



Original Article

Quinteros Hinojosa, Mariela
 PhD in Dentistry, Universidad Mayor de San Simón (UMSS). Masters in Dental Sciences, Universidad Complutense de Madrid (UCM).

Diéguez Pérez, Montserrat
 PhD in Dentistry. Associate Professor, Faculty of Dentistry, Universidad Complutense de Madrid (UCM). Assistant Professor, Faculty of Biomedical and Health Sciences, Universidad Europea de Madrid.

Survey of the Potential Association of Childhood Sleep Disorders with Sleep Bruxism

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ABSTRACT

Objective: Conduct a pilot study of the association between parent-reported sleep bruxism (SB) and sleep disorders in children.

Material and methods: The presence of nocturnal tooth grinding or noise during sleep, clinical variables relating to potential temporomandibular disorders, and various behaviors observed during sleep were evaluated along the previously validated Sleep Disturbance Scale for Children (SDSC) developed by O Bruni et al. Data for the study were collected using a Likert-type rating scale questionnaire given to 43 parents accompanying their children to a pediatric dentistry clinic in the Community of Madrid.

Results: Parent-reported SB in children showed a higher positive correlation with sleep disorders (60%) when compared to levels in children whose parents did not report any presence of SB (40%); a statistically significant result ($p=0.000$). Among the various sleep disorders evaluated, the two showing an association with reported sleep bruxism were sleep-wake transition disorders ($p=0.00$) and respiratory sleep disorders ($p=0.01$)

Conclusions: Some sleep disorders in children may be associated with the presence of sleep bruxism.

KEYWORDS

Bruxism; Sleep bruxism; Childhood sleep disorders; Sleep.

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Correspondence address:

Mariela Quinteros Hinojosa

C./Pintor Velázquez, 17,
 Móstoles P.7A
 28933 Madrid, Spain
 Phone: 635715130
 e-mail: marielaq@ucm.es

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INTRODUCTION

The definition of sleep bruxism varies in the professional literature¹⁻⁵. An international consensus of experts on the subject define SB as: “A repetitive jaw-muscle activity characterized by clenching or grinding of the teeth and/or by bracing or thrusting of the mandible”. Bruxism has two distinct circadian manifestations: it can occur during sleep (indicated as sleep bruxism) or during wakefulness (indicated as awake bruxism)³.

Estimating the prevalence of this behavioral alteration is made more difficult by variance in the strategies used for diagnosis and the type of study population. According to a number of researchers, its prevalence is higher during childhood and decreases with age⁶.

Following a systematic review of parent-reported SB through the use of questionnaires found its prevalence among children aged 2 to 12 y/o could range anywhere from 3.5 to 40.6%⁷.

The etiology of sleep bruxism (SB) is multifactorial. Peripheral or morphological factors, such as occlusal interference, have been considered to be the main factors causing bruxism. However, today the evidence is less convincing^{5,8-10}. Currently, the focus of research concerns the core contributing factors, which may be physiological and/or psychological; namely, sleep architecture, psychosocial factors, trauma, diseases that alter the central nervous system, and the effects of certain drugs⁸⁻⁹.

Sleep disturbances are reported in 25-40% of preschool and school-age children. SB may be comorbid with alterations in sleep architecture and form part of a sleep transition stage called micro-arousals, in which sudden changes in sleep depth occur and the individual transitions to a lighter sleep stage. This sleep stage in this case is accompanied by sudden body movements, increased heart rate, respiratory changes, peripheral vasoconstrictions, and increased muscle activity. Sleep bruxism manifests as an intensification in the frequency and strength of natural orofacial activity during sleep, referred to as rhythmic masticatory muscle activity (RMMA)^{6,8,11-15}.

The use of retrospective questionnaires in this study provides information that supports an additional field of research centering on the etiopatogenia of childhood SB, which would help establish protocols for the prevention and management of this behavioral alteration. Consequently, the objective of this study was to examine the association between parent-reported sleep bruxism and various sleep disorders in children.

MATERIALS AND METHODS

An observational, descriptive cross-sectional pilot study was conducted at a pediatric dentistry clinic following approval by the ethics committee and with the informed consent of the child’s parent or guardian. The sample consisted of 43 children aged 6-12 who met the selection criteria. Participation in the study was voluntary, and the privacy and confidentiality of the data obtained during the study was safeguarded at all times in conformity with the terms established under Spanish data protection legislation (Organic Law 15/1999).

The questionnaire collected data on patient affiliation, age and gender, general health status, clinical data related to temporomandibular disorders (such as headaches in the temporomandibular region), the presence of joint noises or clicking, and limitations in jaw aperture¹⁶. Based on parental reports, the presence of potential sleep bruxism was assessed according to the Lobbezoo et al. diagnostic classification scheme³. Lastly, parents or guardians responded to questions on the Sleep Disturbance Scale for Children (SDSC) (O. Bruni et al.)¹⁷, designed to identify sleep disorders in children (Figure 1). The scale was used to investigate the occurrence of sleep disorders over the prior six months. It contains 26 items designed to assess six types of behavioral sleep disorders, including: Disorders of Initiating and Maintaining Sleep (DIMS), Respiratory Sleep Disorders (RSD), Disorders of Arousal (DOA), Sleep-Wake Transition Disorders (SWTD), Excessive Sleepiness (ES) and Night Sweats (Sleep Hyperhidrosis, SHY)¹⁷⁻¹⁹.

A. BRUNI SLEEP DISTURBANCE SCALE FOR CHILDREN (SDSC)

This questionnaire will allow your doctor to gain a better understanding of your child's sleep-wake ratio and of any potential problems in their sleep behavior. Try to answer all questions. Consider each question in terms of only the last 6 months in your child's sleep behavior. Please answer each question by circling or crossing out the numerical score you assign.

Name: _____ Age: _____ Date: _____

1. How many hours does your child manage to sleep most nights?	1 9-11 hours	2 8-9 hours	3 7-8 hours	4 5-7 hours	5 Less than 5 hours
2. How long after going to bed does your child usually fall asleep?	1 Less than 15'	2 15-30'	3 30-45'	4 45-60'	5 Less than 60'

	5 siempre (diario)				
	4 Often (3 to 5 times per week)				
	3 Sometimes (1 or 2 times per week)				
	2 Occasionally (once or twice a month or less)				
	1 Never				
3. The child goes to bed in a bad mood	1	2	3	4	5
4. The child has difficulty falling asleep at night	1	2	3	4	5
5. The child feels anxiety or is afraid of falling asleep	1	2	3	4	5
6. The child is startled or parts of their body jerk when falling asleep	1	2	3	4	5
7. The child engages in repetitive movements, such as head-rolling to fall asleep	1	2	3	4	5
8. The child lives out dream sequences when falling asleep	1	2	3	4	5
9. The child sweats profusely while falling asleep	1	2	3	4	5
10. The child wakes up more than twice at night	1	2	3	4	5
11. After waking up at night, the child has difficulty falling asleep again	1	2	3	4	5
12. The child experiences frequent leg contractions or jerking while sleeping, or often changes position at night, or kicks the bed sheets	1	2	3	4	5
13. The child experiences difficulty in breathing during the night	1	2	3	4	5
14. The child gasps for breath or is unable to breathe during sleep	1	2	3	4	5
15. The child snores	1	2	3	4	5
16. The child sweats profusely at night	1	2	3	4	5
17. You have observed your child to sleepwalk	1	2	3	4	5
18. You have observed your child to sleep-talk	1	2	3	4	5
19. The child grinds their teeth during sleep	1	2	3	4	5
20. The child wakes from dreams screaming or confused	1	2	3	4	5
21. The child has nightmares they do not remember the next day	1	2	3	4	5
22. The child is difficult to wake up in the mornings	1	2	3	4	5
23. The child wakes up feeling tired in the morning	1	2	3	4	5
24. The child feels unable to move when waking up in the morning	1	2	3	4	5
25. The child experiences daytime sleepiness	1	2	3	4	5
26. The child suddenly falls asleep at inappropriate moments	1	2	3	4	5
Difficulty initiating or remaining asleep (add up scores for items 1,2,3,4,5,10,11)					
Respiratory sleep disorders (add up scores for items 13,14,15)					
Awakening disorders (add up scores for items 17,20,21)					
Sleep-wake transition disorders (add up scores for items 6,7,8,12,18,19)					
Excessive sleepiness disorders (add up scores for items 22,23,24,25,26)					
Sleep hyperhidrosis (add up scores for items 9,16)					
Total score (add up scores for items for all 6 factors)					

A S

Figure 1. O. Bruni et al.¹⁷ Sleep Disturbance Scale for Children (SDSC).

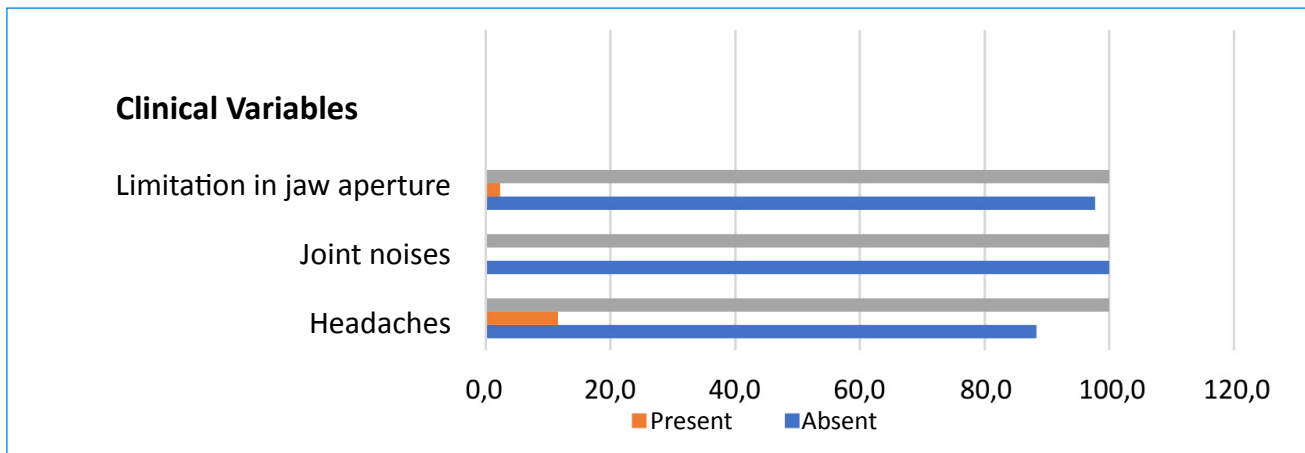


Figure 2. Clinical variables related to temporomandibular disorders.

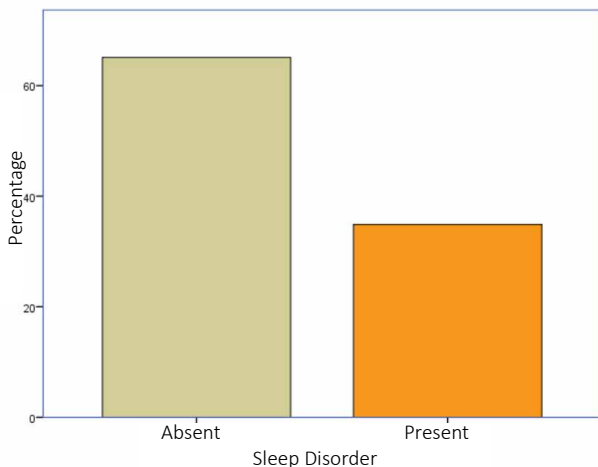


Figure 3. Assessment of sleep disorders on the SDSC scale.

bruxism is a multifactorial disorder, two secondary variables were also evaluated that are evidentially related to the etiology of SB and which we believe could be present in our study population, such as passive smoking and the occurrence of parental SB.

The SPSS application for Windows (v20) was employed to conduct the statistical analysis, split into an initial descriptive analysis and an inferential statistical analysis, where 2 x 2 contingency tables were created to cross-tabulate the qualitative variables using the CROSSTABS function in SPSS. A chi square test and Fisher's Exact Test were used to gauge the independence or dependence between variables. The Phi coefficient was used to measure the strength of the association between the

two binary variables, with $p < 0.05$ taken as the minimum measure for statistical significance.

RESULTS

In terms of the traits of the sample population, the mean age was 9 y/o, 69.8% female and 30.2% male.

The frequency of parent-reported sleep bruxism was 25.6% among all parents. The frequency of clinical variables related to temporomandibular disorders was higher in the case of headaches (11.6%), followed by limitation in jaw aperture (2.3%), with joint noise or audible clicking not reported by any participants (Figure 2).

Regarding assessment of sleep disorder, 34.9% had a score indicative of a sleep disorder (Figure 3). The most common disorders in the study population were sleep-wake transition disorders (53.5%), followed by sleep onset and maintenance disorders (44.2%). Respiratory sleep disorders (39.5%) were less commonly present, followed by excessive sleepiness disorders (34.9%), sleep hyperhidrosis (32.6%) and waking disorder in only (25.6%) of cases (Figure 4).

With regard to inferential analysis, the association between potential parent-reported SB and the presence of sleep disorders was statistically significant ($p = 0.000$). However, the strength of association was measured using the Phi coefficient, with results of 5.77 being indicative

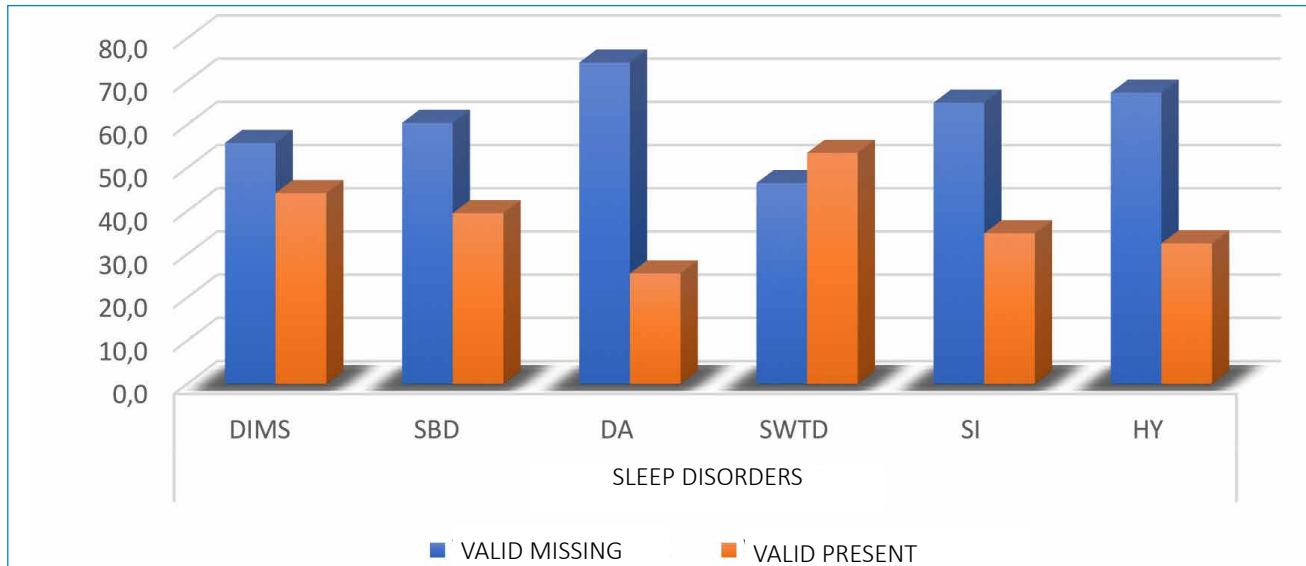


Figure 4. Evaluation of various sleep disorders on the SDSC scale.

of a moderate association. Regarding the association of SB and the various sleep disorders evaluated, only the association of sleep-wake transition disorders and respiratory sleep disorders were found to be statistically significant in both cases ($p=0.00$ and $p=0.01$, respectively). The strength of the association measured with the phi coefficient with respect to respiratory sleep disorders was 3.98, indicating a weak association, and 5.47 in the case of sleep-wake transition disorders, indicating a moderate association (Figure 5).

With respect to the secondary variables evaluated, measures of passive smoking and sleep bruxism in parents were low in frequency and their association with SB was not significant.

DISCUSSION

Given the studies finding that SB episodes can be associated with micro-arousal in 86% of cases^{6,8}, SB can be comorbid with poor sleep quality, manifesting itself as an intensification of orofacial activity (RMMA) in terms of frequency and strength during sleep, falling within the scope of pathology.

Regarding the association between the presence of sleep disorders and parent-reported SB, in his study

on the prevalence and risk factors of SB in infant population, Ferreyra obtained statistically significant results ($p<0.01$) involving children with sleep disorders²⁰. In a systematic review evaluating the risk factors associated with SB, Clastroflorio et al. found that children with sleep disorders were more likely to have SB²¹. These results are considered similar to those obtained in our study, showing a statistically significant relationship between sleep disorders and parent-reported potential SB.

Regarding the evaluation of various sleep disorders using the SDSC scale and their association with SB, while no studies were found that use the same scale to assess various sleep disorders in child populations, certain sleep behaviors relating to each disorder on the scale can be compared to different studies. This study found a significant association between SB and sleep-wake transition disorders and respiratory sleep disorders. Similarly, Restrepo et al.¹⁴ used the child sleep habit questionnaire (CSHQ) and observed that sleep anxiety and sleep breathing disorders increased with the frequency of parent-reported SB in a statistically significant manner ($p<0.05$). Tachibana et al.²² mention in their study that sleep bruxism shows direct correlations with child sleep behaviors described as “moves a lot during sleep”, “sleeps with mouth open”, and “snore heavily”. Such sleep behaviors are

Inferential Statistics	Sleep Disorder	Sleep Bruxism				Total	Test
		Presence		Absence			
		N	%	N	%		
DIMS (Disorders of Initiating and Maintaining Sleep)	Presence	7	63.6	12	37.5	19	F=0.17
	Absence	4	36.4	20	62.5	24	P>0.05
SBD (Respiratory Sleep Disorders)	Presence	8	72.7	9	28.1	17	F=0.43
	Absence	3	27.3	23	71.9	26	P<0.05
							C. Phi =3.98
DOA (Disorders of Arousal)	Presence	4	36.4	7	21.9	11	F= 0.43
	Absence	7	63.6	25	78.1	32	P>0.05
SWTD (Sleep–Wake Transition Disorder)	Presence	11	100	12	37.5	23	F=0.00
	Absence	0	0.0	20	62.5	20	P<0.05
							C. Phi =5.47
ES (Excessive Sleepiness)	Presence	3	27.3	12	37.5	15	F=0.71
	Absence	8	72.7	20	62.5	28	P>0.05
SHY (Sleep Hyperhidrosis)	Presence	6	54.5	8	25.0	14	F=0.13
	Absence	5	45.5	24	75.0	29	P>0.05
	Total	11		32			

The value shown for (F) corresponds to Fisher's Exact Test.

Figure 5. Association of parent-reported SB with various sleep disorders.

similar to those found in our study pertaining to sleep-wake transition disorders and hypervigilance (the child startles or jerks parts of their body during sleep) and respiratory sleep disorders, such as difficulty breathing, gasping, and the presence of snoring during sleep.

The interpretation of our study findings is limited by the lack of a definitive diagnosis of SB, which can be only be determined with a polysomnography exam, considered to be the gold standard for sleep bruxism diagnosis. High financial cost, time limitations, and the need for sophisticated technical equipment, together with an unknown laboratory environment and difficulties in its use with children limit its use as a routine diagnosis.

Thus, the data obtained in this pilot study allow us to assess the use of other tools employed in clinical situations and propose new lines of research in the etiopatogenia of sleep bruxism in children.

CONCLUSIONS

There exists a statistically significant strength of association between parentally assessed sleep disorders and parent-reported sleep bruxism. Behaviors associated with sleep-wake transition disorders and respiratory sleep disorders may also be associated with sleep bruxism in children.



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