

Agreement between two different approaches to assess parent-reported sleep bruxism in children

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ABSTRACT

Introduction: Parents' report is the most used method for the study of sleep bruxism (SB) in children, especially in research with large samples. However, there is no consensus about the questions used to assess SB, what may difficult the comparisons between studies. **Objective:** The aim of this research was to evaluate the agreement between two different approaches to assess possible sleep bruxism (PSB) in children using parents' report. **Methods:** This cross-sectional study was conducted with 201 parents/caregivers. Prior to the questionnaire completion, all participants received a standard explanation of SB concept. Subsequently, the parents/caregivers answered a general question (GQ) and a frequency-time question (FTQ) about SB, and the answers were compared. **Results:** The majority of the participants were the children's mothers (73%) and the childrens mean age was 7.5 years (SD: 2.25). PSB frequency in children did not differ statistically through the two questions [GQ: 30.7% (CI95%: 24.2 - 37.1) and FTQ: 26.6% (CI95%: 20.4 - 32.8)], and an almost perfect agreement was observed between the answers ($\kappa=0.812$). Nevertheless, the FTQ showed a more coherent relation with the factors already recognized as associated with childhood bruxism than GQ. **Conclusions:** Different approaches result in similar PSB frequency, however, they show different ability to identify PSB associated factors and suggest the need of questions including frequency and time in further studies.

Keywords: Sleep Bruxism; Research Design; Surveys and Questionnaires; Self Report; Child.

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INTRODUCTION

Bruxism is defined as a sleep movement disorder¹ and characterized by teeth clenching or grinding or by bracing or thrusting the mandible during sleep. Its classification includes three categories: 'possible', which is based on self-report, by means of questionnaires and/or the anamnestic part of a clinical examination. 'Probable', based on self-report and on clinical examination; and the third category, 'definite', which includes self-report, clinical examination and a polysomnographic recording, preferably with audio and video recordings².

The bruxism diagnostic criteria established by the American Academy of Sleep Medicine include the presence of regular or frequent tooth grinding sounds occurring during sleep¹. The evaluation of this aspect may be performed by polysomnographic exam with audio and video recordings, by self-report, and by parents' or siblings' report. Although polysomnographic exams are excellent tools for sleep bruxism diagnosis, they are too expensive for large population group studies and they may be uncomfortable for children. Despite the questionable validity of parents' report for the evaluation of bruxism³, this tool remains frequently used^{4,5}.

Systematic reviews have shown a lack of methodologically appropriate studies to clarify the effective prevalence and risk factors associated with SB in children^{4,5}. Thus, the absence of consensus and standardization of questionnaires may lead to different outcomes, compromising studies comparisons, especially considering frequency and time characteristics.

The objective of this research was to evaluate the influence of the questions structure on parents' answers, especially in the sleep bruxism (SB) frequency and its association with other factors.

METHODS

Ethical Aspects

This study was conducted in compliance with the Declaration of Helsinki and received approval from the Human Research Ethics Committee of the Federal University of Paraná, Brazil (protocol number: 929.442). All participants signed informed consent terms.

Study Design and Sample

This cross-sectional study was conducted with parents/caregivers whose children were attended at Federal University of Paraná pediatric dentistry clinics, in the city of Curitiba, Brazil, in the period of March to December 2015. Ninety-four girls and 107 boys composed the children sample and their ages varied from two to 12 years-old (7.5; DP: 2.25).

The sample size was calculated based on the formula for the estimation of the population proportion with correction for a finite sample, using a parent-reported bruxism prevalence of 23.1%⁶, a 95% confidence level, an acceptable rate of error of 5% and a total of 500 children in this age group at the pediatric dentistry service. The minimum sample size was 176 children and 20% was added to compensate for possible dropouts, resulting in 212 children.

In order to be included, guardians had to participate with their children at their first dental visit. Illiterate parents/caregivers or those who could not read or write for any reason were excluded.

Questionnaire characteristics

Prior to the questionnaire completion, all participants received an explanation of the term bruxism, considered as "strongly clenching or grinding teeth during sleep, making noises of gnashing of teeth". The parents/guardians answered two questions sequentially. The first question was "Does your child have or has she/he ever had bruxism?" (General Question-GQ). The second question was "In the last 6 months, have you noticed your child making tooth-grinding sounds when s/he was sleeping for at least 3 to 5 nights per week?" (Frequency-Time question-FTQ). The alternative answers were 'yes', 'no' and 'I do not know' for both questions.

In this investigation, the answers 'no' and 'do not know' were grouped, with the aim of verifying the association of other variables with FTQ and GQ positive answers, whereas the parental report of grinding sounds caused by teeth contacts was considered a pathognomonic sign of SB⁷.

The questionnaire also included questions concerning demographic data and caregivers' perception about child's sleep quality, anxiety and irritability.

Statistical Analysis

The data were organized and submitted to statistical analysis using the SPSS program (version 20.0, IBM Corp., Armonk, NY). Cohen's Kappa Statistic performed the measurement of agreement between GQ and FTQ answers. A descriptive analysis of the variables was performed, and it was followed by bivariate analysis (Mann-Whitney and Chi square test). The level of significance for the analysis was 5% ($p < 0.05$). Adjusted residual chi-square was calculated considering 1.96 ($\alpha = 0.05$).

RESULTS

In the study, 201 parents/caregivers participated (average age: 35.6; DP: 8.4 years). The majority of the participants were the children's mothers (73%), followed by fathers (14%), grandparents (6%) and others (7%). Three parents/caregivers refused to participate after reading the consent term.

Children with PSB were younger only when FTQ was used. In this case, the average age of children with PSB was 6.75 years (SD=2.18, median 7, minimum 2 and maximum 11), and in those without PSB was 7.79 years (SD=2.22, median 8, minimum 2 and maximum 12) ($p = 0.008$, Mann Whitney). When GQ was used, it was not found statistically significant difference in children's age with and without PSB ($p = 0.162$, Mann Whitney).

The frequency of PSB assessed through the GQ and the FTQ questions were 30.7% (CI95%: 24.2 - 37.1) and 26.6% (CI95%: 20.4 - 32.8), respectively. Results showed an almost perfect agreement between the GQ and the FTQ ($\kappa = 0.812$). The overall percent agreement was 86.9% (Table 1).

Table 1. Association between Frequency-Time Question (FTQ) and General Question (GQ) concerning bruxism in children.

Questions to parents/caregivers		General Question*		Total (100%)
		Yes	No/NK	
Frequency-Time Question**	Yes	44	9	53
	No/NK	17	129	146
	Total	61	138	199

*"Does your child have or has she/he ever had bruxism?". **"In the last 6 months, have you noticed your child making noises of grinding or clenching the teeth when s/he was sleeping, at least 3 to 5 nights per week?". NK=Not know.

There were associations between the FTQ and the items: quality of sleep and parents'/caregivers' perceptions of children's anxiety and irritability. The same items did not show statistical association with the GQ. However, the 'restless sleep' item showed association with both questions (Table 2).

DISCUSSION

To our knowledge, this is the first study that investigated the influence of the use of two distinct questions in the frequency of possible sleep bruxism and associated factors in children. In this investigation, the frequency of PSB was very similar and an almost perfect agreement was observed between the answers. Nevertheless, it is important to consider that the

associations between PSB and other variables were different depending on the question used.

The current scientific evidence about bruxism in children present various aspects that are still inconclusive, however, they already indicate that SB is more prevalent in younger children, with worse sleep quality and with anxious^{8,9} or nervous behaviors^{6,10,11}.

Although none of the questions was assumed as right, the FTQ showed greater coherence with factors already recognized as associated with childhood bruxism, considering behavioral and sleep characteristics^{5,8,10,12-15}.

The AASM recommends the evaluation of the occurrence of audible teeth grinding during the night as a criterion for the definition of PSB¹, however it does not indicate any validated questionnaire for this purpose. The sensibility and accuracy of parents' report of sleep bruxism are low, however, it shows excellent specificity when compared with polysomnographic findings¹⁶.

The reliability of the questionnaire-based assessment of SB has been questioned¹⁶ and its use has been of concern to several authors, both in studies involving adults^{17,18} and children^{3,16}. Despite its obvious limitations, the parental reports of SB remain important for epidemiological studies with large samples.

Table 2. Association of Frequency-Time and General Questions with other variables.

Variables			Frequency-Time Question*		p-value**	General Question***		p-value**
			Yes	No/NK		Yes	No/NK	
Gender	Feminine	n(%)	20(21.5)	73(78.5)	0.125	24 (25.8)	69 (74.2)	0.165
		AR	-1.5	1.5		-1.4	1.4	
	Masculine	n(%)	33(31.1)	73(68.9)		37 (34.9)	69(65.1)	
		AR	1.5	-1.5		1.4	-1.4	
Does your child sleep well every night?								
Sleep quality	Yes	n(%)	33 (21.6)	120 (78.4)	0.003	43(28.1)	110 (71.9)	0.155
		AR	-2.9	2.9		-1.4	1.4	
	No	n(%)	20(43.5)	26(56.5)		18(39.1)	28(60.9)	
		AR	2.9	-2.9		1.4	-1.4	
Does your child usually have a restless sleep, often changing positions in bed during the night?								
Restless sleep	Yes	n(%)	45(34.4)	86(65.6)	0.001	49(37.4)	82(62.6)	0.005
		AR	3.4	-3.4		2.8	-2.8	
	No	n(%)	8(11.9)	59(88.1)		12(17.9)	55(82.1)	
		AR	-3.4	3.4		-2.8	2.8	
Does your child get irritated easily?								
Easily irritated	Yes	n(%)	36(32.1)	76(67.9)	0.036	38(33.9)	74(66.1)	0.224
		AR	2.1	-2.1		1.2	-1.2	
	No	n(%)	16(18.8)	69(81.2)		22(25.9)	63 (74.1)	
		AR	-2.1	2.1		-1.2	1.2	
Do you think that your child is anxious?								
Anxious child	Yes	n(%)	45(32.1)	95(67.9)	0.004	48(34.3)	92(65.7)	0.067
		AR	2.9	-2.9		1.8	-1.8	
	No	n(%)	7(12.3)	50(87.7)		12(21.1)	45(78.9)	
		AR	-2.9	2.9		-1.8	1.8	

**In the last 6 months, have you noticed your child making noises of grinding or clenching the teeth when s/he was sleeping, at least 3 to 5 nights per week?"; ** Chi-square Test;

***"Does your child have or has she/he ever had bruxism?"; NK=Not know; AR=Adjusted residual chi-square; Frequencies less than 199 due to missing data.

It has been argued that numerous factors may influence the response when interpreting the answers obtained through an instrument, which, perhaps, may not reflect the reality¹⁹. Moreover, the results of this study indicated that questions structure and words used to assess PSB should be considered when interpreting the results of SB studies in children.

Nevertheless, although the use of parents' reports concerning SB in children is a common research practice, the questions descriptions are not always clear and proper. A systematic review⁴ found a very high variability in sleep bruxism prevalence in children. This may be attributed, at least partially, to differences in the questionnaires used. The authors observed great variation in the questions, for example: single-item or part of sleep behavior questionnaires^{20,21}, frequency-time^{22,23} or general question²⁴, and some studies included in this systematic review had unspecified questions²⁵.

In this study, the GQ does not distinguish between wake-time and sleep bruxism, unlike the FTQ, which was more specific with respect to the moment of the events. At least part of the wide prevalence range reported in the literature has been attributed to lack of distinction between wake-time and sleep-related bruxism⁷. Restrepo et al.³ showed that when parental-reported sleep bruxism is based on multiple observations (5-day diary) there was a better agreement with polysomnography findings than the parental-report of a single observation (1-day diary).

This study has some limitations. One of them is the use of a single report. A recent research demonstrated that a multiple observation report had a better agreement with polysomnographic exams than a single observation report. In addition, like all surveys based on questionnaires, this one also has the possibility of memory bias.

Another limitation is the impossibility to generalize the findings because the sample was composed of children from a dental school clinic. Besides, the instrument does not include questions about the presence or absence of the participants at the same bedroom during children sleep, the distance between the parents' and the children's bedrooms, if the bedrooms doors stayed opened or not during sleep time and the presence/absence of awake bruxism.

A possible reason for the difference of 17 participants answering 'no' to the general and 'yes' to the frequency-time question may be the misunderstanding of the term 'bruxism'—even with the prior explanation of its meaning. In addition, three parents refused to answer the questionnaire. This may be due to some participants prejudice against the term "bruxism", which radical is the same as the word in Portuguese *bruxaria*, which means 'witchcraft'. A mystical idea about bruxism etiology in children has already been observed in a part of Brazilian families by Serra-Negra et al.²⁶. On the other hand, the question involving tooth grinding or clenching noises with limited frequency and time is direct, easy to understand and free of any kind of prejudice.

It is already known that, in questionnaire based research, the families require greater clarifications about bruxism²⁶,

however it must be recognized that the instruments used for the evaluation of possible sleep bruxism require further studies and an urgent and specific validation.

CONCLUSIONS

In conclusion, the frequency-time question presented statistical significance with the associated items: age; sleep quality and parents/caregivers' perceptions of children's anxiety and irritability. Such associations did not happen when a general question about SB was applied. The agreement with other studies data suggests that asking a frequency-time question associated with noises during children sleep is a better choice than using a general question for parental report of SB in children.

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