



## Translation and cross-cultural adaptation of the Pediatric Sleep Questionnaire into Portuguese language



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### ABSTRACT

**Objective:** The need for culturally appropriate and linguistically accessible instruments for assessing sleep quality among children has expanded. The Pediatric Sleep Questionnaire (PSQ) is a validated tool for sleep disordered breathing among children. Our aim was to cross-culturally translate and adapt the PSQ into Portuguese language for use in clinical and research settings.

**Methods:** The PSQ was translated into Portuguese language in accordance with the stages recommended by International Guidelines and reviewed by a panel of experts. The caregivers of 180 children (aged from 4 to 12 years) answered the Portuguese version of PSQ. The reliability of the translated questionnaire was measured by Cronbach  $\alpha$ , Pearson correlation and Kappa statistics.

**Results:** Reliability analysis yielded an overall Cronbach  $\alpha$  of 0.781, confirming the survey's consistency. The Cronbach  $\alpha$  of the Portuguese PSQ domains ranged between 0.61 and 0.7. Test–retest reliability for all items was robust with correctness of >90.0% in all items, and the Kappa statistic ranged between 0.5 and 0.8.

**Conclusion:** The Portuguese version of PSQ has sufficient reliability and validity to measure sleep disordered breathing outcomes, and showed to be linguistically accurate and acceptable for use by children in Portugal.

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### 1. Introduction

Sleep-disordered breathing (SDB), including obstructive sleep apnea (OSA) syndrome, is acknowledged to be a cause of morbidity in children. Clinical symptoms of OSA among children include snoring, nocturnal arousals, restlessness during sleep, enuresis, daytime sleepiness, and hyperactivity [1,2]. As a result of increasing international collaboration in sleep research, the need for culturally appropriate and linguistically accessible instruments for assessing sleep quality among children has expanded [3]. This is particularly true in Portugal, where there are very few of such instruments available. Having these validated tools is very important when evaluating specific sleep treatment outcomes across different countries. Specifically, both methods used by

patients and caregivers to describe sleep problems and the assessment of the effects of treatment must be comparable, irrespective of patients' language and cultural background. Recognizing these needs, the International Paediatric Sleep Education Task Force concluded that testing methodologies and culturally sensitive epidemiologic tools are key components of cross-cultural sleep research [4].

Despite a recent meta-analysis [5] suggesting that clinical evaluations have poor diagnostic accuracy, especially in regard to OSA, this does not mean that they should not be performed. As a result of a lack of paediatric sleep laboratories, sleep history is frequently the only instrument available to clinicians, especially in Portugal. Thus, sleep history should, and must, be part of routine health care visits as an initial screening tool for children at risk of OSA.

Based on this meta-analysis, the Sleep-Related Breathing Disorder scale within the Pediatric Sleep Questionnaire (PSQ) appears to be the only instrument validated by full overnight polysomnography (PSG) [6]. Furthermore, using the same gold

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standard, the PSQ was also tested by Spronson et al. [7] in the UK. Thus, it is the most reliable questionnaire for sleep apnea screening.

The purpose of the current study was to evaluate a translation of the PSQ in children in Portugal by checking the accuracy of the translation, assessing its content validity, and determining whether or not it could be clearly understood when piloted in a sample of children.

**2. Materials and methods**

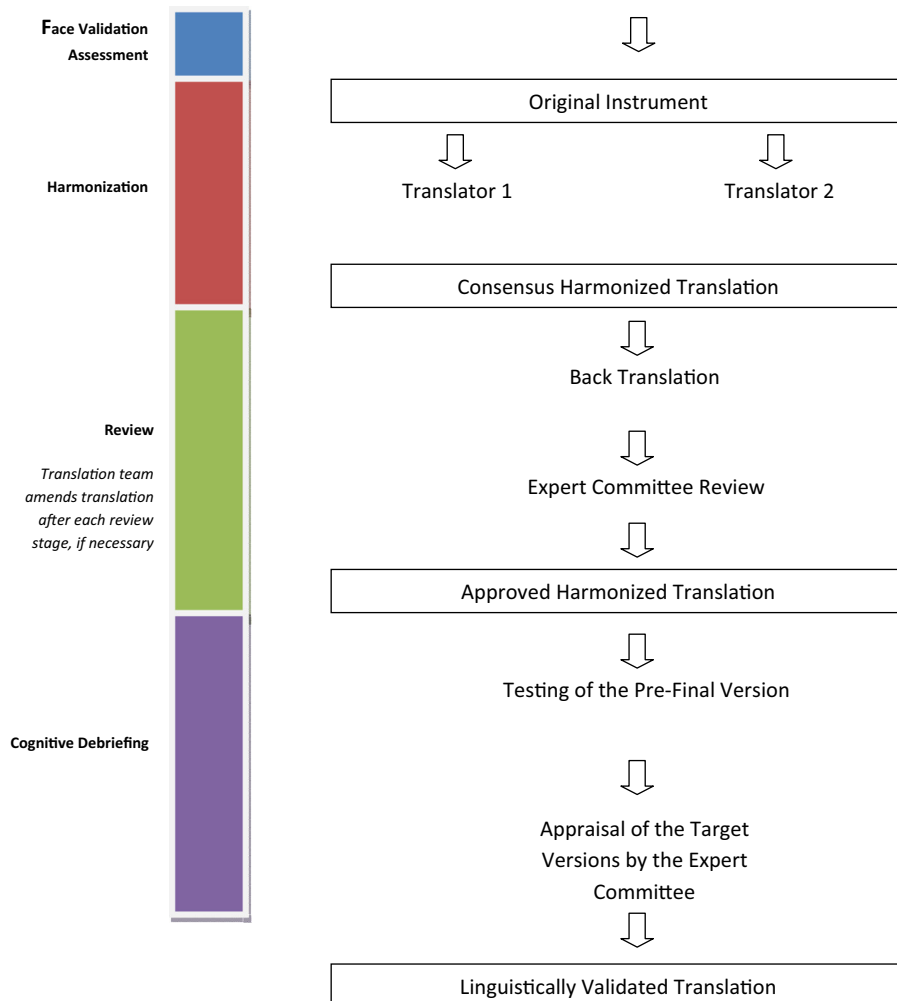
**2.1. The Paediatric Sleep Questionnaire**

The validated PSQ has 22 items documenting the presence or absence of common symptoms such as snoring, observed apneas, breathing difficulty during sleep, daytime sleepiness, and inattentive or hyperactive behaviour. Positive responses are scored as 1 and negative responses as 0. Then, the overall score is divided by 22 to provide a final value. Compared with overnight PSG, the PSQ has been reported to have a sensitivity of between 0.81 and 0.85 and a specificity of 0.87 in detecting OSA. A cut-off value of eight positive responses is thought to be most effective in identifying OSA. Subscales within the PSQ include a seven-item sleepiness scale, a nine-item snoring scale, and a six-item behavioural scale.

**2.2. Study design**

After obtaining ethical approval from the Institutional Review Board and receiving copyright permission, an adaptation of the PSQ questionnaire was performed. A written informed consent was obtained from all parents. The adaptation process followed internationally recommended steps for translation [3], including back-translation, translation evaluation by a judging committee and pilot testing of the pre-final version. A schematic overview of the linguistic validation process is illustrated in Fig. 1.

Two translations of the questionnaires from the original language to the target language were conducted. Bilingual translators (VC and FFL) whose first language was the target language independently produced the two translations. Once the two translated versions were created, a consensus version was established by reconciling the differences between the two translated versions. This was achieved through a discussion between the translators and a recording observer. The goal was to enhance cultural sensitivity and appropriate wording of the instrument. The reconciled version was then independently back-translated into the original language by two naive translators whose first language was the source language (English). The primary objective was to ensure that the translated version reflected the same item content as the original. Subsequently, the back-translated versions were reviewed by the research team.



**Fig. 1.** Overview of the linguistic evaluation process.

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