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EDITORIAL

Sleep apnea screening tools. Is there an impact of the geographical location?

In this edition of Pulmonology, José Coutinho Costa and colleagues are validating the NoSAS score (neck, obesity, snoring, age, sex) as a screening tool for the diagnosis of obstructive sleep apnea (OSA).[1] The authors investigated the accuracy of the NoSAS in a population consisting of patients that were referred to the sleep centre by general practitioners. The relevance of methods other than sleep recordings -including questionnaires- for the diagnosis of OSA have recently been discussed in this journal and therefore will not be subject of this editorial.[2] Also, the general pros and cons of the NoSAS were earlier presented by Walter McNicholas in the editorial to the original validation study and his comments do also apply to the present study.[3]

In 2016 the NoSAS was validated in a Swiss population.[4] The methods used in this study differ in several aspects from the original one. In this study, an in-laboratory polysomnography (PSG) setting was preferred, while the HypnoLaus study investigated the population with an ambulatory PSG protocol.[4] This difference might be only minor; however, the selection of the study cohort was also different, and this is of relevance. Marti-Soler and colleagues[4] used a general population-based study, while in José Coutinho Costa's study[1] the patients were pre-selected by the general practitioners. Each choice of the study population has its advantages or disadvantages[3] but they are not identical. A direct comparison of the NoSAS results from both studies is therefore rather complex. However the present study is very important for anybody using the NoSAS questionnaire in Portugal.

Table 1 demonstrates a selection of published studies validating the NoSAS. It is interesting that between the four studies the concordance probability or area under the curve (AUC) is quite similar, each showing an acceptable discrimination by the NoSAS model. However, the OSA prevalence in each study population, the collected anthropometric data and the comparable cut off value for the presence of OSA are not interchangeable.

This would therefore indicate that the NoSAS questionnaire is a reliable instrument to predict OSA within a given local population even if it is multi-ethnic as in the study from Tan and colleagues (Chinese, Indian and Malays).[6] If so, it raises questions regarding the absolute values as sleep apnea indicators. It is surprising, that in the study cohort from Coutinho Costa et al.[1] the OSA/Non-OSA discrimination calculated by the AUC equals the result from the study of Peng and colleagues[5] that demonstrated a similar study design. Surprisingly, because the average neck-circumference and body mass index were clearly higher in the Coutinho Costa study.[1] Results from the European Sleep Apnea Database (ESADA) demonstrated, that geographical localization (ethnicity was not a problem) of a sleep apnea cohort influences clinical presentation, biochemical results and probably cardiovascular outcome of OSA patients .[7–10] Likewise, differences can be seen in the NoSAS data. Coutinho Costa et al.[1] found 19.1% of the control group with a neck circumference over 40 cm, while Tan and colleagues[6] detected a prevalence of only 15.7% within a group of patients identified by the NoSAS score as high risk for OSA. Thus, the clinical implication of a 40 cm neck circumference or BMI class might differ depending on the location and/or consistence of the study population.

In conclusion: The aim of any diagnostic test in medicine is to distinguish between healthy and not healthy persons. The results from Coutinho Costa and colleagues[1] will be of importance to predict the presence of OSA in the Portuguese population. However, it was investigated in preselected patients and therefore the results need to be validated in a general population cohort. The implication of geographical localization on predictors for OSA, sleep study results and the prognosis of patients with OSA will need further investigation.

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Table 1 Comparison of anthropometric data, OSA prevalence and calculated AUC for NoSAS in four different studies.

Country	General population study	AHI used to define OSA	OSA prevalence	Mean Neck circumference (SD) [cm]	Mean BMI (SD) [kg/m^2]	Age [years]	AUC	Publication
Switzerland	Yes	20/h	26%	36.9 (3.9)	25.6 (4.1)	59 (11)	0.74	(4)
China	No	$\geq$15/h	78.1%	36.9 (4.1)	25.9 (4.3)	48.9 (14.4)	0.731	(5)
Singapore	Yes	$\geq$20/h	28.1%	36.4 (4.1)	No mean	48.3 (14.0)	0.738	(6)
Portugal	No	$\geq$15/h	34.8%	41.0 (3.6)	30.8 (5.1)	53.5 (12.1)	0.77	(1)

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