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Prevalence of Bruxism and Its Related Factors in Patients Referring to Dental School of Zanjan in 2022

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ABSTRACT

Introduction: Bruxism is one of the most influential factors for the high prevalence of Temporo Mandibular Disorders (TMDs). This study aimed to investigate the prevalence of bruxism and its related factors in patients referring to Zanjan Dental School in 2022.

Materials & Methods: In this cross-sectional study, 584 patients referring to Zanjan Dental School were examined for a history of bruxism and TMDs through questions and clinical examination. In addition, the Self-Reporting Questionnaire (SRQ-20) was used to assess Common Mental Disorders (CMDs). The data were analyzed using Mann-Whitney and chi-squared tests at a significance level of 5%.

Results: The prevalence of bruxism in the present study was 33.2%, with no relationship with patients' gender. Dental attrition was the most common sign in patients with bruxism (28.8%). In addition, the prevalence of CMD and TMD in patients with bruxism was significantly higher than in patients without it (p-value:0.001).

Conclusion: Given the high prevalence of bruxism and its association with many factors such as psychological disorders and TMD issues, it seems necessary to inform people about the detrimental effects of bruxism for its proper management.

Keywords: Homo sapiens, Cross-sectional Analysis, Temporomandibular Joint Disorders, Questionnaire.

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Introduction

Parafunctional habits are defined as a set of behaviors that cause changes in the Temporo Mandibular Joint(TMJ), masticatory muscles, and teeth if they exceed physiological limits. The most important symptom of bruxism, a common parafunctional disorder, is the repetitive movements of masticatory muscles with sounds caused by intense dental attrition. [1, 2] Bruxism is not age-specific and

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is seen in children and adults. [3] Hashemipour et al. estimated the prevalence of bruxism in adults over 18 years old at 23.2% in Kerman. [4] Shirani et al estimated the prevalence of bruxism at 14.6% in Isfahan. [5] Drumond et al. reported the prevalence of nocturnal bruxism in students at 40%. [6]

Temporomandibular disorder (TMD) encompasses disorders affecting TMJ, associated with joint pain, masticatory muscle pain, mandibular movement limitation and deviation, etc., affecting 6–12% of the population. [7] Stress-related muscle strain is one of the most important causes of TMD. [8, 9] Velasco-Ortega et al. reported that the prevalence of TMD in patients with schizophrenia was 28% higher than in the healthy control group. [10] Jahandideh et al. reported the prevalence of TMD at 66% in Gilan, and bruxism was one of the most significant factors leading to a high prevalence of this disorder in the study population.[11] On the other hand, bruxism has a multifactorial etiology, and various studies have shown its close relationship with different types of mental disorders. [9, 10] Common mental disorders (CMDs) comprise a branch of mental health disorders described as non-psychotic conditions commonly represented by depression, anxiety, irritability, and somatic complaints. [12] Kinalsky et al. reported a direct relationship between CMDs and bruxism. [9] Ryad et al. reported the prevalence of bruxism at 30% in adults and infants with mental disorders. [13]

Although some studies have reported a relationship between CMDs and bruxism, this relationship remains unknown. In addition, the various studies in different parts of the world have not been in the same line, and their contradictions necessitate further studies. Therefore, this study aimed to evaluate the prevalence of bruxism and its related factors in patients referring to Zanjan Dental School in 2022.

Materials & Methods

In this cross-sectional study, the selection of samples was based on convenience sampling, and 584 patients referring to Zanjan Dental School in 2022 were included according to the following formula:

$$n = \frac{z^2_{1-\frac{\alpha}{2}}\ P(1-P)}{d^2} = (1.96)^2 \times 0.15\frac{1-0.15}{(0.029)^2} = 584$$

This study was approved by the Ethics Committee of Zanjan University of Medical Sciences (ethical number: IR.ZUMS.REC.1401.019).

The inclusion criteria were oral acceptance and completing an informed consent form. Exclusion criteria were psychological disorders, epilepsy, orthodontic treatment, presence of crossbite and open bite, multiple losses of posterior teeth, and lack of cooperation. The research tools were interview, observation, and clinical examination.

All the participants completed a self-report questionnaire consisting of information on age, sex, level of education, history of clenching or grinding teeth, and some basic information related to parafunctional habits. The SRQ-20 questionnaire was used to diagnose CMD. This questionnaire, designed in 1994 by the World Health Organization, is a screening tool for evaluating mental disorders. This questionnaire includes questions about a feeling of sadness, physical symptoms of mental disorders, suicidal ideations in the past, etc. This questionnaire has 20 yes/no questions. If an individual has ≥8 "yes" answers, they are positive for CMD and should see a psychiatrist. [14]

Two qualitative and quantitative methods were used to determine the content validity of the questionnaire. In the qualitative method, the pilot questionnaire was submitted to 14 professors of

dentistry to identify problematic linguistic structures in survey questions, misused words, improper choice of phrases, and inaccurate measurements, and finally, provide the necessary feedback. Content validity ratio (CVR) and content validity index (CVI) were used to measure content validity quantitatively. To this end, the questionnaire was submitted to 14 dental professors who reported the CVR for all the questions at >0.51 and the CVI at >0.79.

The designed questionnaire was submitted to 30 dental students in the clinical stage twice with an interval of one week to determine its reliability. The interclass correlation (ICC) index was calculated at 0.897 after they completed the questionnaires.

The diagnosis of bruxism and its relevant factors, such as dental attrition, masticatory muscle hypertrophy, TMJ pain and sounds, shiny surfaces of amalgam restorations if present, biting the internal mucosa of the cheeks, serrated tongue borders, tooth mobility , and limitations in mouth opening, was based on the self-report questionnaire and examinations by an oral disease specialist. Intraoral examinations were carried out on the dental unit with a dental mirror. The temporalis, masseter, and lateral and medial pterygoid muscles were palpated. Any pain felt by the patient was recorded in the datasheet. TMJ sounds were identified by placing the tips of the fingers on the external surface of the joint in front of the tragus while the individual was opening and closing their mouth. Joint tenderness was recorded in three situations with the mouth closed, while the patient was opening and closing their mouth, and with the mouth open. The distance between the incisal edges of the upper and lower central incisors was recorded during the maximum mouth opening to evaluate limitations in mouth opening.

In this study, to assess the effects of bruxism, specific clinical signs were carefully examined. Dental attrition was identified by observing flattened cusps or incisal edges, distinctive facets on occlusal or palatal surfaces, and discoloration to a yellow hue in these areas. Signs of habitual cheek biting were noted as asymptomatic, thick white-gray patches or plaques with tissue tags resulting from mucosal separation, primarily along the occlusion line. The white appearance of this lesion results from tissue separation, overlapping, and keratosis induced by chronic irritation. Therefore, remained visible even after applying sterile gauze, distinguishing them from other oral conditions. Serrated tongue borders were evaluated by differentiating them from macroglossia, which is characterized by an enlarged tongue with a broad or smooth surface, posterior tooth gaps, Class III malocclusion, and tongue thrusting at rest. Tooth mobility was also assessed while ensuring it was not mistakenly attributed to periodontal disease, which presents with additional symptoms such as bone and gum loss, periodontal pockets, bleeding on probing, and red, swollen and painful inflamed gums. However, tooth loosening caused by bruxism can exacerbate periodontal diseases.

The data were analyzed with SPSS 22. Descriptive statistics of qualitative data (frequencies and relative frequencies) and quantitative data (means and standard deviations) were dealt with first. Mann-Whitney test was used to analyze quantitative data. Chi-squared test was used to compare the qualitative variables. The significance level was set at $P<0.05$. All the necessary data on questionnaires and clinical examinations were used and carried out with patients' informed consent. The participants' privacy was maintained, and the collected data were kept confidential during the research.

Results

In this study, of 584 participants, 49.7% were male (n=290), and 50.3% female (n=294), and the mean age of the participants was 27.99±11.0 years. The prevalence of bruxism in males was 34.5%, and 32% in females; the overall prevalence in the subjects was 33.2%. The present study showed no significant relationship between bruxism and the participants' gender (Table 1).

Table 1. Prevalence of bruxism and its relationship with gender

Sex	With Bruxism (n)	Without bruxism (n)	Prevalence (%)	p-value (%)
Male	100	190	34.5	
Female	94	200	32	.29٠
Total	194	390	33.2	

p-value > 0.05= not significant

According to the results, 17.5% and 20.4% of the subjects had TMD and CMD, respectively. The prevalence of these disorders in subjects with bruxism was significantly higher than in those without bruxism (Table 2). The prevalence of CMD in individuals with bruxism was 38.1%, compared to 11.5% in those without bruxism. This indicates a significant association between CMD and bruxism. Among the factors examined, fear and anxiety showed the highest prevalence (39%).

Table 2. Prevalence of TMD, CMD and their association with bruxism

Disorder	Number (%)	With Bruxism (%)	Without bruxism (%)	p-value
TMD Positive	102 (17.5)	84(82.5%)	18(17.5%)	
TMD Negative	482 (82.5)	110(22%)	372(88%)	0.001*
CMD Positive	119 (20.4)	74(62%)	45(38%)	
CMD Negative	465 (79.6)	120(26%)	345(74%)	0.001*

The evaluation of the relationship between parafunctional oral habits and bruxism showed that all factors had a significant relationship with bruxism, and tooth attrition had the highest prevalence (Table 3).

Table3. Prevalence of oral symptoms of parafunctional habits and their relationship with bruxism

parafunctional habits	Answer	Number	With Bruxism (n)	Without bruxism(n)	p-value
Pain in the face and around the ear	Yes	100 (17.1)	84	16	0.001*
	No	484 (82.9)	110	374	
Grinding teeth together	Yes	91 (15.6)	91	0	0.001*
	No	493 (84.4)	103	390	
TMJ Pain	Yes	94 (16.1)	79	15	0.001*
	No	490 (83.9)	115	375	
masticatory muscles hypertrophy	Yes	27 (4.6)	26	1	0.001*
	No	557 (95.4)	168	389	
Tooth Wearing	Yes	168 (28.8)	134	34	0.001*
	No	416 (71.2)	60	356	
Polishing of amalgam restorations	Yes	18 (3.1)	12	6	0.003*
	No	566 (96.9)	182	384	
Buccal mucosa bite	Yes	38 (6.5)	34	4	0.001*
	No	546 (93.5)	160	386	
Scalloped tongue	Yes	46 (7.9)	38	8	0.001*
	No	538 (92.1)	156	382	
Tooth mobility	Yes	7 (1.2)	7	0	0.001*
	No	577 (98.8)	187	390	
tooth fracture	Yes	36 (6.2)	31	5	0.001*
	No	548 (93.8)	163	385	
limitation in opening the mouth	Yes	37 (6.3)	33	4	0.001*
	No	547 (93.7)	161	386	

***Significant**

Discussion

In this study, the prevalence of bruxism in subjects was 33.2%. Various studies have reported different prevalence rates for bruxism; nevertheless, this disorder has a relatively high prevalence in most societies. Kinalsky et al., in a cohort study in Brazil, reported a prevalence rate of 41% for bruxism. [9] Drumond et al. reported the prevalence of bruxism in primary school children at 40% in Brazil in 2018. [6] Carra et al., Clementino et al., and Seraj et al. reported the prevalence of bruxism at 15%, 32.4%, and 26.2%, respectively. [15-17] Methods and tools for evaluating bruxism affect the final results. Studies using questionnaires to investigate the prevalence of bruxism reported a higher prevalence and studies using clinical examinations and questionnaires reported a more acceptable prevalence for bruxism. On the other hand, in addition to questionnaires and clinical examinations, precise equipment, such as Polysomnography (PSG), has been used to assess bruxism by some studies, reporting a lower

prevalence of bruxism. Therefore, different methods and the cultural differences of the societies account for different results.

In the present study, the prevalence of TMD was 17.5%, and a significant relationship was found between bruxism and TMD. The prevalence of bruxism was higher in individuals with TMD. Khademi et al. reported a prevalence of 53.2% for TMD in subjects aged 15–62 years in Gilan Province, and the prevalence of TMD in subjects with bruxism was higher than in subjects without bruxism. [18] Ebrahimi et al. reported a prevalence of 34.7% for TMD in Mashhad, and most subjects with TMD symptoms had bruxism. [19]

In this study, the relationship between bruxism and symptoms, such as tooth attrition, tooth mobility, temporomandibular joint pain, etc, was significant (Table 3). Carra et al. reported higher rates of jaw muscle fatigue, headache, and TMD in subjects with bruxism than in normal subjects. [16] Jahandideh et al. reported a higher prevalence of TMD in subjects with symptoms such as limited mouth opening and TMJ pain than in subjects without these symptoms. [11] According to various studies, the prevalence of TMD is very different worldwide because of different sample sizes and equipment, the multifactorial nature of this problem, the role of various elements in its development, and the differences concerning criteria and diagnostic methods used for TMD evaluation. However, previous studies have reported that TMJ pain, limited mouth opening, masticatory muscle hypertrophy, etc., are related to TMD, consistent with the present study.

In the present study, the prevalence of CMD was 20.4%. Various studies have shown a close relationship between bruxism and psychological disorders. In Brazil, Kinalsky et al. reported that the prevalence of bruxism was higher in subjects with symptoms of CMD during their lifetime [9] Hashemipour et al. reported a higher prevalence of bruxism in subjects with anxiety. [4] Also, Drumond et al. reported that stress in mothers was significantly related to parafunctional behaviors in children. [6] Seraj et al. reported that 87% of the children with bruxism had psychological tension. [17] In South Africa, Makhubele et al. reported a prevalence of 37.5% for CMD using the SRQ-20 questionnaire, which is higher than the present study. [14] As the questionnaire in the present study and Makhubele's study was the same, the cultural differences in different countries and different psychological tensions accounted for this difference. On the other hand, Smards et al [20] and Ohlman et al [21] did not report a significant relationship between stress and bruxism. The discrepancies in the results of the two recent and other studies are due to the use of polysomnography to evaluate bruxism and/or inappropriate stress measurement tools.

In this study, the prevalence of bruxism was based on a self-reported questionnaire, and its accuracy is based on the participant's opinion. Also, the participants of the study were selected among the people who visited Zanjan Dental School, which may not be generalizable to the entire population. Therefore, a more comprehensive study with a large sample size is recommended. However, the strength of this study was the careful examination of the participants for symptoms related to bruxism and no radiographic examinations were performed.

Conclusion

Given the high prevalence of bruxism and its association with many factors such as psychological disorders and TMD issues and considering the parental indifference to bruxism and its consequences, it seems necessary to inform people about the detrimental effects of bruxism for its proper management. The results of studies similar to the present study can help determine a certain path to properly deal with bruxism in different stages of the disease and advance the results of future studies one-step forward.

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Conflicts of Interest

The authors certify that they have no conflict of interest.

Author's Contribution

F Alimohammadi and M Sheikhi contributed to the concept, writing the manuscript and rewriting it. M Mohebian and M Sheikhi were the supervisors of the study. M Sheikhi was the project manager. F Alimohammadi, M Sheikhi, and M Mohebian contributed to the Literature search, implementation of the study, data collection, data analysis, definition of intellectual content, validation of methods, and provision of resources. All authors read and approved the final manuscript.

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