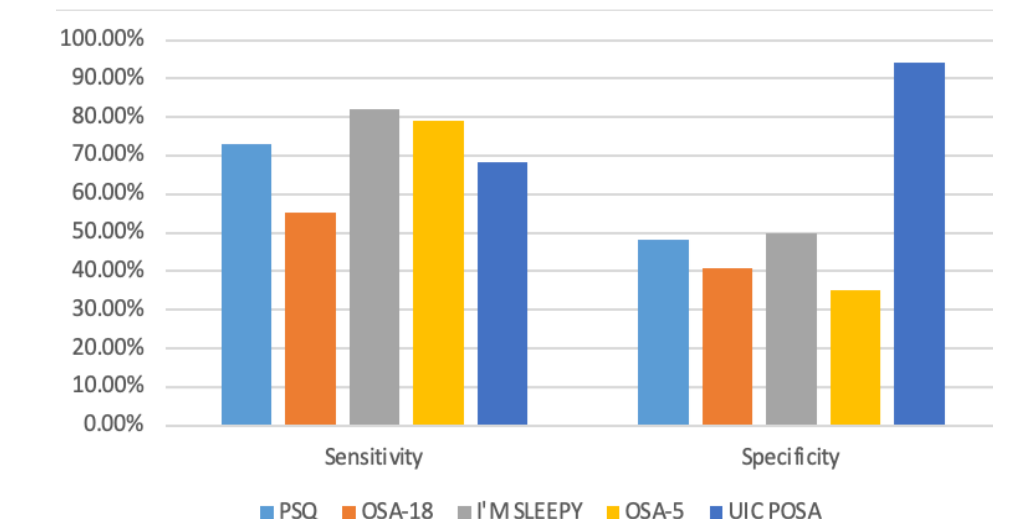


Fig. 4 Abbreviated Questionnaire Sensitivity and Specificity Comparison

Conclusions

- Our questionnaire is effective in identifying youth at high risk for POSA, as well as was validated in a large sample population
- When used with our weighted scale, it shows moderate-to-high sensitivity and specificity
- It is the shortest questionnaire in existing literature
- Implementation of this questionnaire may facilitate large scale screening and pertinent referrals in a busy clinical setting.