

ORIGINAL ARTICLE

## ASSOCIATION OF PROBABLE SLEEP BRUXISM IN CHILDREN WITH STRESS AND QUALITY OF LIFE: Preliminary Cross-Sectional Study

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Highlights:

- (1) Probable sleep bruxism was not associated with stress in children.
- (2) Children with and without bruxism had similar impacts on their quality of life.
- (3) The most affected dimensions of quality of life were “family” and “function”.

ABSTRACT

**Aim:** This study aimed to investigate the association of probable sleep bruxism with stress and quality of life in children. **Methods:** A cross-sectional study was conducted with 117 children, aged 8-11 years, from public schools in São Luís, Maranhão, Brazil, from March to December 2019. A questionnaire with demographic and socioeconomic questions, aspects related to sleep bruxism, and deleterious oral habits was answered by parents. The children underwent clinical examination and then answered the Childhood Stress Scale and the *Autoquestionnaire Qualité de Vie Enfant Imagé* (AUQUEI). Data were subjected to descriptive, bivariate, and multivariate analyses (hierarchical Poisson regression models) at 5% significance level. **Results:** A brown race prevailed in the sample (70.1%). Probable sleep bruxism and stress were observed in 11.1% and 38.5% of the children, respectively. The “family” and “function” domains of AUQUEI were the most impaired (10,892.20 and 10,211.87, respectively), while probable sleep bruxism was not significantly associated with stress ( $p=0.293$ ). **Conclusions:** Based on these findings, it can be concluded that probable sleep bruxism was not associated with stress or a negative impact on children’s quality of life.

**Keywords:** sleep bruxism; psychological stress; quality of life; child.

### ASSOCIAÇÃO DO BRUXISMO PROVÁVEL DO SONO EM CRIANÇAS COM STRESS E QUALIDADE DE VIDA: ESTUDO TRANSVERSAL PRELIMINAR

RESUMO

O objetivo deste trabalho foi investigar a associação do PBS com estresse e qualidade de vida em crianças. Foi realizado um estudo transversal com 117 crianças, de 8 a 11 anos de idade, provenientes de escolas públicas de São Luís, Maranhão, Brasil, no período de março a dezembro de 2019. Um questionário com perguntas demográficas, socioeconômicas, de aspectos relacionados ao bruxismo do sono e hábitos bucais deletérios foi respondido pelos pais. As crianças foram submetidas a exame clínico e, em seguida, responderam à Escala de Stress Infantil (ESI) e ao Autoquestionnaire Qualité de Vie Enfant Imagé (AUQUEI). Os dados foram submetidos à análise descritiva, bivariada e multivariada (modelos de regressão de Poisson hierárquica), ao nível de significância de 5%. A raça parda prevaleceu na amostra (70,1%). O PBS foi observado em 11,1% das crianças e o estresse foi apresentado por 38,5% das crianças. Os domínios “família” e “função” do AUQUEI foram os mais comprometidos (10,89±2,20 e 10,21±1,87, respectivamente). O PBS não foi associado significativamente ao stress ( $p=0,293$ ). Com base nos achados, conclui-se que o provável bruxismo do sono não foi associado ao estresse e ao impacto negativo na qualidade de vida das crianças.

**Palavras-chave:** bruxismo do sono; estresse psicológico; qualidade de vida; criança.

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## INTRODUCTION

Probable sleep bruxism (PSB) is a parafunction characterized by repetitive masticatory muscle activity, which is diagnosed by the presence of characteristic signs (flat-face-type tooth wear that fits into the occlusal surfaces of antagonist teeth) and a positive report of teeth grinding sounds during sleep.<sup>1</sup> PSB is a condition of multifactorial etiology that involves biopsychosocial issues.<sup>2</sup> Additionally, psychological factors, such as stress, anxiety, and few personality traits (neuroticism, aggressiveness, perfectionism, and a great sense of responsibility), are strongly associated with the genesis of PSB.<sup>2,3-10</sup>

Stress can be perceived as a condition or feeling that arise from events that exceed the adaptive capacity of the individual, affecting ones responses to the situations experienced.<sup>11</sup> Stress can trigger changes in several bodily functions, including repercussions of the stomatognathic apparatus.<sup>12</sup> In general, common sense sees childhood as a worry-free phase, incompatible with a situation of excessive emotional tension. Thus, the lack of knowledge among parents, teachers and health professionals about childhood stress and its manifestations makes it difficult to develop an adequate assessment, contributing to the possibility of negative outcomes in children's health.<sup>13</sup>

A population-based case-control study of 8-year-old children reported that high levels of stress and a high degree of responsibility imposed on children are factors contributing to the development of bruxism.<sup>8</sup> Other studies have also verified the relationship between the occurrence of PSB and emotional factors that translate into stress in daily life, such as dealing with an accumulation of tasks, losses, expectations, self-image, self-esteem, anxiety, and conflicts in general.<sup>5,14</sup> According to a systematic review, stressed individuals are more likely to present with bruxism, especially when the stress involves emotional disturbances and occupational exposures (the social domain of stress arising from daily life events).<sup>15</sup> In addition to these factors, stress in children can have familial origins, especially maternal stress.<sup>16-18</sup>

The presence of PSB, in addition to causing direct damage to the stomatognathic system, can cause symptoms, such as orofacial pain, headache, and severe sleep disorders<sup>3</sup>, and compromise aspects of daily life involving function, emotion, and sociability.<sup>4,10,19</sup> A study conducted with Colombian children investigated the association between PSB and quality of life (QoL)<sup>20</sup>, and found the involvement of certain emotional aspects, such as "feeling afraid or being scared" and "problems sleeping," and school-related cognitive aspects, such as "forgetting things". The same characteristics were found in a study that described an anxious personality in children with bruxism<sup>5</sup>, suggesting that emotional symptoms are risk factors for PSB in children.

The *Autoquestionnaire Qualité de Vie Enfant Imagé* (AUQEI) is a tool used to assess the impact on children's quality of life. It can assess subjective well-being based on visual responses. The questionnaire is based on the perspective of the child's satisfaction reflected in images (facial expressions representing different emotional states) associated with various life domains (functions - questions related to activities at school and routine such as meals, bedtime, etc.; family - questions addressing the child's concept of their parents and themselves; leisure - questions related to vacation periods, birthdays and relationships with grandparents; and autonomy - questions related to the child's independence, relationships with peers and school performance).<sup>21</sup>

Although studies have shown an association between stress and QoL in children with PSB<sup>5,8,12,15,18,20</sup>, different methodologies, instruments, and evaluated variables still leave many questions about the associated factors with bruxism in children, demonstrating the need for further research to confirm these findings. Thus, this preliminary study aimed to investigate the prevalence of PSB and your association of with stress and QoL in children aged 8-11 years.

## METHODOLOGY

A cross-sectional study was conducted with 117 children, aged 8–11 years, from public schools in São Luís, Maranhão, between March and December 2019. This study was approved by the Research Ethics Committee of #2.994.621/2018.

To participate in the research, the children had to have a mixed dentition, with erupted first permanent molars, not be undergoing orthodontic treatment, not be having extensive carious lesions affecting the first permanent molars, not have severe malocclusion, not have systemic alterations that are related to the occurrence of bruxism, and not use medications that interfere with the central nervous system, such as anticonvulsants, antidepressants, and antipsychotics.

Calibration was performed for the clinical diagnosis of PSB-related tooth wear and consisted of a theoretical stage (discussion of diagnostic criteria and analysis of photographs, initial and reevaluation 14 days later) and a clinical stage (pilot study) with 10 children whose mouth reexamination occurred within a 14-day interval. Kappa statistics were used to measure the level of intra and inter-examiner agreement ( $K=0.81$  to  $0.90$  and  $0.79$  to  $0.85$ , respectively).

The children who participated in the study were from 5 municipal public schools in São Luís. After authorization by the Municipal Department of Education, these schools were randomly selected from a list of all the municipal public schools. The children were given an informed consent form along with the questionnaire to be answered by their guardians. The questionnaire contained sociodemographic questions (sex, age, race, and mother's level of education), economic questions (monthly family income), questions related to sleep bruxism (reports of tooth grinding during sleep and parents' teeth grinding habit), sleep-related aspects (whether children slept with their mouth open, tired, or with pain in the muscles when waking up, feel discomfort in the teeth on waking up, feel pain in or near the ear), and deleterious oral habits (biting nails or objects).

For the diagnosis of PSB, the criteria proposed by the international consensus for the evaluation of bruxism were: report of audible teeth grinding sounds during sleep along with clinical signs of occlusal surfaces depicting the flat-facing type of wear that occludes into the antagonist tooth surfaces.<sup>1</sup>

The children were examined in a private school room. The child was positioned facing the examiner, both seated, and the teeth were evaluated under artificial light using a head lamp (Petzl Zoom lamp, Petzl America, Clearfield, UT, USA) with the aid of a flat mouth mirror (Duflex, SS White, Rio de Janeiro, RJ, Brazil) and a ball tip explorer probe (WHO-621, Trinity, Campo Mourão, PA, Brazil). Personal protective equipment was used in this study.

Prior to oral evaluation, the teeth were dried with gauze and brushed in case of the presence of visible bacterial biofilm. The signs evaluated were wear facets on deciduous and permanent teeth (occlusal surfaces of antagonistic teeth characterized by flat and glossy faces that fit together).

To verify the existence of stress, the Childhood Stress Scale (CSS)<sup>22</sup> was used for children aged 6-14 years. This instrument is composed of 35 statements related to four dimensions of childhood stress: physical (items 2, 6, 12, 15, 17, 19, 21, 24, and 34), psychological (items 4, 5, 7, 8, 10, 11, 26, 30, and 31), psychological with a depressive component (items 13, 14, 20, 22, 25, 28, 29, 32, and 35), and psychophysiological (items 1, 3, 9, 16, 18, 23, 27, and 33). A five-point Likert-type response scale was recorded in quarter-circles according to the frequency with which the children experienced the symptoms pointed out by the statements. Each quarter-circle equals one point. The diagnosis of stress is based on the criteria that classify it into one of the four stages. A child is classified with significant signs of stress when completely filled (painted) circles appear on seven or more items of the total scale: in the alert phase with a total score of 39.60 to 59.50, in the

endurance phase with a total score of 59.50 to 79.40, in the near-exhaustion phase with a total score of 79.40 to 99.30, and in the exhaustion phase with a total score greater than 99.30. A total score of 0 to 39.59 indicates no stress. The scale was applied by a psychologist, D.S.M., immediately after the clinical examination.

To evaluate the impact of PSB on QoL, we used the scale of evaluation of QoL in children (Auto-questionnaire Qualité de Vie Enfant Imagé-AUQUEI), which is validated for the Brazilian Portuguese children aged 4-12 years.<sup>21</sup> This is a generic instrument that evaluates all the dimensions of QoL and can be used for healthy populations as well as for any clinical population, regardless of the type of medical condition. Moreover it is based on the child's point of view of satisfaction, visualized from four face pictures that express different emotional states (very unhappy, unhappy, happy, and very happy) and are associated with four life domains in the form of 26 questions (autonomy: questions regarding independence, relationships with peers, and evaluations; leisure: questions regarding vacations, birthdays, and relationships with grandparents; functions: questions regarding activities at school, meals, going to bed, going to the doctor, etc.; and family: questions regarding opinions about parental figures and their opinions about themselves). The response categories and their respective scores were very unhappy (0), unhappy (1), happy (2), and very happy (3), with a maximum score of 78 points. A score of < 48 is equivalent to impaired QoL and a score of ≥ 48 to unimpaired QoL. The scale was applied in an interview format immediately after the CSS application.

A descriptive analysis was performed to characterize the sample (sociodemographic and economic characteristics, PSB, sleep-related aspects, deleterious oral habits, stress, and child QoL). The chi-squared test was used to assess the association between childhood stress and PSB. The Mann-Whitney test was applied for the comparison of QoL between the groups (with and without bruxism; mean for domains and total score of the AUQUEI).

The possible explanatory variables for PSB were explored. Unadjusted and hierarchically adjusted Poisson regression analyses were performed to determine the strength of the associations between the independent variables and PSB. Exploratory variables with a p-value < 0.20 in the unadjusted analysis were incorporated into the adjusted model, and those with a p-value < 0.05 in each adjusted model were added to the next level. The hierarchical model presented six levels: children's characteristics (sex and age), parents' tooth grinding, sleep-related aspects (sleeps with mouth open, tired, or with pain in muscles on waking up; feeling discomfort in teeth on waking up; feeling pain in or near the ear), deleterious oral habits (nail biting and/or object biting), QoL (total AUQUEI score), and stress. The Poisson regression effect measure was the prevalence ratio with 95% confidence interval. Data were analyzed using SPSS (IBM SPSS Statistics for Windows, Version 21.0, IBM Corp, Armonk, NY, USA).

## RESULTS

Table 1 characterizes the sample according to the sociodemographic, economic, PSB, sleep-related, deleterious oral habits, stress, and QoL variables. The study sample mainly consisted of brown children (70.1%). The most prevalent maternal educational level was eight or more years of schooling (67.5%). PSB, deleterious oral habits, and stress were observed in 11.1%, 73.5%, and 38.5% of the children, respectively. The AUQUEI domains with the highest mean impact scores were "family" and "function" (35.62±4.77 and 10.89±2.20, respectively).

Table 1 – Sociodemographic, economic, probable sleep bruxism, sleep-related aspects, deleterious oral habits, stress and quality of life characteristics of the sample (n=117), São Luís, Brazil

Characteristics	n (%)
<b>Sex</b>	
Male	54 (46.2)
Female	63 (53.8)
<b>Age</b>	
8 years	31 (26.5)
9 years	23 (19.7)
10 years	39 (33.3)
11 years	24 (20.5)
<b>Race *</b>	
White	14 (12.0)
Black	16 (13.7)
Mestizo/Parda	82 (70.1)
Yellow	1 (0.9)
<b>Maternal education *</b>	
≥ to 8 years of study	79 (67.5)
< to 8 years of study	22 (18.8)
Unknown	2 (1.7)
<b>Monthly family income *</b>	
From 2 to less than 5 MW	3 (2.6)
Below 2 MW	86 (73.5)
Don't know	13 (11.1)
<b>Probable sleep bruxism</b>	
Yes	13 (11.1)
<b>Sleep related aspects*</b>	
Father/mother grind their teeth	14 (12)
Child sleeps with open mouth	54 (46.2)
Tired child with pain in the facial muscles on waking	14 (12)
Child feels discomfort in the teeth on waking up	17 (14.5)
Child has earache or near earache	28 (23.9)
<b>Deleterious oral habits**</b>	
Yes	86 (73.5)
<b>Stress – CSS</b>	
Present	45 (38.5)
<b>Quality of Life – AUQUEI</b>	<b>Mean (SD); Median; 25%-75%</b>
<b>Domains</b>	
Autonomy	7.86 (1.395); 8.00; 7.00-9.00
Leisure	10.21 (1.870); 10.00; 9.00-11.50
Function	10.89 (2.196); 11.00; 9.00-12.50
Family	35.62 (4.769); 36.00; 33.00-39.00
<b>Total score</b>	6.65 (2.175); 6.00; 5.00-8.00

\* Lost data

MW, Minimum wage; CSS, Childhood Stress Scale; AUQUEI, *Autoquestionnaire Qualité de Vie Enfant Imagé*; SD, Standard Deviation

\*\* Presenting at least one of the following habits: biting fingernails, biting objects, cheeks and lips; Autonomy domain: how you feel when you play alone, sleep away from home, friends talk about you, you are away from your family, and receive your grades? Leisure domain: how do you feel on your birthday, during vacations, and when you interact with your grandparents? Function domain: how do you feel at the table with your family, at night when you go to bed, when you go to sleep, in the classroom, and at a doctor's appointment? Family domain: how do you feel when you play with your siblings, think about your mother and father, your mother and father talk about you, and someone asks you to show them something you can do?

The distribution of PSB according to the stage of childhood stress is detailed in Table 2. PSB was not significantly associated with stress ( $p=0.293$ ). Among the phases of stress, the most prevalent was the alert phase, corresponding to 82.4% and 17.6% of children without and with bruxism.

Table 2 – Distribution of probable sleep bruxism according to the phases of the childhood stress scale (n=117), São Luís, Brazil

CSS	Probable sleep bruxismo		p*
	No n (%)	Yes n (%)	
No stress	66 (91.7)	6 (8.3)	0.293
Stress alert phase	28 (82.4)	6 (17.6)	
Stress resistance phase	9 (100)	0 (0)	
Near exhaustion phase of stress	1 (50)	1 (50)	
Stress Exhaustion Phase	0	0	

\*Test  $\chi^2$  for linear trend.

CSS, Childhood Stress Scale

There was no significant difference in the mean for the different domains and the total AUQUEI score between the groups with and without PSB. For children with PSB, the highest mean scores were for the function and family domains (Table 3).

Table 3 – Mean of domains and total score of the AUQUEI for the groups (with and without probable sleep bruxism) (n=117), São Luís, Brazil

Domains	Probable Sleep Bruxism		p*
	No	Yes	
<b>Autonomy</b>			
Mean (SD)	6.83 (2.216)	6.72 (2.085)	0.910
Median	6.50	7.00	
Percentile 25%–75%	5-9	5-8	
<b>Leisure</b>			
Mean (SD)	7.85 (1.350)	8.07 (1.242)	0.335
Median	8.00	9.00	
Percentile 25%–75%	7-9	7-9	
<b>Function</b>			
Mean (SD)	10.33 (1.703)	10.02 (2.116)	0.429
Median	11.00	10.00	
Percentile 25%–75%	9-11	9-12	
<b>Family</b>			
Mean (SD)	11.16 (1.982)	10.98 (2.198)	0.751
Median	11.00	11.00	
Percentile 25%–75%	10-12.75	10-13	
<b>Total score</b>			
Mean (SD)	34.99 (5.231)	34.64 (6.278)	0.864
Median	35.50	36.00	
Percentile 25%–75%	31–39	30–39	

SD: standard deviation; AUQUEI, *Autoquestionnaire Qualité de Vie Enfant Imagé*

\* Mann–Whitney test.

In the unadjusted regression model, the exploratory variables that were likely to explain the outcome (PSB) were father and mother grinding teeth (PR=2.017; 95% CI=1.233-3.301) and child feels discomfort in teeth when waking up (PR=2.066; 95% CI=1.286-3.318). In the adjusted regression model (model 4), PSB was not associated with any exploratory variable ( $p > 0.05$ ) (Table 4).



Table 4 – Hierarchical Poisson regression for independent explanatory variables for the outcome (probable sleep bruxism) (n=117), São Luís, Brazil

Independent variables Children's characteristics	UNADJUSTED MODEL			MODEL 1 G <sup>2</sup> = 3,426			MODEL 2 G <sup>2</sup> = 6,775			MODEL 3 G <sup>2</sup> = 10,354			MODEL 4 G <sup>2</sup> = 7,435		
	PR <sub>no-adjust</sub>	CI (95%)	p	PR <sub>adjust</sub>	CI (95%)	p	PR <sub>adjust</sub>	CI (95%)	p	PR <sub>adjust</sub>	CI (95%)	p	PR <sub>adjust</sub>	CI (95%)	p
<b>Sex</b>															
Female	1.071	0.675–1.701	0.770	0.406	0.133–1.240	0.114	0.338	0.084–1.367	0.128	0.321	0.111–0.934	0.037	0.416	0.138–1.256	0.120
Male	1			1			1			1					
<b>Age</b>															
8 years	0.845	0.454–1.571	0.594	0.355	0.035–3.564	0.379	0.710	0.047–10.669	0.805	0.325	0.040–2.663	0.295	0.358	0.037–3.474	0.375
9 years	1.148	0.624–2.112	0.656	1.801	0.337–9.622	0.491	3.338	0.425–26.218	0.252	1.592	0.358–7.078	0.541	1.830	0.349–9.590	0.474
10 years	0.559	0.281–1.114	0.099	1.814	0.400–8.223	0.440	3.247	0.458–23.026	0.239	1.349	0.345–5.277	0.667	1.901	0.462–7.818	0.373
11 years	1			1			1			1			1		
<b>Father/mother grinds teeth</b>															
Yes	2.017	1.233–3.301	0.005	---	---	---	0.965	0.108–8.581	0.974	---	---	---	---	---	---
No	1			---	---	---	1		---	---	---	---	---	---	---
<b>Sleep-related aspects</b>															
<b>Child sleeps with the mouth open</b>															
Yes	1.528	0.918–2.542	0.103	---	---	---	---	---	---	0.367	0.117–1.146	0.084	---	---	---
No	1			---	---	---	---	---	---	1		---	---	---	---
<b>Tired child or sore muscles on waking</b>															
Yes	1.659	0.971–2.835	0.064	---	---	---	---	---	---	0.662	0.089–4.942	0.687	---	---	---
No	1			---	---	---	---	---	---	1		---	---	---	---
<b>Child feels discomfort in the teeth on waking up</b>															
Yes	2.066	1.286–3.318	0.003	---	---	---	---	---	---	1.262	0.222–7.171	0.793	---	---	---
No	1			---	---	---	---	---	---	1		---	---	---	---
<b>Child has pain in or near the ear</b>															
Yes	1.560	0.954–2.550	0.076	---	---	---	---	---	---	1.751	0.464–6.611	0.408	---	---	---
No	1			---	---	---	---	---	---	1		---	---	---	---
<b>Deleterious oral habits</b>															
<b>Child bites fingernails</b>															
Yes	0.714	0.453–1.126	0.147	---	---	---	---	---	---	---	---	---	0.882	0.313–2.482	0.812
No	1			---	---	---	---	---	---	---	---	---	1		
<b>Child bites objects</b>															
Yes	1.667	1.067–2.604	0.025	---	---	---	---	---	---	---	---	---	0.700	0.178–2.756	0.700
No	1			---	---	---	---	---	---	---	---	---	1		
<b>AUQUEI (total score)</b>															
Yes	0.991	0.943–1.043	0.738	---	---	---	---	---	---	---	---	---	---	---	---
No	1			---	---	---	---	---	---	---	---	---	---	---	---
<b>STRESS</b>															
Yes	1.867	0.670–5.202	0.233	---	---	---	---	---	---	---	---	---	---	---	---
No	1			---	---	---	---	---	---	---	---	---	---	---	---

PR, Prevalence ratio; CI, Confidence interval; G<sup>2</sup> (likelihood-ratio chi-square)

## DISCUSSION

In this study, PSB had a prevalence of 11.1%, which was in agreement with the percentage reported in the previous literature.<sup>18,19,23</sup> Stress was observed in 38.5% of the samples. Few studies have shown that children with stress are more likely to exhibit PSB<sup>18,23-25</sup>, which was not observed in the present study because PSB was not significantly associated with stress ( $p=0.293$ ). Considering the phases of stress, most children with PSB were in the alert phase (46.2%). According to Lipp and Lucarelli<sup>22</sup>, this phase occurs when the organism mobilizes itself in the face of a stressful agent, reestablishing homeostasis; thus, no significant physical or psychological consequences are observed.

An integrative literature review found that of the instruments available to assess stress, the Child Stress Scale (CSS) was the most widely used to identify stress in children.<sup>26</sup> This instrument was used in the present study precisely because it is suitable for assessing the presence of stress in individuals aged between 6 and 14 (the research sample) and because it is simple, standardized, highly reliable, validated and easy to apply.<sup>22</sup>

Although few studies have shown an association between PSB and biting fingernails and biting habits<sup>8,18,23</sup>, this association was not found in the present study; however, 73.5% of children reported few of these habits. It should be noted that deleterious oral habits are usually related to a compensatory or escape mechanism through which children try to remedy their emotional and/or psychological problems (pressure, tension, frustration, insecurities, and anxiety).<sup>24</sup>

For research findings to be considered reliable, it is essential that validated instruments are applied. The CSS was the instrument used to assess stress in this study as well as in other previous research.<sup>18,25,27,28</sup> Ferreira-Bacci et al.<sup>28</sup> used this instrument to assess the association of PSB and behavioral problems and emotional stress in children, and suggested that the variables studied may be risk factors for PSB in children, thus drawing attention to the fact that higher the score on the CSS, the more significant are the physical and psychological manifestations of stress, including PSB.

Similar to stress, impairment of the QoL in children has been related to PSB.<sup>20</sup> QoL is a construct that refers to some characteristics of human experience that determine the subjective sense of well-being, and its assessment should involve aspects that extend beyond the medical issues, including lifestyle, community, and family life.<sup>21</sup> Previous studies have reported that the presence of PSB can compromise aspects of children's daily lives (functional, emotional, and social), impairing the QoL of children affected by this parafunction.<sup>3,4,10,19</sup>

In this study, the negative impact on children's QoL (mean scores below 48) was similar in the groups with and without PSB, corroborating the findings of Castelo et al.<sup>29</sup>. The most affected domains were "function" and "family," which are aspects related to school and medical activities, and the opinion of themselves and their parents.

Studies using other instruments to evaluate oral health-related QoL have verified a significant difference between children with and without bruxism. In a study performed by Carvalho et al.<sup>30</sup> in which the Child Perceptions Questionnaire for 11-14-year-old children (CPQ<sub>11-14</sub>) was used, it was found that children with bruxism, compared to those without bruxism, had a significantly higher impact by means of the total score and the "functional limitation" and "social well-being" domains. Another study carried out with Colombian children aged 6 to 13 years old, found a significant difference in the impact measured by the Pediatric Inventory of Quality of Life (PedsQL4.0TM) from the domains Emotional Function (items "feeling afraid or scared" and "problems sleeping") and School Function (item "forgetting things").<sup>20</sup> It is worth noting a trend of aspects related to school function as impact factors on QoL, regardless of the instrument used to assess this construct.



In this study, QoL was evaluated using the AUQUEI, which is a generic instrument that evaluates different dimensions of QoL, such as autonomy, leisure, functions, and family. It is indicated for all types of medical conditions and healthy populations.<sup>2</sup> This instrument was chosen because it has been validated in Brazilian Portuguese for use in children aged 4-12 years, which reduces the presence of biases.<sup>21</sup>

As for the diagnosis of bruxism, we used the criteria proposed by the international consensus for the evaluation of bruxism (report of audible sounds of tooth grinding during sleep along with clinical signs of occlusal surfaces depicting the flat-facing type of wear that occludes into the antagonist tooth surfaces) to overcome the limitation that may arise from the exclusive diagnosis based on parents' report.<sup>1</sup>

It is noteworthy that the strict use of the parents' report can introduce a measurement bias, since those responsible may not hear the teeth grinding sounds of their children, either because they sleep in different or distant rooms<sup>8</sup>, or because of deep sleep. Diagnosis based on clinical findings alone that is represented by dental wear would not always indicate a current history of bruxism and could, in fact, indicate a past history of this condition. It is also necessary to emphasize that in the case of children, especially younger ones, the frequency of teeth grinding could indicate bruxism in an initial phase in which it is not yet possible to identify dental wear.<sup>31</sup>

The limitation of the present study comes from the cross-sectional design, which does not allow the establishment of a cause-and-effect relationship. Thus, the factors investigated serve to demonstrate an association with PSB but do not explain this condition. Thus, new studies with longitudinal designs which are capable of investigating risk factors for PSB should be conducted. Furthermore, from this preliminary cross-sectional study it is not possible to infer the findings for the entire population of children in São Luís, since only children from public schools participated in the study.

## CONCLUSIONS

Based on the findings, it is concluded that:

- PSB was not associated with stress;
- It is likely that PSB negatively impacted the QoL of children in both groups, indicating that other factors, including oral factors, may be the real culprit for this impact;
- The data obtained serves as a basis for future studies; further research should be carried out in order to investigate the relationship between PSB and stress in children.

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