GRADUATION PROJECT

Degree in Dentistry

PREVALENCE AND RISK FACTORS ASSOCIATED TO BRUXISM

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RESUMEN

Introducción: El bruxismo es una actividad repetitiva de los músculos masticatorios que puede manifestarse durante el sueño o en vigilia, y se ha relacionado con factores psicológicos, conductuales y relacionados con el estilo de vida. Su prevalencia muestra una gran variabilidad entre estudios en función del método diagnóstico empleado, y los datos procedentes de poblaciones académicas no clínicas son escasos. **Objetivo:** El presente estudio tuvo como finalidad determinar la prevalencia autodeclarada del bruxismo de sueño y del bruxismo en vigilia, evaluar el nivel de consciencia sobre sus consecuencias e identificar los factores de riesgo asociados, incluyendo hábitos de vida, alteraciones del sueño y antecedentes médicos o farmacológicos, en una muestra universitaria. **Material y métodos:** Se llevó a cabo un estudio cuantitativo, observacional y transversal mediante un cuestionario anónimo en línea, distribuido entre estudiantes y personal docente de la Universidad Europea de Madrid entre marzo y abril de 2026. Un total de 74 participantes cumplieron los criterios de inclusión. **Resultados:** El 82,4% de los participantes refirió signos compatibles con alguna forma de bruxismo. El bruxismo en vigilia resultó más frecuente que el bruxismo de sueño (70,3% frente a 55,4%). El consumo de tabaco, la ingesta de cafeína, los hábitos parafuncionales y la mala calidad del sueño se asociaron con tasas más elevadas. A pesar de que el 83,8% de los participantes conocía las posibles consecuencias del bruxismo, el 61,3% de estos nunca había consultado a un profesional sanitario. **Conclusiones:** El bruxismo presentó una elevada prevalencia autodeclarada en esta muestra académica, con predominio del bruxismo en vigilia. Se identificó una brecha significativa entre el conocimiento y la conducta de búsqueda de atención, lo que subraya la necesidad de un cribado proactivo en la práctica odontológica.

PALABRAS CLAVES

Odontología; Bruxismo; Epidemiología; Factores de riesgo; Prevalencia; Calidad del sueño

ABSTRACT

Introduction: Bruxism is a repetitive jaw-muscle activity that manifests during sleep or wakefulness and has been associated with multiple lifestyle, psychological, and sleep-related factors. Its prevalence varies widely across studies depending on the diagnostic method used, and data from non-clinical academic populations remain limited; **Objective:** This study aimed to determine the self-reported prevalence of sleep and awake bruxism, evaluate awareness of its consequences, and identify associated risk factors including lifestyle habits, sleep disturbances, and medical or pharmacological background in a university population; **Material and Methods:** A quantitative, observational, cross-sectional study was conducted using an anonymous online questionnaire distributed among students and academic staff at Universidad Europea de Madrid between March and April 2026. A total of 74 participants met the inclusion criteria; **Results:** Overall, 82.4% of participants reported signs compatible with at least one form of bruxism. Awake bruxism was more prevalent than sleep bruxism (70.3% versus 55.4%). Tobacco use, caffeine intake, parafunctional habits, and poor sleep quality were associated with higher bruxism rates. Although 83.8% of participants were aware that bruxism could cause dental and musculoskeletal damage, 61.3% of those aware had never consulted a healthcare professional; **Conclusions:** Bruxism showed high self-reported prevalence in this academic sample, with awake bruxism predominating. A significant gap between knowledge and health-seeking behavior was identified, highlighting the need for proactive screening in dental practice.

KEYWORDS

Dentistry; Bruxism; Epidemiology; Prevalence; Risk factors; Sleep quality

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1 INTRODUCTION

1.1 Definition of Bruxism

Bruxism describes a pattern of jaw-muscle activity in which a person may press, clench or rub their teeth together, or maintain the lower jaw in a tense or forward position. These actions can appear either during wakefulness or during sleep, and they differ from normal functional movements like chewing or speaking, which are voluntary and purposeful (1,2). Although traditionally considered a harmful habit, bruxism is now understood as a motor behavior that can be harmless, can protect in certain situations, or potentially damage depending on its frequency and intensity (1,2).

1.2 Types of Bruxism

1.2.1 Sleep Bruxism (SB)

Sleep bruxism takes place during sleep and may present either as rhythmic (phasic) bursts or as sustained (tonic) contractions.. Sleep bruxism takes place during sleep and may present either as rhythmic (phasic) bursts or as sustained (tonic) contractions.(3–5). Evidence indicates that SB is an intermittent, arousal-related phenomenon rather than a continuous behavior, which explains the need for instrumental assessment when accurate detection is required (4)

1.2.2 Awake Bruxism (AB)

Awake bruxism refers to sustained or repetitive tooth contact, clenching, or mandibular bracing occurring during wakefulness (1,2). It is strongly linked with psychological and emotional factors such as stress, anxiety, and hypervigilance (5,6). AB is also associated with symptoms of temporomandibular disorders, poor sleep quality, and other oral parafunctions, suggesting a behavioral and psychological origin in many cases (5,6). These distinctions justify treating SB and AB as two circadian manifestations of the same behavior, yet with different triggers, associated factors, and consequences (1,2).

1.2.3 Concept Evolution

The 2018 consensus emphasized that bruxism should be considered a motor activity rather than a disorder, acknowledging a continuum ranging from harmless behaviors to clinically significant consequences This shift allowed researchers to study bruxism without automatically labeling all cases as pathological (1,2).

In 2025, the updated definition clarified that bruxism may coexist with systemic, neurological, or psychological conditions while maintaining its fundamental behavioral nature. This update eliminated the restrictive phrase “in otherwise healthy individuals” (1).

1.3 Physiopathology

Bruxism results from a complex interaction between central nervous system regulation, neurotransmitter activity, psychological influences, and sleep physiology(3).

1.3.1 Sleep Bruxism Mechanism

SB episodes occur in close association with micro-arousals brief activations of cortical, autonomic and cardiovascular activity, representing a physiological reaction to sleep fragmentation (3). These arousals activate motor nuclei in the brainstem and cortical regions responsible for jaw movement, producing characteristic phasic or tonic contractions of the masticatory muscles (3,4).

SB is frequently linked with parasomnias, restless legs syndrome, and breathing disturbances such as obstructive sleep apnea (conditions associated with increased sleep fragmentation) (4).

1.3.2 Awake Bruxism Mechanism

AB is more strongly associated with emotional, cognitive, and behavioral processes (3,4).

AB may function as a behavioral response to anxiety, cognitive load, or hypervigilance, explaining why individuals under psychological pressure frequently report daytime clenching (5).

1.3.3 Neurochemical Regulation

Dopaminergic and serotonergic pathways play a central role in regulating masticatory motor activity. Dysregulation of these circuits has been implicated in both SB and AB (3).

1.4 Prevalence

Prevalence measures the occurrence of any health condition in a given population (7).Prevalence estimates of bruxism vary widely because they depend on the definition used, the assessment strategy (self-report, clinical signs, instrumental methods), and the population studied (1,2,8). Studies based on self-report tend to report higher prevalence than those using objective recordings (8).

Syntheses that pool adult data suggest that both AB and SB are common in the general population, with estimates typically in the two-digit range depending on the diagnostic approach (7). Daytime (awake) bruxism tends to be more frequently self-reported among young adults and shows consistent associations with psychological strain and parafunctional habits (10). Instrumental studies generally yield lower but more specific estimates than questionnaires, underscoring the role of method in shaping reported prevalence (8).

1.5 Consequences of Bruxism

Bruxism can influence teeth, muscles, temporomandibular joints, prosthetic restorations, and quality of life. The severity and type of consequences depend on the frequency, intensity, and pattern of SB

or AB, as well as on individual susceptibility factors (1,10,11).

1.5.1 Dental Consequences

A large clinical study demonstrated that individuals with probable bruxism exhibit significantly higher bite forces and a greater frequency of fractures in both natural teeth and ceramic restorations (12).

1.5.2 Muscular and TMJ Impact

Increased masticatory muscle activity may lead to masseter hypertrophy, myalgias, morning stiffness, fatigue, limited mandibular opening.(10)

Both SB and AB can overload the temporomandibular joints, resulting in pain, functional noises (3,6).

1.5.3 Soft Tissue and Systemic Effects

Soft tissue manifestations may include cheek biting, linea alba, tongue scalloping, and mucosal trauma (8–10). Bruxism can also contribute to headaches, cervical muscle tension, and generalized facial discomfort (3,10).

1.5.4 Quality of Life and Psychosocial Burden

Awake bruxism is frequently associated with stress and poor sleep quality, contributing to reduced daytime well-being (10). In pediatric populations, bruxism-related sleep alterations may impact school performance, behavior, and daytime attention (4).

1.6 Risk Factors

Although SB and AB share certain neurobiological mechanisms, their principal triggers differ: AB is strongly influenced by emotional and behavioral factors, whereas SB is more closely linked to sleep physiology and arousal mechanisms (1,3,10,11).

1.6.1 Psychological Factors

Psychological influences are among the strongest and most consistent risk factors for awake bruxism. Stress, anxiety, emotional hyperreactivity, and cognitive overload correlate with increased daytime jaw muscle activity (10).

Individuals exhibiting high levels of parafunctional behaviors, poor sleep quality, and stress-related symptoms show a significantly increased likelihood of AB(10,11).

Neurophysiological studies confirm that AB activates brain regions involved in emotional and cognitive processing, including the anterior cingulate cortex, prefrontal cortex, and limbic structures, reinforcing the link between psychological tension and mandibular bracing (3,6).

In children and adolescents, emotional factors can also contribute to SB, although the relationship is more complex due to the influence of developmental sleep patterns (4).

1.6.2 Lifestyle and Environmental Factors

Excessive screen time, demanding work environments, and stressful daily routines contribute to higher jaw-muscle activity (11). Substance-related trigger including caffeine, tobacco, and alcohol have been associated with bruxism by stimulating sympathetic activity or disrupting sleep stability (11). Other parafunctional behaviors such as gum chewing, nail biting, or pen chewing show strong associations with AB, reflecting the behavioral dimension of the condition (10).

1.6.3 Sleep and Arousal-Related Factors

SB is closely related to sleep micro-arousals, sleep fragmentation, and shifts in autonomic activation (3,4). Conditions such as parasomnias, restless legs syndrome, and obstructive sleep apnea may coincide with SB because they increase sleep instability (4).

1.6.4 Medication and Neurological Conditions

Certain medications (particularly serotonergic antidepressants (SSRIs)) have been associated with the onset or worsening of bruxism by altering serotonergic and dopaminergic regulation within basal ganglia circuits (3,6). Neurological conditions such as Parkinson's disease, epilepsy, and ADHD also show increased rates of bruxism due to disturbances in motor-control circuitry (3,6).

1.7 Diagnosis

Individuals are often unaware of their own parafunctional activity, an accurate diagnosis relies on integrating subjective, clinical, and instrumental findings (1,2,8). Modern diagnostic framework such as the STAB (Standardized Tool for the Assessment of Bruxism) promote a multimodal approach for establishing whether bruxism is possible, probable, or definite (8).

1.7.1 Signs and symptoms

Self-reported bruxism is based on the individual's awareness or reports from others regarding tooth grinding or clenching behaviors. Both self-reported and clinical signs in order to estimate the likelihood of the condition in epidemiological and clinical studies.(2)

1.7.2 Subject-Based Assessment

Self-report questionnaires and interviews assess awareness of clenching, grinding sounds, sleep quality, stress levels, and orofacial symptoms (8,13).

However, subjective reports tend to underestimate sleep bruxism and overestimate awake bruxism(8). Despite their limitations, subjective methods remain essential for large-scale epidemiological studies in which instrumental assessments are impractical (8).

1.7.3 Clinical Assessment

Clinical evaluation identifies signs that may be associated with bruxism, including tooth wear, linea alba, tongue scalloping, masseter hypertrophy, and cheek indentations (1,8,13). Evidence shows that tooth wear has high specificity but low sensitivity for bruxism, meaning that absence of wear suggests low activity, but its presence does not confirm the behavior (13).

1.7.4 Instrumental Assessment

Instrumental methods provide objective confirmation of bruxism activity. (8).

Polysomnography (PSG) with audio–video monitoring remains the gold standard for diagnosing sleep bruxism because it records EMG bursts, sleep stages, respiratory parameters, and related movement patterns simultaneously (3,8).

Surface electromyography (sEMG), allows long-term monitoring of muscle activity during both sleep and awake bruxism it bridge the gap between subjective tools and PSG, making objective assessment more feasible (8).

1.7.5 Multimodal Approach

The current consensus supports combining subjective reports, clinical findings and instrumental data to determine the degree of diagnostic certainty (1,8).

1.8 Treatment Approaches

1.8.1 Behavioral Therapies

Cognitive-behavioral therapy (CBT), stress-management training, relaxation and mindfulness techniques, habit-awareness exercises, help patients identify episodes of clenching and reduce muscular overactivation, particularly in individuals with stress-induced AB (10,11).

1.8.2 Occlusal appliances

Occlusal splints do not eliminate SB activity, they protect teeth from excessive mechanical wear, redistribute occlusal forces of natural or prosthetic teeth (4,6).

1.8.3 Pharmacological Strategies

Botulinum toxin injections can reduce masseter and temporalis contraction intensity and relieve pain, though they do not reduce SB frequency (5,11).

Adjusting or changing medications particularly SSRIs may benefit patients whose bruxism correlates with serotonergic drug use (6).

1.8.4 Multidisciplinary Approach

Because bruxism involves psychological, neurological, sleep-related, and dental factors, optimal outcomes often require collaboration between dentists, psychologists, sleep physicians, neurologists (1,5,11).

1.9 Justification

Bruxism is defined as a motor activity with circadian manifestations whose reported prevalence and associated risk factors vary widely across studies, mainly due to differences in definitions, assessment methods, and study populations. Although its clinical and physiological aspects are well described, data from non-clinical adult populations remain limited and inconsistent.

Therefore, this empirical study is justified as it aims to determine the prevalence of awake and sleep bruxism and to analyze associated lifestyle, psychological, sleep-related, and medical factors in a non-clinical academic population, using a structured questionnaire aligned with current consensus frameworks.

2 OBJETIVES AND HYPOTHESES

1. To determine the prevalence of sleep bruxism (SB) and awake bruxism (AB) using validated diagnostic criteria.
2. To evaluate participants' awareness of the potential consequences of bruxism in order to provide recommendations for early identification, prevention, and management of individuals at higher risk.
3. To identify lifestyle-related risk factors, including caffeine intake, tobacco, alcohol consumption, and parafunctional habits.
4.To assess the influence of sleep-related variables, such as sleep quality, sleep fragmentation, and presence of parasomnias.
5.To identify medical and pharmacological contributors (e.g., neurological conditions, use of SSRIs or other medications).

Null hypothesis (H0): In a non-clinical adult academic population, the prevalence of self-reported bruxism is not associated with lifestyle factors, sleep quality, or medical and pharmacological factors, and does not differ between sleep and awake bruxism.

Alternative hypothesis (H1): In a non-clinical adult academic population, the prevalence of self-reported bruxism is high, with awake bruxism being more frequent than sleep bruxism, and is significantly associated with lifestyle factors (caffeine, tobacco, alcohol, parafunctional habits), poor sleep quality, and the use of certain medications.

3 MATERIAL AND METHODS

3.1 Study design

This research was designed as a quantitative, observational, cross-sectional study based on an online questionnaire. The objective was to determine the prevalence of awake bruxism (AB) and sleep bruxism (SB) and to analyze associated risk factors in a non-clinical adult population.

3.2 Study population and sample size

The study population consisted of adult university students and academic staff (lecturers) aged 18 years or older. The recommended sample size was estimated using an online calculator, considering a 95% confidence level and a 5% margin of error, for descriptive purposes. However, as participation was voluntary, the final sample size depended on the number of completed questionnaires.

3.3 Inclusion and exclusion criteria

3.3.1 Inclusion criteria

-Age ≥ 18 years

-University student or academic staff member

-Voluntary participation with informed consent

3.3.2 Exclusion criteria

-Age < 18 years

-Refusal to provide informed consent

-Incomplete questionnaires

3.4 Questionnaire Design

The questionnaire was designed to assess the prevalence of self-reported bruxism and to explore potential associated factors. It included questions on sociodemographic characteristics (age, gender and academic status), lifestyle habits such as caffeine consumption, smoking and alcohol intake, sleep quality and sleep disturbances, and perceived stress levels. Additional questions investigated medical and dental history, as well as symptoms commonly associated with bruxism, including tooth grinding or clenching, jaw discomfort, headaches, tooth wear, dental fractures and temporomandibular joint pain or noises. Most questions were closed-ended to facilitate quantitative analysis. The complete questionnaire is presented in Annex I**.**

3.5 Intervention

Data were collected exclusively through a self-administered questionnaire without clinical examination or therapeutic procedures.

3.6 Data collection method

Data were collected between March and April 2026 using an anonymous online Google Forms questionnaire specifically designed for this study, in accordance with the research objectives and current conceptual frameworks of bruxism. The questionnaire was shared the first question addressed informed consent, informing participants about the voluntary nature of participation, anonymity, confidentiality, and the right to withdraw at any time.

The questionnaire consisted mainly of closed-ended questions assessing sociodemographic data, self-reported awake and sleep bruxism, lifestyle-related factors, sleep-related variables, psychological factors, medical and pharmacological background. The final version of the questionnaire is included in the Annexes (Annex I).

3.7 Ethical considerations and approvals

This study was conducted in accordance with the ethical principles of the Declaration of Helsinki. Approval was obtained from the Department through the TFG Committee, and an official approval code was assigned (TFG approval code: OD.088/2526).

Given the use of a questionnaire involving personal data, additional approval was obtained from the Universidad Europea de Madrid Research Ethics Committee (CI approval code: 2026-732).

All data were collected are used exclusively for academic research purposes. During the data collection process, the student researcher was supervised by the tutor or a designated lecturer, ensuring compliance with ethical and confidentiality regulations.

4 RESULTS

4.1 Sociodemographic characteristics of the participants

A total of 74 participants completed the questionnaire. The questionnaire was distributed online between March and April 2026 via an anonymous Google Forms survey shared among university students and academic staff at Universidad Europea de Madrid. All participants met the inclusion criteria (age ≥18 years, university student or academic staff, voluntary participation with informed consent). No responses were excluded for incomplete data. The sample comprised 54.1% female (n=40) and 45.9% male (n=34) participants. The majority were aged 18–25 years (71.6%, n=53), followed by the 26–35 age group (23.0%, n=17). Undergraduate students represented the largest academic subgroup (74.3%, n=55), followed by postgraduate students (13.5%, n=10) and lecturers/professors (12.2%, n=9)(Table 1.).

Table 1. Sociodemographic characteristics of the participants

Variable	n	%
Sex		
Female	40	54.1%
Male	34	45.9%
Age group		
18–25	53	71.6%
26–35	17	23.0%
36–45	1	1.4%
>45	3	4.1%
Academic status		
Undergraduate student	55	74.3%
Postgraduate student	10	13.5%
Lecturer/Professor	9	12.2%

4.2 Prevalence of self-reported bruxism

The prevalence of self-reported bruxism was assessed based on responses to questions regarding tooth grinding during sleep (Q4) and tooth clenching during wakefulness (Q5). Overall, 82.4% (n=61) of participants reported signs compatible with at least one form of bruxism. Sleep bruxism (SB) was identified in 55.4% (n=41) of participants, reporting tooth grinding 'sometimes', 'often', or 'very often'. Awake bruxism (AB) was reported by 70.3% (n=52) of participants. Both forms coexisted in 43.2% (n=32) of participants, while only 17.6% (n=13) reported no signs of either form. (Annex 2: Table 2 , Figure 1.)

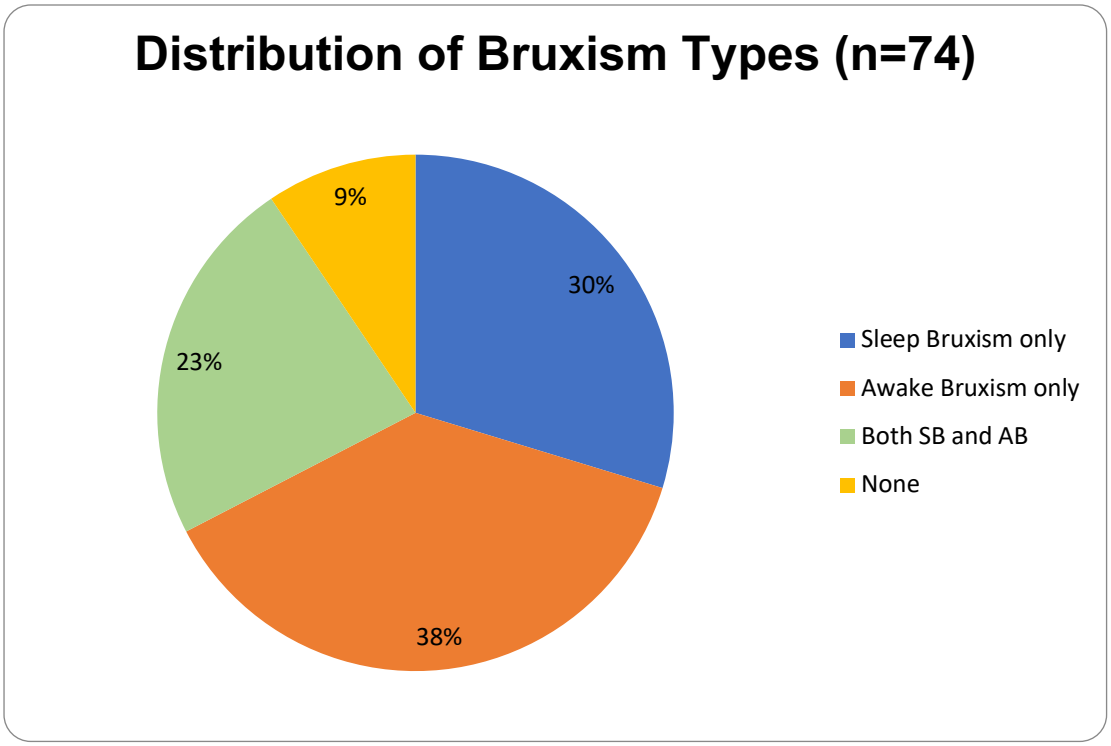


Figure 1. Distribution of bruxism types among participants (n=74).

4.3 Self-reported symptoms and signs associated with bruxism

Participants were asked about symptoms commonly associated with bruxism (Q7). The most frequently reported symptom was jaw or facial muscle pain (47.3%, n=35), followed by headaches (43.2%, n=32) and the absence of any symptom (21.6%, n=16). Temporomandibular joint (TMJ) pain or noises were reported by 33.8% (n=25), and tooth wear or fractures by 14.9% (n=11). (Annex 3:Table 3., Figure2.)

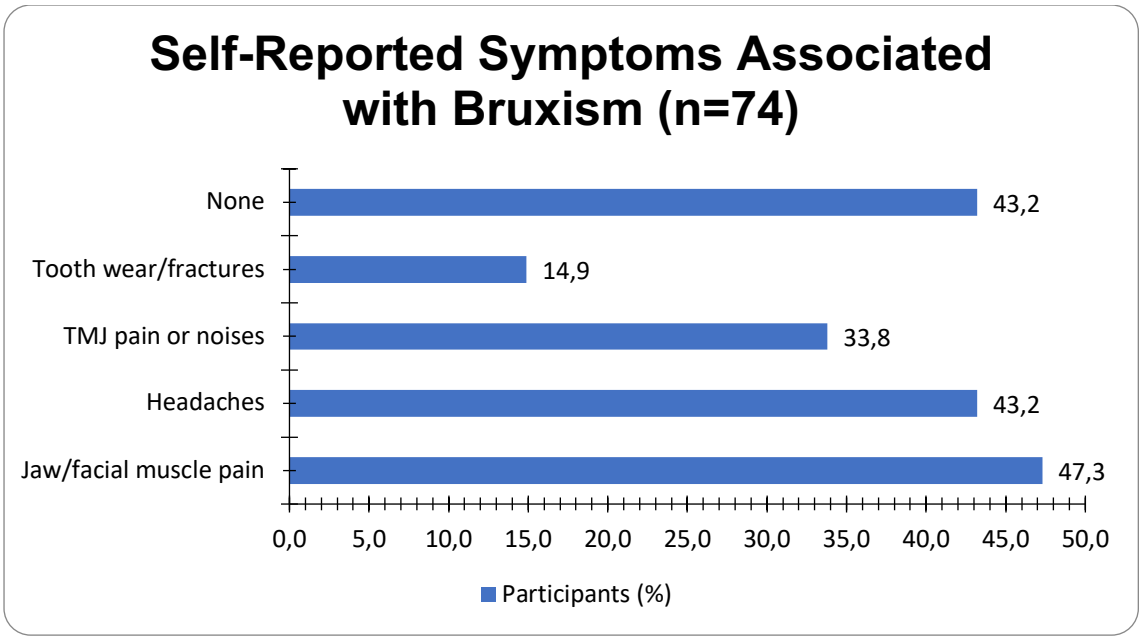


Figure 2. Frequency of self-reported symptoms associated with bruxism (n=74).

4.4 Healthcare seeking behavior and awareness

Regarding healthcare-seeking behavior (Q8–12), 37.8% (n=28) of participants had consulted a healthcare professional for their symptoms, while 60.8% (n=45) had never done so. Among those who consulted,85.4% (n=24) received a formal bruxism diagnosis. Of diagnosed participants, 16 were identified with sleep bruxism, 5 with awake bruxism, and 2 with both. Treatment was received by 23 participants (31.1%), with the occlusal splint as the most common option (24.3%, n=18).

Regarding awareness (Q13), 83.8% (n=62) of participants reported being aware that bruxism can lead to dental damage, muscle pain, or temporomandibular disorders. However, 61.3% (n=38) of those who were aware had never consulted a healthcare professional, representing a striking discrepancy between knowledge and action. (Table 4., Figure 3.)

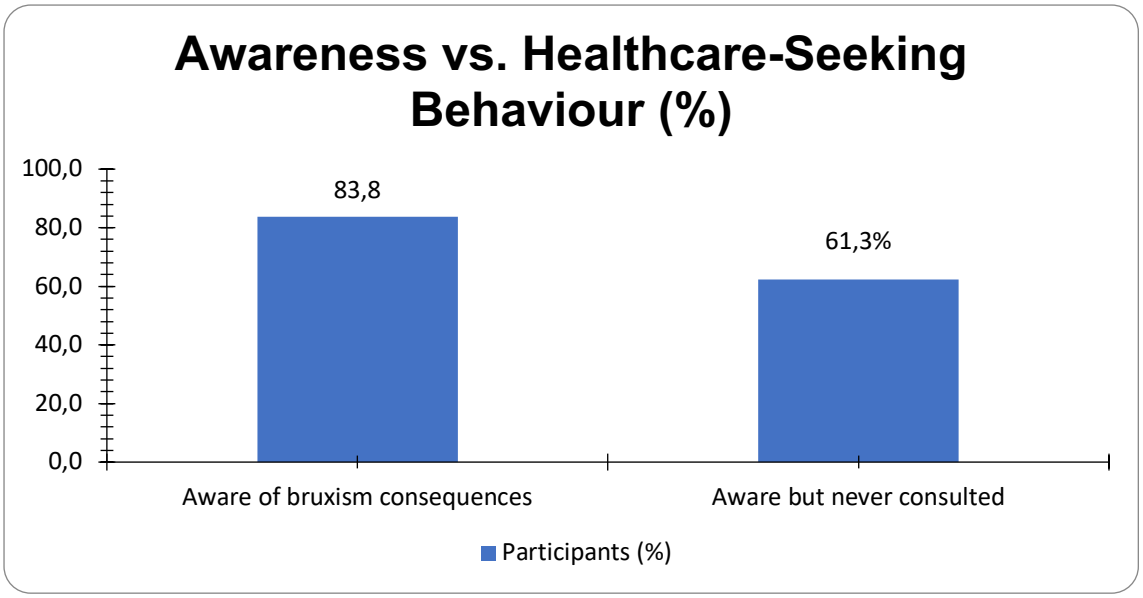


Figure 3. Awareness of bruxism consequences vs. healthcare-seeking behavior (n=74).

4.5 Treatments received

Among participants who received a diagnosis and treatment, the occlusal splint was the most frequently reported intervention (24.3%, n=18), followed by other unspecified treatments (2.7%, n=2), physiotherapy (8.1%, n=6), orthodontic treatment (6.8%, n=5), botulinum toxin injections and occlusal adjustment (5.4% each, n=4), and behavioral therapy and medication (4.1% each, n=3)(Figure 4. , Annex 5., Table 5.)

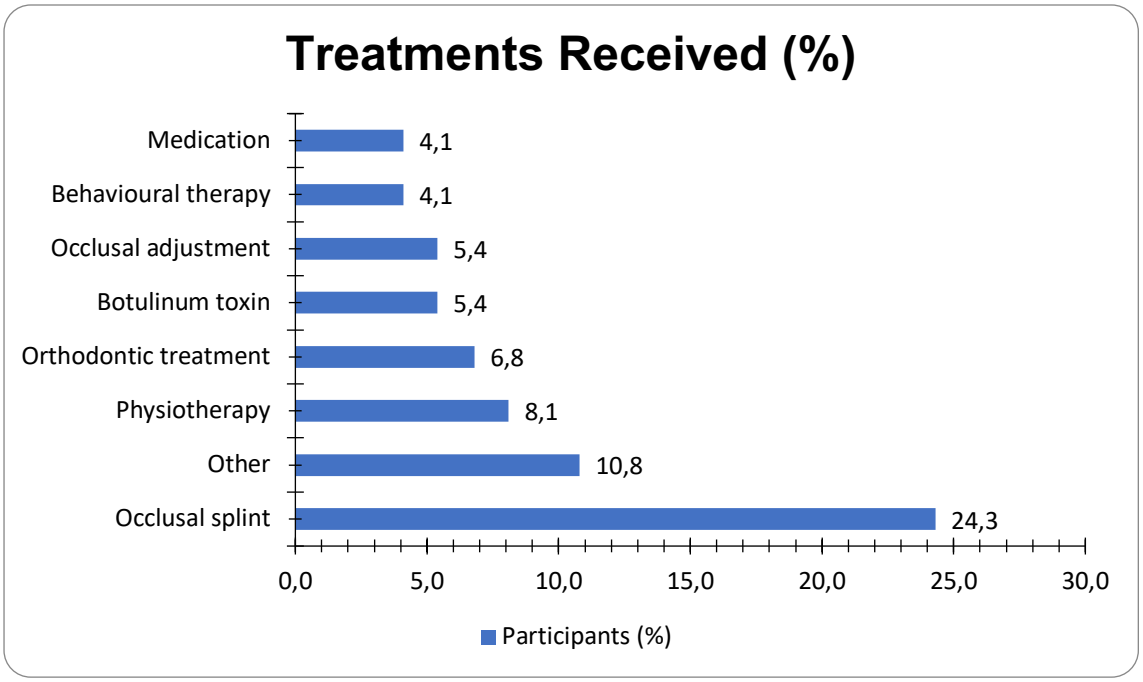


Figure 4. Distribution of treatments received among diagnosed participants (n=74).

4.6 Lifestyle factors

Caffeine consumption (Q14) was reported by 72.9% (n=54) of participants, with 59.5% (n=44) consuming 1–2 beverages per day and 13.5% (n=10) consuming three or more. Tobacco use (Q15) was reported by 51.4% (n=38), including daily smokers (35.1%, n=26) and occasional users (16.2%, n=12). Alcohol consumption (Q16) was reported by 62.2% (n=46), predominantly occasionally (54.1%, n=40). Parafunctional habits (Q17) were reported by 66.2% (n=49) of participants: gum chewing was the most frequent (43.2%, n=32), followed by nail biting (35.1%, n=26) and chewing objects (27.0%, n=20).(Annex 6. , Table 6. , Figure 5.)

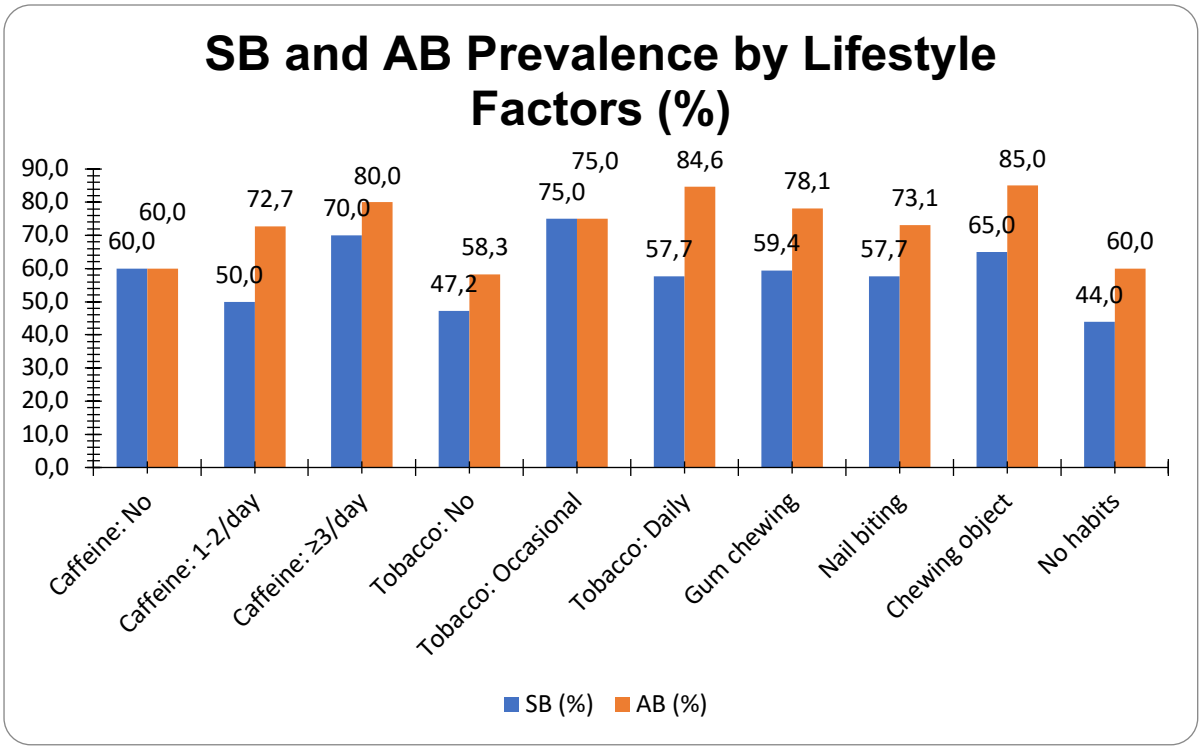


Figure 5. SB and AB prevalence by lifestyle factors (caffeine, tobacco, alcohol).

4.7 Sleep characteristics

Most participants described their sleep quality (Q18) as good (56.8%, n=42) or very good (17.6%, n=13). However, 27.0% (n=19) reported poor or very poor sleep quality. Occasional night awakenings (Q19) were reported by 63.5% (n=47), and frequent awakenings by 13.5% (n=10). Among sleep-related signs observed by partners (Q20), 51.4% (n=38) reported none, while 28.4% (n=21) noted snoring or breathing interruptions, 21.6% (n=16) reported teeth grinding sounds, 16.2% (n=12) nightmares, and 13.5% (n=10) restless sleep. (Annex 7. , Table 7. ,Figure 6)

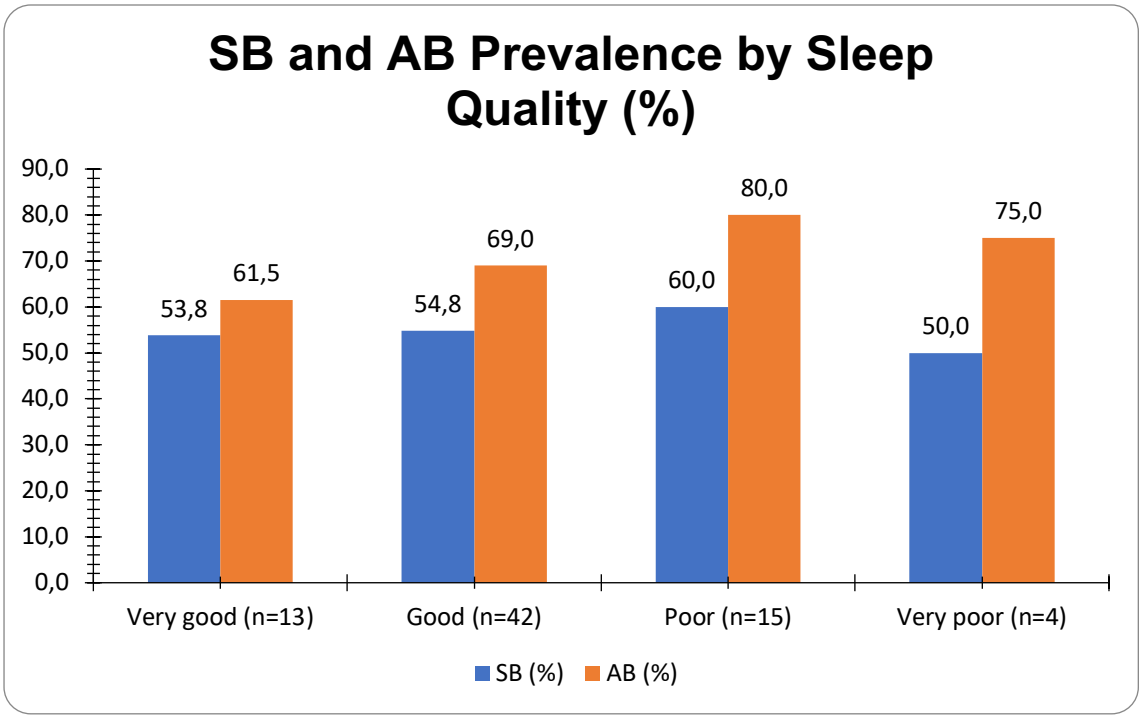


Figure 6. Bruxism prevalence (SB and AB) by self-reported sleep quality.

4.8 Medical conditions and medication use

Among all participants (Q21), 5.4% (n=4) reported a diagnosis of a neurological or sleep-related condition. No participants reported current use of SSRIs or anxiolytics.

Table 8. Medical factors

Variable	n	%
Neurological or sleep-related condition	4	5.4%

5 DISCUSSION

The present study assessed the self-reported prevalence of sleep bruxism (SB) and awake bruxism (AB) and investigated associated risk factors in a non-clinical academic population of 74 participants at Universidad Europea de Madrid. Data were collected through an anonymous online questionnaire between March and April 2026. The findings are discussed below in comparison with the existing literature, structured according to the five objectives of the study.

5.1 Overall prevalence and comparison with literature

The overall prevalence of self-reported bruxism was 82.4% (n=61), with AB predominating over SB (70.3% vs 55.4%). Both forms coexisted in 43.2% of participants. These figures substantially exceed those reported in the general adult population. Zieliński et al. (2024), in a systematic review and meta-

analysis of studies published between 2003 and 2023, estimated a global SB prevalence of 21% (95% CI 18.7–23.5%) and a global AB prevalence of 23% (95% CI 18.8–28.5%) in adult populations (11). Similarly, Stanisic et al. (2025), in their PRISMA-compliant meta-analysis encompassing 94 studies and 49,163 individuals, reported a mean self-reported AB prevalence of 25.9% (95% CI 22.2–29.9) in the general population, rising to 50.0% in individuals with temporomandibular disorders (6) , and 20.8% (95% CI 13.2–31.1%) in general university student samples — a population directly comparable to the present study.The elevated rates observed in the present study can be explained by the specific characteristics of the sample. University students and academic staff are exposed to chronic academic and occupational stress, which constitutes one of the most consistently reported risk factors for AB. Matusz et al. (2022) noted that individuals with high levels of psychological strain and parafunctional behaviours show a significantly increased likelihood of AB (10). Kuhn & Türp identified emotional stress as the factor with the highest odds ratios across all bruxism-related risk factors in their systematic review of literature published between 2007 and 2016 (9). The dominance of AB over SB in this sample is consistent with findings from comparable young adult populations.

It must also be acknowledged that prevalence based on self-report systematically exceeds estimates obtained through instrumental methods. The international consensus updated by Verhoeff et al. (2025) and Lobbezoo et al. (2018) classifies self-reported bruxism as 'possible' bruxism, with definitive diagnosis requiring polysomnographic or electromyographic confirmation (1,2).

5.2 Lifestyle factors and their differential association with SB and AB

Daily smokers in this sample exhibited an AB prevalence of 85%, compared to 58% among non-smokers. This constitutes the strongest lifestyle-related association observed, and aligns with the findings of Kuhn and Türp (2018), who identified tobacco consumption as a significant risk factor with notably high odds ratios (9). The proposed mechanism involves nicotine-driven stimulation of dopaminergic and noradrenergic pathways, which enhance masticatory motor activity during wakefulness. The elevated SB rates among daily smokers (58% vs 47% in non-smokers) may additionally reflect the well-documented association between tobacco use and bruxism (9).

Regarding caffeine, participants consuming three or more beverages per day showed higher rates of both SB (70%) and AB (80%) compared to non-consumers (60% each). This is consistent with the observations of Popescu et al. (2025), who noted that caffeine stimulates sympathetic nervous system activity, increasing masticatory muscle tone (5). The more pronounced effect on AB is mechanistically coherent, as caffeine acts principally during wakefulness to reinforce hypervigilance and jaw muscle tension.

Parafunctional habits were associated with higher bruxism rates across both forms. Participants reporting gum chewing showed 77% AB, compared to 68% among those without parafunctions. Nail

biters showed similarly elevated rates (75% AB). These findings are directly supported by Matusz et al. (2022), who described gum chewing, nail biting, and object chewing as behaviours closely associated with AB due to their shared behavioural and neuromuscular dimension (10). Hilgenberg-Sydney et al. (2022), in a cross-sectional study of 50 participants, also identified parafunctional habits as one of the most consistent factors associated with probable awake bruxism (13).

5.3 Sleep quality and its relationship with SB and AB

Participants reporting poor sleep quality showed an AB prevalence of 80%, rising to 75% among those with very poor sleep, compared to 69% and 62% in those reporting good and very good sleep quality, respectively. In contrast, SB rates did not follow a consistent upward gradient with worsening sleep quality (54–60%), with no clear linear relationship. This differential pattern has important mechanistic implications. AB is strongly linked to the subjective perception of psychological distress and poor rest, whereas SB is primarily driven by objective sleep architecture, specifically micro-arousals and sleep fragmentation, which are not reliably captured by self-report. Uchima Koecklin et al. (2024) confirmed that SB episodes are tightly coupled with cortical and autonomic micro-arousals occurring independently of conscious sleep perception (3,4). Bulanda et al. (2021) noted that SB is frequently associated with sleep-stage instability and comorbid sleep disorders (4). This finding reinforces the value of distinguishing between self-reported sleep quality, which correlates with AB, and objective sleep disturbances, which are more relevant to SB assessment.

5.4 The awareness-action paradox

One of the most clinically significant findings of this study is the gap between awareness and health-seeking behavior. Although 83.8% (n=62) of participants reported knowing that bruxism can cause dental damage, muscle pain, or temporomandibular disorders, 61.3% of those who were aware (n=38) had never consulted a healthcare professional. This discrepancy, here termed the awareness-action paradox, reflects a well-documented phenomenon in health behavior research: passive knowledge of a condition's consequences does not reliably translate into health-seeking action unless it is accompanied by perceived personal susceptibility and perceived severity of one's own symptoms.

Notably, none of the studies included in this review specifically assessed patient awareness of bruxism consequences as a variable. This absence reflects an implicit assumption in the existing literature: that the primary barrier to care-seeking is a lack of information, and that raising awareness would naturally translate into higher consultation rates. The present findings challenge this assumption. In this academic population, most participants already possessed the relevant knowledge — yet the majority had never sought professional evaluation. This suggests that the barrier is not informational but

attitudinal, and that awareness alone is insufficient to drive health-seeking behavior. Future research should therefore move beyond measuring what patients know about bruxism and begin examining why that knowledge fails to produce action.

In the context of bruxism, this gap is particularly significant because the condition is often intermittent, silent, and underestimated by those affected. Many patients are unaware that they grind or clench their teeth until informed by a partner or a dental professional. This makes passive awareness insufficient as a driver of care-seeking. The international bruxism consensus updated by Verhoeff et al. (2025) and the diagnostic framework proposed by Lobbezoo et al. (2018) both emphasize that accurate bruxism identification requires active multimodal clinical assessment rather than patient self-referral (1,2). Popescu et al. (2025) further demonstrated that clinical examination combined with instrumental assessment substantially improves diagnostic accuracy compared to self-report alone (5). Together, these observations underscore the central public health implication of this study: dental professionals must proactively screen for bruxism during routine clinical examinations rather than waiting for patients to present with advanced consequences such as tooth wear, prosthetic failure, or orofacial pain.

5.5 Academic status and the stratification of risk and care-seeking

A stratified analysis by academic status revealed important and clinically relevant differences. Undergraduate students exhibited the highest AB rate (76.4%) and the lowest consultation rate (32.7%), with 64.4% of aware undergraduates having never sought professional evaluation. This pattern is coherent with their high stress exposure in combination with limited clinical experience and lower perceived severity of symptoms. Postgraduate students showed intermediate bruxism rates (60% AB and SB) alongside the highest consultation rate (60%), possibly reflecting greater clinical literacy and familiarity with dental assessment acquired through advanced training. Lecturers and professors demonstrated the highest SB rates (66.7%) and complete awareness (100%), yet 55.6% had still never consulted a professional.

The finding that even fully aware academics do not seek care highlights that the awareness-action gap is not primarily driven by knowledge deficits but by structural and attitudinal barriers, including normalisation of symptoms, time constraints, and low perceived urgency. Each academic subgroup may therefore require tailored communication and screening strategies. Kuhn & Türp (2018) argued that knowledge of bruxism risk factors is essential to guide clinical history-taking, as patients rarely seek care proactively before consequences become apparent (9).

5.6 Limitations

An additional source of overestimation is the nature of self-report itself. Lobbezoo et al. noted that

public media exposure and prior counselling by dental professionals may heighten patients' awareness of bruxism-related behaviours, leading them to report tooth contact habits they would otherwise not have noticed (2). In the present sample, composed of university students and academic staff with likely above-average health literacy, this awareness effect may have contributed to the elevated self-reported prevalence rates observed.

6 CONCLUSIONS

1. Awake bruxism (70.3%) was more prevalent than sleep bruxism (55.4%) in this academic population, with both forms coexisting in 43.2% of participants. Overall, 82.4% of participants reported signs compatible with at least one form of bruxism, substantially exceeding estimates reported in general adult populations, consistent with the high psychosocial burden characteristic of university environments.

2. Although 83.8% of participants were aware that bruxism can lead to dental damage, muscle pain, or temporomandibular disorders, 61.3% of those who were aware had never consulted a healthcare professional. This awareness-action gap was observed across all academic subgroups, including fully informed lecturers and professors, indicating that knowledge alone is insufficient to drive health-seeking behavior. These findings highlight the need for proactive bruxism screening during routine dental examinations rather than relying on patient self-referral.

3. Daily tobacco use showed the strongest lifestyle-related association with awake bruxism (85% in daily smokers versus 58% in non-smokers). High caffeine consumption (≥3 beverages/day) was associated with elevated rates of both forms of bruxism. Parafunctional habits, including gum chewing and nail biting, were consistently linked to higher awake bruxism prevalence, reflecting the shared behavioral and neuromuscular dimension of these activities.

4. Poor self-reported sleep quality was associated with higher awake bruxism prevalence (80% in poor sleepers versus 62% in very good sleepers), while sleep bruxism rates showed no consistent linear relationship with subjective sleep quality. This differential pattern supports the distinction between awake bruxism, which is driven by perceived psychological distress, and sleep bruxism, which is primarily determined by objective sleep architecture and micro-arousal frequency.

5. Only 5.4% of participants reported a diagnosed neurological or sleep-related condition, and no participant reported current use of SSRIs or anxiolytics. While these figures may reflect genuine low prevalence in this sample, they are also likely influenced by underdiagnosis and underreporting. Medical and pharmacological contributors to bruxism remain difficult to assess through self-report alone, underscoring the value of integrating clinical history review into bruxism evaluation protocols.

7 SUSTAINABILITY

This study contributes to sustainability across social, economic, and environmental dimensions, aligned with the United Nations Sustainable Development Goals (SDGs).

Social sustainability (SDG 3 – Good Health and Well-Being): By identifying the prevalence and risk factors of bruxism in an academic population, this research supports evidence-based preventive dentistry. Early detection reduces the risk of long-term orofacial damage, chronic pain, and temporomandibular disorders, thereby contributing to individual well-being and reducing the burden on public healthcare systems. Raising awareness among university students and staff promotes proactive health-seeking behavior, a key component of sustainable public health strategy.

Economic sustainability: Untreated bruxism leads to costly dental restorations, prosthetic failures, and specialist referrals. Preventive strategies informed by this study, such as systematic bruxism screening during routine dental examinations, can substantially reduce long-term treatment costs for both patients and healthcare systems, thereby contributing to a more efficient and sustainable allocation of dental resources.

Environmental sustainability: Data collection was conducted exclusively through a fully digital, paperless online questionnaire, minimizing resource consumption and environmental impact. This methodological choice reflects responsible and sustainable research practices, consistent with the principles of environmental stewardship in academic research.

8 ANNEXES

8.1 Annex 1

INFORMED CONSENT

This survey is part of the Graduation Project in Dentistry at Universidad Europea of Madrid titled PREVALENCE AND RISK FACTORS ASSOCIATED TO BRUXISM. The purpose of this work is to identify awareness and risk factors associated to bruxism and the information will be collected through a brief survey. Your participation in this study is voluntary. You may request to be withdrawn from the study without prior justification or prejudice to you. The information collected will be kept confidential and will not be used for any other purpose outside this research and research dissemination purposes. The data collected will be completely anonymous. No personal identifying information will be requested. Information collected in the survey will be treated in accordance with the provisions of Organic Law 3/2018, of December 5, Protection of Personal Data and Guarantee of Digital Rights. Do you give your consent to participate in the survey as a volunteer for the results to be used in the Final Degree Project PREVALENCE AND RISK FACTORS ASSOCIATED TO BRUXISM?

For the purposes of the provisions of the regulation of the Organic Law 3/2018, of 5 December, on the

Protection of Personal Data and Guarantee of Digital Rights, you are informed and expressly consent that the data provided in the survey may be used for the aforementioned purposes. This consent is granted without prejudice to all the rights that you have in relation to the aforementioned regulations, with the possibility of accessing the information provided, rectification, cancellation and opposition at any time you wish.

☐ I agree to participate

☐ I do not agree to participate

1. Age

☐ 18–25 ☐ 26–35 ☐ 36–45 ☐ >45

2. Sex

☐ Female ☐ Male ☐ Prefer not to say

3. Academic status

☐ Undergraduate student ☐ Postgraduate student ☐ Lecturer / Professor

4. Has anyone noticed or have you been told that you grind your teeth during sleep?
☐ Never ☐ Sometimes ☐ Often ☐ Very often ☐ I sleep alone / I don't know

5. Are you aware of clenching your teeth or tensing your jaw muscles during the day?
☐ Never ☐ Sometimes ☐ Often ☐ Very often

6. Have you experienced jaw stiffness or facial muscle fatigue upon waking?
☐ Never ☐ Sometimes ☐ Often ☐ Very often

7. Have you experienced any of the following? *(multiple answers allowed)*

☐ Tooth wear or fracture

☐ Jaw or facial muscle pain

☐ Temporomandibular joint pain or noises

☐ Headaches

☐ None

8. Have you ever consulted a healthcare professional for these symptoms?
☐ Yes ☐ No

9. If yes, were you diagnosed with bruxism?

☐ Yes ☐ No ☐ I don't know

10. If diagnosed, which type was identified?

☐ Sleep bruxism ☐ Awake bruxism ☐ Both ☐ Not specified ☐ Not applicable

11. If diagnosed, did you receive any treatment?

☐ Yes ☐ No ☐ Not applicable

12. If yes, which type of treatment? *(multiple answers allowed)*

☐ Occlusal splint

☐ Occlusal adjustment

☐ Orthodontic treatment

☐ Physiotherapy

☐ Medication (e.g., benzodiazepines)

☐ Botulinum toxin injections

☐ Behavioral therapy

☐ Other

☐ Not applicable

13. Are you aware that bruxism can lead to dental damage, muscle pain, or temporomandibular disorders?

☐ Yes ☐ No ☐ I am not sure

14. Do you consume caffeinated beverages?

☐ No ☐ 1–2 per day ☐ ≥3 per day

15. Do you smoke tobacco or use nicotine products?

☐ No ☐ Occasionally ☐ Daily

16. Do you drink alcohol?

☐ No ☐ Occasionally ☐ Several times per week

17. Do you have any of the following habits? *(multiple answers allowed)*

☐ Gum chewing ☐ Nail biting ☐ Chewing objects ☐ None

18. How would you describe your overall sleep quality?

☐ Very good ☐ Good ☐ Poor ☐ Very poor

19. Do you experience frequent night awakenings?

☐ Never ☐ Occasionally ☐ Frequently

20. Have you or a bed partner noticed any of the following? *(multiple answers allowed)*

☐ Teeth grinding sounds

☐ Restless slee

☐ Nightmares

☐ Snoring or breathing interruptions

☐ None

21. Have you been diagnosed with any neurological or sleep-related condition?

☐ No ☐ Yes ☐ Prefer not to say

8.2 Annex 2

Table 2. Prevalence of self-reported bruxism

Bruxism type	n	%
Sleep Bruxism (SB)	41	55.4%
Awake Bruxism (AB)	52	70.3%
Both SB and AB	32	43.2%
None	13	17.6%
Any bruxism	61	82.4%

8.3 Annex 3

Table 3. Self-reported symptoms associated with bruxism

Symptom	n	%
Jaw or facial muscle pain	35	47.3%
Headaches	32	43.2%
TMJ pain or noises	25	33.8%
Tooth wear or fractures	11	14.9%
None	16	21.6%

8.4 Annex 4

Table 4. Healthcare seeking behaviour and awareness

Variable	n	%
Consulted a professional	28	37.8%
Did not consult	45	60.8%
Diagnosed with bruxism	24	32.4%
Aware of bruxism consequences	62	83.8%
Aware but never consulted	38	61.3%

8.5 Annex5

Table 5. Treatments received

Treatment	n	%
Occlusal splint	18	24.3%
Other	2	2.7%
Physiotherapy	6	8.1%
Orthodontic treatment	5	6.8%
Botulinum toxin injections	4	5.4%
Occlusal adjustment	4	5.4%
Behavioural therapy	3	4.1%
Medication	3	4.1%

8.6 Annex 6

Table 6. Lifestyle habits

Habit	n	%
Caffeine 1–2/day	44	59.5%
Caffeine ≥3/day	10	13.5%
Smoking (daily)	26	35.1%
Smoking (occasionally)	12	16.2%
Alcohol (occasionally)	40	54.1%
Alcohol (several times/week)	6	8.1%
Gum chewing	32	43.2%
Nail biting	26	35.1%
Chewing objects	20	27.0%

8.7 Annex 7

Table 7. Sleep characteristics

Variable	n	%
Good/Very good sleep quality	55	74.3%
Poor/Very poor sleep quality	19	25.7%
Frequent night awakenings	10	13.5%
Teeth grinding sounds	16	21.6%
Snoring or breathing interruptions	21	28.4%
Nightmares	12	16.2%
Restless sleep	10	13.5%

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