

The Relationship between Sleep Bruxism with Coping with Stress, Anxiety and Alexithymia in Women

Kadınlarda Uyku Bruksizminin Stresle Başa Çıkma, Anksiyete ve Aleksitimi ile İlişkisi

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Abstract

Objective: Stress is known as a major cause of sleep bruxism. This disorder is characterised by repeated contraction of the masticatory muscles and requires multidisciplinary treatment. The objective of this study is to determine the relationship between sleep bruxism and three elements, namely alexithymia, coping with stress and anxiety on women.

Materials and Methods: One hundred female participants were examined in the study. All respondents completed a stress coping questionnaire, State-trait Anxiety inventory (STAI) and Toronto-alexithymia-scale (TAS-20). A Mann-Whitney U test, Student's t-test and chi-square tests were applied to analyse the data. Statistical significance was assumed for $p < 0.05$.

Results: The study sample consisted of 68 bruxist and 32 non-bruxist patients. Statistical significance was found between the two groups on religion and alcohol substance abuse coping scores ($p < 0.05$), although not for the case of TAS-20 and STAI values ($p > 0.05$).

Conclusion: The high score of "alcohol-substance use" (dysfunctional coping) in bruxist individuals and a high score of "religion" (emotion-focused coping) in non-bruxist individuals suggested that bruxist individuals have a tendency to prefer temporary methods to reduce stress instead of focusing on the root cause.

Öz

Amaç: Stres uyku bruksizminin gelişmesinde ana neden olarak tartışılmaktadır. Bu hastalık, çiğneme kaslarının tekrarlı kontraksiyonu ile karakterizedir ve multidisipliner tedavi gerektirir. Bu çalışmanın amacı kadınlarda uyku bruksizmi ve şu üç unsur arasındaki ilişkiyi belirlemektir: aleksitimi, stresle başa çıkma ve kaygı.

Gereç ve Yöntemler: Araştırmada yüz kadın katılımcı incelendi. Tüm katılımcılara stresle başa çıkma anketi, Durumluk-süreklilik Kaygı Envanteri (STAI) ve Toronto-aleksitimi ölçeği (TAS-20) doldurtuldu. Verilerin analizinde Mann-Whitney U testi, Student t-testi ve ki-kare testi uygulandı. İstatistiksel anlamlılık $p < 0,05$ olarak kabul edildi.

Bulgular: Çalışma örneklemini bruksizmi olan 68 ve bruksizmi olmayan 32 hastadan oluşmaktaydı. Her iki grup arasında din ve alkol-madde kötüye kullanımı başa çıkma puanları ($p < 0,05$) açısından istatistiksel anlamlılık tespit edildi, ancak TAS-20 ve STAI değerleri için farklılık bulunmadı ($p > 0,05$).

Sonuç: Bruksizmi olan bireylerdeki "alkol madde kullanımı" (disfonksiyonel başa çıkma) skorunun yüksek olması ve bruksizmi olmayan bireylerde "din" (duygu odaklı başa çıkma) skorunun yüksek bulunması bruksizmi olan bireylerin stresi azaltmak için ana nedene odaklanmak yerine geçici yöntemleri tercih etme eğiliminde olduklarını düşündürmektedir.

Introduction

The uncontrolled or subconscious movement of the jaw and its associated muscles during slumber (such as to grit or grind teeth) is known as sleep bruxism (SB) (1-3). As a result of SB, masticatory muscle pain, headache, muscle fatigue, tooth wear, tooth hypersensitivity, teeth movement, scalloped tongue, and linea alba related to cheek biting can occur (1-4). The common means by which SB may be diagnosed include electromyography, surveys, dental examination, and polysomnography. Among these methods, electromyography and polysomnography pairs are accepted as the highest quality and are the gold standard, although they suffer from prohibitive costs and availability issues when undertaking analysis using a sample of any significant size (5). Females frequently experience SB (6), particularly those in the 20-45 age bracket (1,3); in general, its presence is inconsistent and changes across a range of 5-30%, depending on the diagnostic methods and categorizations used (3). Several causative factors have been suggested for SB such as occlusal discrepancies, personality traits, disturbance of the dopaminergic system, stress, and anxiety (3,7,8). Anxiety levels can be measured by the State-trait Anxiety inventory (STAI). It is a self-reported instrument assessing state and trait anxiety (9).

Compulsive, aggressive, and controlling people are more prone to develop bruxism (10). Stress have been discussed as one of the etiological factor of SB by several researchers (1). Stress coping is the strategy of an individual to address a stressor (3). Coping styles are specific to the individual and can vary depending on factors such as age, gender, and diseases (11). Some people are less resilient to stress and therefore suffer more from the physical and psychological consequences of stress (4). Ahlberg et al. (12) found that bruxism is closely related to stress levels, and bruxism is thought to be a way to cope with stress. The COPE inventory is a multidimensional coping inventory to assess the different ways in which people respond to stress (13). COPE is a valid and reliable instrument for assessing coping strategies (11).

One condition commonly linked with SB is alexithymia, which was named after the Greek meaning 'deficient in expression and feeling' (from a, meaning lack, thymos, meaning emotion, and lexis, meaning language) by Sifneos (14) in the early 1970s. Alexithymia describes an inability to experience and express emotions and to distinguish between emotional states and bodily sensations (15). It is seen that these people have little relationship with their own spiritual realities and live in a mechanical manner like a robot (16). They lack creativity (17), and their ability to empathize with others is weak (18). Alexithymic characteristics may be observed in patients with a wide range of medical and psychiatric disorders, including psychogenic pain, substance abuse, stress, and depression (19). Salminen et al. (20) reported that prevalence of alexithymia was 13% in the general population. The Toronto-alexithymia-scale (TAS-20), developed by Bagby et al. (21,22) is used worldwide as a valid measurement of alexithymia (23).

The objective of this study was to determine the relevance between SB and three elements: alexithymia, coping with stress, and anxiety on women.

Materials and Methods

A total of 100 female individuals (68 bruxist and 32 non-bruxist patients) between 16 and 45 years old were sampled for the analysis, which was performed with the approval of the Necmettin Erbakan University Faculty of Dentistry Research Ethics Committee. Furthermore, the analysis was performed within the stipulations laid out by the Declaration of Helsinki (decision no: 2016/005, date: 18/05/2016). The sampled individuals were taken from the Department of Oral and Maxillofacial Radiology of the Faculty of Dentistry at Necmettin Erbakan University, and they were referred there for a dental check-up.

The sample eliminated individuals based on the following categories: painful temporomandibular joint disorders, mental disorders, use of psychotropic substances, other substance abuse such as alcohol or drugs, gross malocclusion existence, prior removal

of any teeth except the third molars, and presently undergoing orthodontic processes.

All questionnaires were undertaken by a single analyst, with those not yet 18-years-old also supplying documented and informed consent prior to their participation. Documented consent was obtained from each individual prior to their undertaking the STAI, TAS-20 and COPE inventory.

SB was diagnosed via the following classification, as stipulated by the American Academy of Sleep Medicine (24):

1. The presence of regular or frequent tooth-grinding sounds occurring during sleep
2. One or more of the following:
 - Tooth wear consistent with tooth grinding during sleep
 - Transient morning jaw muscle pain or fatigue and/or a temporal headache and/or jaw locking upon awakening consistent with tooth grinding during sleep.

Sociodemographic data, such as age, employment, marital status, education, and income level, was recorded for each participant.

The survey that accompanied the physical examination asked the following of participants:

1. Do you have a habit of tooth grinding/clenching?
2. Does anyone else hear you grinding your teeth at night?
3. Do you wake up in the morning with a dull headache?
4. Do you feel pain around the jaw joint after waking up?
5. Do you have a complaint about poor sleep quality/waking up tired?
6. Do you have tooth hypersensitivity?

The objective of the COPE inventory is to analyze the myriad of ways in which individuals may react to stress. Its 60 items contain a range of possible responses from the highest of 4 ("I do this a great deal") to 1 ("I don't do this at all") in a similar manner to the Likert scale. From these results, a scale score can be determined to reflect the frequency with which a method of dealing with stress is employed among the sample (25). Table 1 demonstrates the categorization of the items into subscales and into a trio of categories that are problem-focused (PF), dysfunctional (D), and emotion-focused (EF) coping mechanisms.

The STAI is widely used as a self-reported measure of general anxiety. There are 40 items and two subscales within this measure; 20 items of the State anxiety scale (S-anxiety) evaluate the current state of anxiety, and 20 items of the Trait anxiety scale (T-anxiety) evaluate the trait anxiety (26). All items are rated on a 4-point scale from "Almost Never" to "Almost Always" A validity and reliability study of the STAI was performed by Lecompte and Öner (27).

Alexithymia is measured using the TAS-20, which is a globally employed tool relying on the individual to volunteer information and was deemed valid by research from by Güleç et al. (28) that confirmed its suitability to Turkish culture. Similar to the COPE inventory, the TAS-20 employs a Likert scale of over 20 items, with responses ranging from "strongly agree" to "strongly disagree" and a trio of subscales (21,22). These subscales are as follows:

1. Problems Identifying Feelings, which quantifies the problems of individuals in locating emotions.
2. Externally Oriented Thinking, which quantifies the extent to which people pay attention to the world outside of themselves.
3. Problems Describing Feelings, which quantifies the extent to which individuals struggle to label their emotions.

Table 1. Fifteen subscales of COPE inventory

Cope 1: Positive reinterpretation and growth	EF
Cope 2: Mental disengagement	D
Cope 3: Focus on and venting emotions	D
Cope 4: Seeking instrumental social support	PF
Cope 5: Active coping	PF
Cope 6: Denial	D
Cope 7: Religion	EF
Cope 8: Humor	EF
Cope 9: Behavioral disengagement	D
Cope 10: Restraint coping	PF
Cope 11: Seeking emotional social support	EF
Cope 12: Alcohol/drug use	D
Cope 13: Acceptance	EF
Cope 14: Suppression of competing activities	PF
Cope 15: Planning	PF
EF: Emotion-focused coping, PF: Problem-focused coping, D: Dysfunctional coping mechanisms	

Statistical Analysis

All statistical analysis was performed using SPSS software (ver. 21; SPSS, Inc., Chicago, IL, USA). Data were tested for normality using the Kolmogorov-Smirnov test. If normally distributed, score differences between bruxist and non-bruxists were evaluated by Student’s t-test. If normality was violated, data were analyzed by the Mann-Whitney U test. The chi-square test was used for defining the relationship between SB and marital status, education level, and income level. Statistical significance was assumed for $p < 0.05$.

Results

Of the 100 female patients with a mean age of 22.6, 68 were bruxist and 32 were non-bruxist patients. One of the participants (1%) was divorced, 18 (18%) were single, and 81 (81%) were married. Subjects who were married had a higher percentage of SB (72%) than singles (66%).

In all, 87% of the study sample had graduated from university. There was no relationship between SB and marital status, education level, and income level ($p > 0.05$) (Table 2).

It was found that there was statistical significance between bruxists and non-bruxist patients regarding the cope 7 (religious coping) ($p = 0.049$, $p < 0.05$) and cope 12 (alcohol-drug use) ($p = 0.020$, $p < 0.05$) subscales (Table 3). Alcohol-substance use is more commonly used in bruxist patients, while religious coping is used in non-bruxist patients.

The TAS-20 and STAI scores showed no significant differences between bruxist and non-bruxist patients ($p > 0.05$) (Table 4).

Discussion

Based on the etiology, bruxism can be classified as awake, sleep, occlusion-dependent, psycho-dependent, and a mixed type, depending both on the occlusion and psyche (29). The most destructive type is SB (1). This disorder is characterized by

repeated contraction of the masticatory muscles, and the highest activity is observed during the REM (rapid eye movement) phase of sleep (30). It requires multidisciplinary treatment that should include specialists such as a dentist, psychiatrist, physiotherapist, neurologist, psychologist, and a dental technician (31).

Stress is a causal agent of SB, and SB occurs more often after exhausting and stressful days (32). It can be divided into acute and chronic. Chronic stress causes the most destructive conditions threatening a human organism (33). “Emotional brain”, which has a completely separate structure from the neocortex and functions separately, controls vital emotions and reactions. Pathological chronic stress and emotional disorders are the consequences of functional disturbances of the “emotional brain” (31). Various pathological emotional experiences more and more often result in the development of a muscular

Table 3. The difference between SB and COPE subscales (The results of Student’s t-test)

	p-values
COPE-1	0.266
COPE-2	0.563
COPE-3	0.155
COPE-4	0.316
COPE-5	0.132
COPE-6	0.638
COPE-7	0.049*
COPE-8	0.554
COPE-9	0.607
COPE-10	0.887
COPE-11	0.343
COPE-12	0.020*
COPE-13	0.816
COPE-14	0.473
COPE-15	0.723

*The significance level is 0.05, SB: Sleep bruxism

Table 2. The difference between SB and marital status, education level, income level (The results of chi-square test)

	Marital status	Education level	Income level
p-values	0.710	0.295	0.483

SB: Sleep bruxism

Table 4. The difference between SB and TAS-20 and State-Trait Anxiety inventory scores (The results of Mann-Whitney U test)

	TAS-1	TAS-2	TAS-3	STAI-1	STAI-2
p-values	0.633	0.945	0.983	0.125	0.473

SB: Sleep bruxism

parafunction/bruxism (10). The contemporary environment is full of stress threats, and the number of patients suffering from bruxism has increased significantly in recent years (31).

In an epidemiologic study on German, British and Italian populations, self-reported SB was found to be related to a highly stressful lifestyle (34) and severe stress at work (12). The majority of studies suggest that SB is associated with stress (35), while a small proportion reported no relationship between self-reported stress levels and the degree of SB (36-38). In dentistry, stress has also been regarded as an etiological factor for periodontal diseases, such as acute necrotizing ulcerative gingivitis (39).

Since we included SB or non-SB individuals without any tooth-loss, age range was kept relatively narrow (16-45 years). Men and women tend to react differently with stress-both psychologically and biologically. We studied only with women because gender difference can be an important risk factor for some health problems such as autoimmune diseases, chronic pain, depression, and anxiety disorders are relatively more prevalent among women (40).

Lurie et al. (4) showed no difference in the intensity of stress experienced by pilots compared to non-pilot officers, but differences in coping behaviors contributed to the high percentage of bruxism in pilots. The pilots suffering from bruxism tended to use less PF and more EF coping methods. An analysis of stress-coping strategies in patients with SB compared to non-bruxist controls revealed that patients with SB used significantly more negative coping strategies such as escape (1,3).

The majority of studies in the literature tried to find an association between the influence of various stress factors and their effects on health but failed to consider individual responses to the same (39). The present study investigated the anxiety, alexithymia and stress coping scores in SB and non-SB individuals. An evaluation of coping methods was provided to discover differences in the use of certain strategies by the SB and non-SB participants (41).

Schneider et al. (3) showed that bruxist patients used significantly more D coping methods. Our results indicated that one of the D coping styles ("alcohol-substance use") is more commonly used in SB patients, while one of the emotional focused coping styles ("religion") is more commonly used in

non-SB patients. This may be explained with EF coping behaviors have less risk of SB. D coping strategies include consuming alcohol or drugs to make oneself feel better, admitting that one cannot address it and should quit trying, and acting as though the problem has not really occurred. EF coping, such as religion, is an avoidance and unlikely to be effective in dealing with stress and is associated with low levels of well-being. However, the understanding of 'fatalism' existing in the Islamic religion facilitates 'acceptance' in the face of the negative life events that people experience. This suggests that the person is less likely to be hurt when the stressor is realistic and unchanging. It is thought that this is the cause of the difference in our cases. On the other hand, PF coping is associated with high levels of well-being (42). Genco et al. (42) suggested that individuals with high levels of PF coping had less periodontal tissue destruction. PF coping is practiced in those situations that are considered changeable, while EF coping is more common in conditions that have to be accepted and in which an individual feels helpless (39).

Individuals who were single had less risk for SB in our study. Being single may help to raise strength when facing a challenge (42).

The relationship between anxiety and bruxism has been evaluated in previous studies; however, the results are controversial (43). The current study indicated that STAI scores did not show a difference between SB and non-SB individuals. This result is in accordance with Manfredini et al. (44) but in contrast with Gungormus and Erciyas (43). Methodology and study sample diversity may lead to this difference.

The present study hypothesized that individuals developed SB as a bodily response at a point where they could not express their emotions. Therefore, this study evaluated alexithymia scores and revealed no difference between SB and non-SB participants. Numerous reports have been published linking alexithymia with various somatic and psychosomatic diseases (45), but our results revealed that SB is not a manifestation of not expressing the emotions of an individual. Sipilä et al. (45) found that alexithymia is connected with orofacial symptoms. Alexithymia scores were higher in subjects with more orofacial symptoms than in asymptomatic subjects. Jerlang (46) found that the majority of patients with burning mouth syndrome were alexithymic, and in a study by

Miyaoka et al. (47) patients with glossodynia were more alexithymic than controls.

Conclusion

In conclusion, one of the D coping styles (“alcohol-substance use”) is more commonly used in SB patients, while one of the emotional focused coping styles (“religion”) is more commonly used in non-SB patients. The high score of ‘alcohol-substance use’ in individuals with SB suggested that SB individuals have a tendency to prefer temporary methods to reduce stress instead of focusing on the cause. Anxiety and alexithymia did not associated with SB.

Ethics

Ethics Committee Approval: This Study was performed with the approval of the Necmettin Erbakan University Faculty of Dentistry Research Ethics Committee. Furthermore, the analysis was performed within the stipulations laid out by the Declaration of Helsinki (decision no: 2016/005, date: 18/05/2016).

Informed Consent: All questionnaires were undertaken by a single analyst, with those not yet 18-years-old also supplying documented and informed consent prior to their participation. Documented consent was obtained from each individual prior to their undertaking the STAI, TAS-20 and COPE inventory.

Peer-review: Externally peer-reviewed.

Authorship Contributions

Concept: S.Ö., M.A., Design: S.Ö., M.A., Data Collection or Processing: M.T., Analysis or Interpretation: M.T., S.Ö., M.A., Literature Search: M.T., Writing: M.T., S.Ö., M.A.

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