Melania Evangelisti, Maria Pia Villa

melania.evangelisti@uniroma1.it

Landmark papers in respiratory medicine

The importance of screening in children who snore

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Obstructive sleep disordered breathing (SDB) is an upper airway dysfunction that occurs during sleep and is characterised by snoring and/or increased respiratory effort caused by upper airway resistance and pharyngeal collapsibility [1]. Obstructive SDB includes a spectrum of clinical entities from simple snoring and upper airway resistance syndrome to obstructive sleep apnoea syndrome (OSAS).

Obstructive SDB, particularly OSAS, is a highly relevant pathology in the paediatric population. The prevalence of habitual snoring as determined by parental report was found to be 7.45%, while the prevalence of OSAS ranges from 1 to 5% [1]. Although overnight polysomnography (PSG) remains the gold standard for the diagnosis of SDB, this procedure is expensive, and in many countries it can only be used in a minority of cases, due to the low number of paediatric sleep centres available, delaying the diagnosis and treatment of patients with SDB.

The American Academy of Sleep Medicine published practice parameters for polysomnographic indications in children with SDB [2]. The authors reported that evaluation for SDB mostly based on clinical evaluation alone does not have sufficient specificity and sensitivity to establish a diagnosis of OSAS.

Several questionnaires have been created and developed in an effort to find a simple screening instrument to identify paediatric subjects who are at high risk for OSAS [3–5]. Various aetiological factors may underlie OSAS in the paediatric population, including adenotonsillar hypertrophy, obesity, various craniofacial disorders and neuromuscular diseases. It is important to distinguish children with different levels of severity of OSAS using the patient's clinical history and physical examination, to identify children who need PSG. In this article, we talk about the two most relevant validated sleep questionnaires that have changed paediatricians' clinical practice.

Chervin *et al*. [3], in 2000, validated a paediatric sleep questionnaire for SDB, snoring, sleepiness and behavioural problems in 162 children aged 2–18 years. In a comparison of sleep laboratory referred children confirmed to have sleep-related breathing disorders (SRBD) and non-referred children whose parents were surveyed in general paediatric waiting rooms, the SRBD scale showed a sensitivity of 81% and a specificity of 87%. The SRBD scale contains 22 symptom items that ask about snoring frequency, loud snoring, observed apnoeas, difficulty breathing during sleep, daytime sleepiness, inattentive or hyperactive behaviour, and other paediatric OSAS features, each previously shown to correlate with OSAS confirmed by PSG in referred children. Responses are: "yes"=1, "no"=0, and "don't know"=missing. The score is the mean response on non-missing items and can vary from 0 to 1. Data suggest that a cut-off value of 0.33 would be most effective in identifying paediatric OSAS. Subscales within the SRBD scale include a four-item sleepiness scale, a four-item snoring scale, and a six-item inattention/hyperactivity

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scale originally derived from the Diagnostic and Statistical Manual of Mental Disorders (fourth edition) criteria for attention deficit hyperactivity disorder (ADHD). The SRBD scale may predict OSAS-related neurobehavioral morbidity and its response to adenotonsillectomy as well or better than PSG [4]. The main limitation of this questionnaire is that consider the subject's history alone and no information on physical examination is reported.

In 2013, Villa *et al*. [5] proposed the sleep clinical record (SCR), a rapid, validated instrument for detecting paediatric candidates for a PSG study for suspected OSAS. Briefly, the SCR consists of three main items. The first item takes into consideration the data yielded by a physical examination of the nose, oropharynx, and dental and skeletal occlusion. The following signs are considered: signs of oral breathing; nasal obstruction, inferior turbinate hypertrophy or rhinolalia; pathological palate position graded according to the Friedman classes (grades three and four are considered positive) [6]; nasal septum deviation; tonsillar hypertrophy, with grades three and four being considered as tonsillar hypertrophy [7]; obese or adenoid phenotype; dental/skeletal malocclusion and narrow palate. The dental/skeletal malocclusion, *i.e.* the intermaxillary divergence, includes jaw deviation from normal occlusion such as retrognathia, prognathia, open, deep bite, crossbite and overjet. These signs were scored as either 2 points (positive sign) or 0 points (negative sign). The second item involves calculating the Brouillette score by considering a score ≥–1 as positive [8] and scoring it as 0.5. The third item consists of assessing the presence of inattention and hyperactivity symptoms using the ADHD rating scale for school-aged children [9]. A score higher than six was considered positive and scored as 1. A total score of 6.5 or more was considered to be positive, as has previously been approved [5]. The SCR score had a sensitivity of 96.05% and a specificity of 67%. The combination of clinical examination and patient history has a high negative predictive value, indicating that children with a low score have a low risk of developing severe OSAS. The limitation of the SCR is that it was validated in a selected population of children with suspected SDB and it has not been validated in asymptomatic children.

Summary

It is important to screen for OSAS in children who snore, as early treatment of OSAS can prevent neurocognitive, behavioural, cardiovascular and metabolic consequences. Paediatricians should always investigate sleep habits and the possible presence of snoring, respiratory efforts or pauses during routine examination of children. These instruments may be effectively used to identify patients with OSAS, and the specificity and positive predictive value may be increased by adding other screening instruments such as nocturnal pulse oximetry [10]. The sleep questionnaires are instruments that can be used to screen patient candidates for a PSG study for suspected OSAS, and to identify those with a mild form of SDB, enabling early treatment.

Affiliations

Melania Evangelisti, Maria Pia Villa

Pediatric Sleep Disease Center, Child Neurology, NESMOS Dept, School of Medicine and Psychology, Sapienza University of Rome, S. Andrea Hospital, Rome, Italy.

Conflict of interest

M. Evangelisti has nothing to disclose. M.P. Villa has nothing to disclose.

References

1. Kaditis AG, Alonso Alvarez ML, Boudewyns A, *et al*. Obstructive sleep disordered breathing in 2- to 18-year-old children: diagnosis and management. *Eur Respir J* 2016; 47: 69–94.
2. Aurora RN, Zak RS, Karippot A, *et al*. Practice parameters for the respiratory indications for polysomnography in children. *Sleep* 2011; 34: 379–388.
3. Chervin RD, Hedger KM, Dillon JE, *et al*. Pediatric Sleep Questionnaire (PSQ): validity and reliability of scales for sleep-disordered breathing, snoring, sleepiness, and behavioral problems. *Sleep Med* 2000; 1: 21–32.
4. Chervin RD, Weatherly RA, Garetz SL, *et al*. Pediatric sleep questionnaire: prediction of sleep apnea and outcomes. *Arch Otolaryngol Head Neck Surg* 2007; 133: 216–222.
5. Villa MP, Paolino MC, Castaldo R, *et al*. Sleep clinical record: an aid to rapid and accurate diagnosis of paediatric sleep disordered breathing. *Eur Respir J* 2013; 41: 1355–1361.
6. Friedman M, Ibrahim H, Joseph NJ. Staging of obstructive sleep apnea/hypopnea syndrome: a guide to appropriate treatment. *Laryngoscope* 2004; 114: 454–459.
7. Liistro G, Rombaux P, Belge C, *et al*. High Mallampati score and nasal obstruction are associated risk factors for obstructive sleep apnoea. *Eur Respir J* 2003; 21: 248–252.
8. Brouilette R, Hanson D, David R, *et al*. A diagnostic approach to suspected obstructive sleep apnea in children. *J Pediatr* 1984; 105: 10–14.
9. Marzocchi GM CC. Una scala di facile uso per la rilevazione dei comportamenti problematici dei bambini con Deficit di Attenzione e Iperattivita [A scale to indentify behavioural problems in ADHD children]. *Psicologia Clinica dello Sviluppo* 2000; 4: 43–64.
10. Villa MP, Pietropaoli N, Supino MC, *et al*. Diagnosis of pediatric obstructive sleep apnea syndrome in settings with limited resources. *JAMA Otolaryngol Head Neck Surg* 2015; 141: 990–996.