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ORIGINAL ARTICLE

Prevalence and Risk Factors of Bruxism in a Selected Population of Iranian Children

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ABSTRACT

Objective: To investigate the prevalence of bruxism in Iranian children aged 6 to 12 years. **Material and Methods:** This cross-sectional study was conducted on 600 schoolchildren aged 6-12 years. The questionnaire consisted of two sections: the first section included demographic information, while the second evaluated the occurrence of bruxism. Kruskal-Wallis, Chi-Square, Fisher and Multinomial logistic regression were used. A level of $p<0.05$ was considered statistically significant. **Results:** 698 questionnaires were distributed, of which 600 participants were returned. According to Multinomial logistic regression, awake bruxism was associated significantly with the following variables: age, sequence of birth, recurrent headache, gastrointestinal disease, nasal obstruction, neurological disorder, easy child crying, sleep disorders, talking in a dream and snoring and jaw disorder. Sleep bruxism was associated significantly with age, premature birth, allergy, gastrointestinal disease, drooling, mouth breathing, nasal obstruction, oral habit, nail biting, sleep disorder, jaw disorders, and family history. **Conclusion:** Pre-birth and post-birth factors play an important role in the prevalence of bruxism in society. It is possible to prevent complications of bruxism by informing parents and making a timely diagnosis. Parents should be aware of this occurrence to reduce possible related factors to teeth and the masticatory system.

Keywords: Parasomnias; Sleep Bruxism; Pediatric Dentistry; Epidemiologic Methods.

Introduction

Bruxism is generally defined as regular or phasic masticatory muscle movement separate from functional activities and considered as parafunctional action. According to the International Classification of Headache Disorders, primary bruxism concentrates on individual clinical consequences. Secondary bruxism usually has a specific cause. For instance, multisystem atrophy, primary dystonia, Down syndrome, Parkinson's disease, autistic spectrum disorders, Hutchinson disease, and other primary diseases can be a secondary mark of hyperkinetic movement disorders. Secondary bruxism can even reveals as the first disease [1].

In other classification, bruxism has two types. Type one is known as awake or diurnal bruxism. Type two, which causes at night or during sleep, is named sleep bruxism. Advancement of this adverse disorder does not differentiate gender, age or culture [2]. According to a recent systematic review, the prevalence of sleep bruxism in children ranges from 3.5 to 40.6%. The prevalence of bruxism is highest in children (14-18%), gradually decreasing with age (3% in the elderly) [3]. A study in children stated a higher occurrence of bruxism (51.3%) in children in which one of the parents stated a past history of sleep bruxism (30.6%) [4]. The main cause of bruxism has not yet been determined, but this disorder is multifactorial. Systemic, local, emotional and genetic factors are some etiological factors related to bruxism. Emotional problems are associated with stress and anxiety [5]. Several psychological personalities that have been stated in persons with bruxism, such as anxiety personality traits, have been related to the rs6313 polymorphism of the 5HT2A gene. One of the reasons for the development of sleep bruxism is the DRD1 rs686 polymorphism; the rs6313 HTR2A SNP is involved in the pathogenesis of sleep bruxism [6].

Bruxism has no definite symptoms, but pressing the teeth together can affect the surface of the teeth and damage the enamel. Removing dental enamel increases the sensitivity of the teeth, causing cracking and even fracture. In posterior teeth, sometimes, the cusp of the teeth is damaged [7]. Other symptoms such as headache, toothache, tooth decay, gingival recession, neck pain, insomnia, pain in the cheek area, otitis, jaw opening and severe tooth sensitivity sometimes may be detectable [8].

In this study, all everyday life factors that could cause stress for the child were investigated. Early diagnosis of bruxism prevents important complications that may affect teeth, occlusion, and TMJ disorders. Furthermore, clinicians who routinely treat children and adolescents are often questioned about the cause and prevalence of bruxism. Therefore, the cause and prevalence of bruxism are very important issues that clinicians should be well aware. Moreover, the awareness of parents regarding the side effects of bruxism makes them motivated to attend follow-up visits. Therefore, this study aimed to investigate the prevalence and possible factors of bruxism affecting 6-12-year children.

Material and Methods

Study Design and Ethical Clearance

This study was a cross-sectional descriptive-analytical study. The statistical population was students in Kerman elementary schools. The questionnaire was anonymous, and all patient demographic information was kept private. The purpose of the study was clearly explained to the parents. They voluntarily participated in the study and signed a written consent form. Study participants were free to withdraw from answering the questionnaire at any stage. This project was approved by the Ethics Committees of Kerman University of Medical Sciences under the code IR.KMU.REC.1394.658.

Sampling

In the population of this study, the statistical confidence of 95% (z = 1.96) and accuracy of 5%, and frequency of 38% were applied. According to a previous study [9], the sample size was calculated at 673 persons, which was determined by considering a 10% loss and the effect of a 1.5 multistage sampling design on 600 individuals. Method of calculating and analysing data to achieve project goals:

$$n = \frac{z^2_{1-\alpha/2} \times p \times (1-p)}{d^2}$$

The subjects included 600 Kerman elementary school students. Ten elementary schools in District 1 (5 girls' schools and 5 boys' schools) and ten schools in District two (5 girls' schools and 5 boys' schools) were randomly selected and 30 students were selected from each school. A stratified random sampling was used. The exclusion criteria were children with an orthodontic appliance, a history of obstructive sleep apnea, common cold, severe malocclusion, autism, intellectual retardation, cerebral palsy, epilepsy or who were taking medications that could affect sleep movement and children whose parents were illiterate.

Data Collection

Initially, a letter was distributed to selected parents of children in the age group of 6-12 years. Before completing the questionnaire, the purpose of the study was explained to parents and also a letter was sent to them and explained about the early diagnosis and management of bruxism so the chance of bias was reduced. Finally, to confirm the diagnosis of bruxism, an examination was performed on children with bruxism.

A researcher-made self-administered questionnaire was used in this study, which was prepared based on a structured literature review [3]. The questionnaire consisted of two general sections. The first section included demographic information such as age, sex, number of children, parental education, parental occupation, parental smoking, and medical history of the child (allergy, recurrent otitis, asthma, recurrent headache, neurological disorder, gastrointestinal disease or nasal obstruction and tonsils the child starts school, family history of bruxism, temporomandibular joint (TMJ) disorder, parasomnia, oral habits such as nail biting and thumb or lip sucking and psychologic disorders. TMJ disorders include pain when opening the mouth, restriction of the mouth opening and pain in the jaw. Factors associated with psychologic disorders include susceptibility, anxiety, easy crying, staring at a point, hyperactivity, obsession, isolation, depression, phobia and ultimately common parasomnia factors, including sleep speaking, sleep walking, bedtime wetness, excessive daytime sleepiness, abdominal colic, drooling, oral respiration and night snoring.

To evaluate the reliability of the questionnaire, in a pilot study, it was distributed among 12 parents and Cronbach's alpha coefficient of 0.61 was calculated. The face and content validity of the questionnaire was evaluated by a group of dental experts. The face validity was confirmed. Two items were eliminated and five items were corrected; the remaining items were deemed very appropriate. Finally, the content validity index (CVI) of the questionnaire was calculated as optimal. Questionnaires were distributed by a dental student, properly familiar with the procedures during the evaluation of validity and reliability.

Data Analysis

Data were analysed by SPSS version 19.00 software (SPSS Inc., Chicago, IL, USA). Relative frequency, mean and criterion were used to describe the data. A level of $p<0.05$ was considered as statistically significant. For analysing data Kruskal-Wallis, Chi-Square, Fisher and Multinomial logistic regression were used.

Results

In this study, 698 questionnaires were distributed among the parents of students, of which 600 were returned (response rate = 85.9). The participants included: 327 (54.5%) males and 273 (45.5%) females. The mean age of participants was 9.18 years, with a standard deviation of 1.81 and a range of 6 to 12 years. The average age of bruxism beginning in our study is 8.5 years. Table 1 shows the demographic information of the participating students.

The prevalence of bruxism in this study was 16.2% (n=97), 15.8% (n=43) for girls, and 16.5% (n=54) for boys. Table 1 compares the frequency of sleep and awake bruxism based on demographic variables.

Table 1. Sample distribution according to the occurrence of bruxism.

Variables	Categories	Bruxism			p-value
		Sleep N (%)	Awake N (%)	No N (%)	
Age (Mean±SD)		8.71±2.09	10.18±1.77	9.19±1.83	0.03
Birth Rank	I	50 (14.60)	5 (1.50)	287 (83.90)	0.16
	II	25 (13.50)	3 (1.60)	157 (84.90)	
	III	8 (14.80)	1 (1.80)	45 (83.40)	
	IV	0 (0.00)	2 (11.80)	15 (88.20)	
Family History	Yes	21 (31.30)	2 (3.00)	44 (65.70)	<0.001*
	No	63 (11.80)	9 (1.70)	461 (86.50)	
Premature Birth	Yes	10 (23.80)	2 (4.80)	30 (71.40)	0.04*
	No	74 (13.30)	9 (1.60)	475 (85.10)	
Allergy	Yes	23 (18.70)	3 (2.40)	97 (78.90)	0.20
	No	61 (12.80)	8 (1.70)	406 (85.50)	
Drooling	Yes	7 (35.00)	1 (5.00)	12 (60.00)	0.01*
	No	77 (13.30)	10 (1.70)	493 (85.00)	
Breathing through the Mouth	Yes	9 (25.00)	3 (8.30)	24 (66.70)	0.001*
	No	75 (13.30)	8 (1.40)	481 (85.30)	
Nasal obstruction	Yes	9 (25.70)	3 (8.60)	23 (65.70)	0.003*
	No	75 (13.30)	8 (1.40)	482 (85.30)	
Repeated Headache	Yes	1 (11.10)	1 (11.10)	7 (77.80)	0.17
	No	83 (14.00)	10 (1.70)	498 (84.30)	
Gastrointestinal Disorder	Yes	3 (42.80)	1 (14.40)	3 (42.80)	0.01*
	No	81 (13.60)	10 (1.70)	502 (84.70)	
Jaw Disorder	Yes	4 (44.50)	2 (22.20)	3 (33.30)	<0.001*
	No	80 (13.60)	9 (1.50)	502 (84.90)	
Oral Habits	Yes	25 (21.00)	4 (3.40)	90 (75.60)	0.01*
	No	59 (12.30)	7 (1.40)	415 (86.30)	
Nail Chewing	Yes	20 (20.60)	3 (3.10)	74 (76.30)	0.06
	No	64 (12.70)	8 (1.60)	431 (85.70)	
Nervous Disorder	Yes	25 (16.40)	6 (3.90)	122 (79.70)	0.04*
	No	59 (13.20)	5 (1.10)	383 (85.70)	
Sleep Disorder	Yes	16 (25.00)	4 (6.20)	44 (68.80)	<0.001*
	No	68 (12.70)	7 (1.30)	461 (86.00)	
Talking in a dream	Yes	9 (23.70)	2 (5.30)	27 (71.00)	0.04*
	No	75 (13.40)	9 (1.60)	478 (85.00)	
Easy child crying	Yes	17 (18.50)	5 (5.40)	70 (76.10)	0.006*
	No	67 (13.20)	6 (1.20)	435 (85.60)	
Walk in the dream	Yes	2 (18.20)	1 (9.10)	8 (72.70)	0.16
	No	82 (13.90)	10 (1.70)	497 (84.40)	
Snore	Yes	3 (23.10)	2 (15.40)	8 (61.50)	0.006*
	No	81 (13.80)	9 (1.50)	497 (84.70)	

SD: Standard Deviation; *Statistically Significant.

Table 2 analyzes the relationship between awake bruxism, sleep bruxism, no bruxism, and variables. After selecting variables with a p-value less than 0.2 in the univariate model, a multivariate logistic regression model was fitted to the data.

Table 2. Multinomial logistic regression for bruxism categories

Variables		Bruxism			
		Awake		Sleep	
		POR (%95 CI for POR)	p-value	POR (%95 CI for POR)	p-value
Age		1.36 (0.95-1.94)	0.09*	0.87 (0.77-0.98)	0.03**
Birth Rank		1.73 (0.92-3.23)	0.08*	0.85 (0.62-1.18)	0.34
Premature Birth	Yes	3.51 (0.72-17.01)	0.11	2.14 (1.01-4.56)	0.05*
	No	1			
Allergy	Yes	1.57 (0.41-6.05)	0.50	1.58 (0.93-2.69)	0.08*
	No	1		1	
Repeated Headache	Yes	7.11 (0.79-63.36)	0.08*	0.85 (0.10-7.05)	0.88
	No	1		1	
Gastrointestinal Disorder	Yes	16.73 (1.60-175.13)	0.01**	6.20 (1.23-31.23)	0.02**
	No	1		1	
Drooling	Yes	4.10 (0.48-34.70)	0.19	3.73 (1.42-9.78)	0.007***
	No	1		1	
Breathing through the Mouth	Yes	7.51 (1.87-30.13)	0.004***	2.40 (1.07-5.37)	0.03**
	No	1		1	
Nasal Obstruction	Yes	7.86 (1.95-31.59)	0.004***	2.51 (1.12-5.64)	0.02**
	No	1		1	
Oral Habits	Yes	2.63 (0.75-9.19)	0.13	1.95 (1.16-3.28)	0.01**
	No	1		1	
Nail Biting	Yes	2.18 (0.56-8.42)	0.25	1.82 (1.04-3.18)	0.03**
	No	1		1	
Nervous disorder	Yes	3.76 (1.13-12.56)	0.03**	1.33 (0.80-2.21)	0.27
	No	1		1	
Easy Child Crying	Yes	5.18 (1.54-17.42)	0.008***	1.57 (0.87-2.84)	0.13
	No	1		1	
Sleep Disorder	Yes	5.98 (1.68-21.25)	0.006***	2.46 (1.31-4.61)	0.005***
	No	1		1	
Talking in a Dream	Yes	3.93 (0.81-19.11)	0.09*	2.12 (0.96-4.69)	0.06*
	No	1		1	
Walk in the Dream	Yes	6.21 (0.71-54.47)	0.10	1.51 (0.31-7.26)	0.60
	No	1		1	
Snore	Yes	13.80 (2.56-74.36)	0.002***	2.30 (0.60-8.85)	0.22
	No	1		1	
Jaw Disorder	Yes	37.18 (5.52-250.30)	<0.001***	8.36 (1.84-38.08)	0.006***
	No	1		1	
Family History	Yes	2.39 (0.50-11.40)	0.27	3.58 (1.99-6.42)	<0.001***
	No	1		1	

*Sig<0.1, **Sig<0.05; ***Sig<0.01; POR: Prevalence Odds Ratio; CI: Confidence Interval; Goodness of fit test' sig<0.001.

Table 3 shows multinomial logistic regression for three category bruxism (multiple results). Results interpreted as follows: age was a variable that only affected the child's sleep bruxism, and as the age increased, the chance of bruxism decreased to 0.85. Opposing to age, the birth rate only affected awake bruxism; for every one year of age, the odds of bruxism prevalence increased by 2.09 times. Jaw dysfunction was a variable that affected both awake and sleep bruxism. The chance of awake bruxism prevalence for children with jaw disorder was 45.50 times higher than for children who did not have jaw disorder. On the other hand, this chance for sleep bruxism was 8.87 times. Finally, the gastrointestinal disorder was similar to a jaw disorder that affected both awake and sleep bruxism.

Table 3. Multinomial logistic regression for bruxism categories.

Variables		Bruxism			
		Awake		Sleep	
	Categories	POR (%95 CI for POR)	p-value	POR (%95 CI for POR)	p-value
Age		1.28 (0.87-1.88)	0.20	0.85 (0.75-0.98)	0.02**
Birth Rank		2.39 (1.10-5.21)	0.02**	0.92 (0.65-1.31)	0.67
Jaw Disorder	Yes	45.50 (4.07-508.78)	0.002***	8.87 (1.82-43.25)	0.007***
	No	1		1	
Premature Birth	Yes	3.26 (0.39-26.91)	0.27	2.15 (0.96-4.83)	0.06*
	No	1		1	
Gastrointestinal Disorder	Yes	78.23 (4.96-123.73)	0.002***	7.79 (1.46-41.38)	0.01**
	No	1		1	
Breathing through the Mouth	Yes	12.00 (2.33-61.90)	0.003***	2.03 (0.84-4.85)	0.11
	No	1		1	
Sleep Disorder	Yes	3.83 (0.85-17.28)	0.08*	2.06 (1.03-4.15)	0.04**
	No	1		1	
Easy Child Crying	Yes	7.81 (1.72-35.41)	0.008**	1.37 (0.72-2.60)	0.33
	No	1		1	
Family History	Yes	1.78 (0.28-11.26)	0.53	2.93 (1.57-5.48)	0.001***
	No	1		1	

*Sig<0.1; **Sig<0.05; ***Sig<0.01; POR: Prevalence Odds Ratio; CI: Confidence Interval; Goodness of fit test' sig<0.001.

The odds of awake bruxism prevalence for children with gastrointestinal disorders were 78.23 times that of children who did not have a gastrointestinal disorder. On the other hand, the odds of sleep bruxism prevalence for children with gastrointestinal disorders were 7.79 times higher for children who did not have gastrointestinal disorders. Regarding the oral respiratory factor, it had a significant effect only on children with awake bruxism. Awake chances of bruxism for children who breathe through the mouth were 12 times higher than for other children. It is for children who do not have this disorder. Sleep disorder was the only factor affecting sleep bruxism. The chance of sleep bruxism prevalence for children with sleep disorders was 2.06 times that of children who did not have sleep disorders. Easily crying of the child was like a breath through the child that only affects children with awake bruxism. The chances of awake bruxism prevalence for children who cry easily were 7.81 times that of other children. Concerning family history, like sleep disorder, it only had a significant effect on children's sleep bruxism. The implication was that the odds of sleep bruxism prevalence for children with a family history of bruxism were 2.93 times higher than for other children. The results were interpreted at a significant level of 5%. Considering the significance level of 10%, it can be claimed that premature birth was also an important factor that affected sleep bruxism.

Discussion

This study aimed to investigate the prevalence of awake and sleep bruxism and its related factors and complications. This study provided complete information about bruxism before the parents answered the questionnaire questions.

The prevalence of bruxism in this study was 16.2%. The prevalence was 15.8% and 16.5% for boys and girls, respectively. The study of Winocur et al. [10] assessed the prevalence of awake and sleep bruxism among Israeli adolescents. According to their study findings, 43.4% of adolescents had no bruxism, 34.5% had awake bruxism, 14.8% had sleep bruxism, and 7.3% had both types of bruxism [10]. In a systematic review [3], the prevalence of sleep bruxism in children was reported to be between 9.5% and 6.49%. In a 2014 study by Garde et al. [11], an epidemiologic study of the prevalence of damaging oral habits in 832 children aged 6-12 years was done. In their study, the highest prevalence of bruxism was 17.3 % [11]. Ghafournia and Tehrani [12] assessed

400 children aged 3-6 years in Isfahan, and bruxism was detected in 12.75% of children. Differences in prevalence, maybe due to difficult diagnosis of this disorder, socioeconomic state, national factors, geographic positions and population characteristics.

This study found no significant relationship between bruxism and child age. Emodi Perlman et al. [13] found no significant relationship between the prevalence of bruxism and age. Another aim of the present study was the association between bruxism and gastrointestinal disorders. Based on the logistic regression test, children with a history of gastrointestinal disorders had more chance of awake bruxism than sleep bruxism. Li et al. [14] examined the association between bruxism and gastrointestinal problems and found that gastrointestinal disturbance was associated with sleep and awake bruxism. In the study of Mengatto et al. [15], there was a significant relationship between gastrointestinal disorders and bruxism. These two studies are consistent with the results of the present study. The gastrointestinal disorder causes gastric acid reflux, which predisposes teeth to erosion. Therefore, bruxism may be the cause of teeth erosion.

A very important topic in this study was to investigate the relationship between temporomandibular joint (TMJ) disorder with bruxism. In this study, 6 (66.7%) out of 9 people with TMJ disorder had bruxism, shown in logistic regression analysis. Children with a TMJ disorder history were likely to have awake and sleep bruxism. The results of many studies are consistent with the results of this study. In a review study by Demjaha et al. [7], in 2019, undesirable oral habits during daytime in children were assessed. One of the consequences of bruxism was TMJ disorder, but it did not adversely affect the quality of life [7]. Motta et al. [16] a found significant relationship between bruxism and TMJ problems.

In this study, children with a family history of bruxism had a 2.93 times higher risk for sleep bruxism. This illustrates the great importance of family history in the prevalence of bruxism. Children with a family history of bruxism were 2.6 times more likely to have bruxism than children who did not have a family history of bruxism. These results are in accordance with the results of the present study [17]. Individuals with inheritance are susceptible to sleep bruxism [18].

Many studies have identified psychological and social disorders (especially stressful lifestyles) as an important risk factor for bruxism [19,20]. In the present study, children who were anxious were significantly more likely to have awake bruxism.

There was also a significant relationship between nail biting, unusual anxiety, easy crying of the child (considered a symptom of stress) and bruxism. In the study of Alfano et al. [21], based on polysomnography, 1.3 children had bruxism. Children with sleep bruxism reported greater muscle and abdominal pain. In addition, children with sleep bruxism showed significantly longer waking hours than those who did not [21]. There was a direct relationship between anxiety disorder and the onset of bruxism in children [22]. It has also been reported that people with bruxism respond differently to depression and anxiety.

Stress is more strongly associated with bruxism in the waking state than sleep bruxism [23]. Other studies have shown that children with sleep bruxism have significantly higher anxiety levels [5,24]. Stressful periods of life, such as exams, loss of family members, marriage, and divorce, can be factors that increase bruxism. Animal studies have also shown a relationship between bruxism and psychological and social factors [25].

Another interesting point in this study was the significant relationship between premature birth and bruxism. Results showed that children born prematurely were 3 times more predisposed to awake bruxism and 2 times more likely to have sleep bruxism. This may be due to the development of neuromuscular or psychologic systems during pregnancy [26]. Furthermore, premature birth is one of the factors that was not mentioned in other studies and this issue needs to be studied.

Sleep disturbance and lack of sleep were other factors that were significantly correlated with awake and sleep bruxism in this study. Ahlberg et al. [17] also found a significant relationship between sleep disorder and bruxism and stated that recurrent bruxism is significantly associated with sleep disturbance and lack of sleep. However, they also point out that bruxism's prevalence is probably higher than the amount reached in their research because they used only questionnaires and believed that many people do not state bruxism for different reasons [17].

Oral habits were one of the factors that had a significant relationship with bruxism in this study. The prevalence of oral habits in different studies varies for two reasons. One reason is differences in diagnostic methods and the variances of oral habits examined in each study. In the study of Gonçalves et al. [27], a significant relationship was found between bruxism and oral habits, which has been reported by other researchers. However, Cheifetz et al. [28] in their study state that those who are used to finger sucking are less likely to have bruxism (p=0.06).

Respiratory problems have been identified as one of the etiologic factors of bruxism. In the present study, there was a significant relationship between bruxism and nasal congestion, and nasal obstruction. In the Motta et al. [29] study, children with bruxism had significantly higher respiratory problems. The results are consistent with this study. Grechi et al. study [30], which analyzed children and their respiratory conditions, found significant relation with bruxism.

The limitations of this study were parents' lack of awareness of the bruxism existence in their children, their unwillingness to fill out a questionnaire, and their lack of knowledge about bruxism. However, this study's questionnaire provided an effective method to gather frequency data on bruxism in children from a large population. There are some deficiencies. Parents may be unconscious of the habit when it occurs, or they may be unwilling to state the presence of a problem, such as bruxism. Also, cross-sectional studies can only recognize relations and not causal associations. The current study has the limitations integral to a cross-sectional project and the questionnaire's answers may have depended on information bias.

It is recommended that research be conducted to investigate the association of bruxism with early childhood caries, as most of these children may press their teeth together to relieve dental pain, especially in dental caries.

Conclusion

The results of measuring possible awake and sleep bruxism are part of a large epidemiologic investigation on the oral health of the Iranian children population. This study shows a prevalence of 1.2% for awake bruxism and 14% for sleep bruxism. Both awake and sleep bruxism decreased with age. Sleep bruxism is a common condition in Iranian children, whereas awake bruxism is rarer. Knowing that sleep bruxism is a common condition amongst Iranian children can help dental professionals once oppose adverse healthcare consequences. Training programs to prevent and reduce the prevalence of bruxism seems necessary in the study population.

Authors' Contributions

FJ	https://orcid.org/0000-0003-0990-5386	Visualization, Supervision and Project Administration.
MT	https://orcid.org/0000-0002-3349-4129	Conceptualization, Validation, and Data Curation.
HP	https://orcid.org/0000-0003-2626-8630	Conceptualization, Methodology, Formal Analysis, Investigation and Writing - Review and Editing.
MS	https://orcid.org/0000-0002-0946-3234	Writing - Original Draft and Writing - Review and Editing.

All authors declare that they contributed to critical review of intellectual content and approval of the final version to be published.

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Conflict of Interest

The authors declare no conflicts of interest.

Data Availability

The data used to support the findings of this study can be made available upon request to the corresponding author.

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