

Association between Self-Reported Bruxism, Peripartum Depression and Myogenous Temporomandibular Disorders among Postpartum Women in Turkey

SUMMARY

Background/Aim: It is possible to find studies in the literature evaluating the relationship among self-reported bruxism, psychological factors, and myogenous temporomandibular disorder. In addition, the relationship between these issues has not yet been clarified. The objective of this study was to evaluate the association between peripartum depression, self-reported bruxism, and myogenous temporomandibular disorders among postpartum women in Turkey. **Material and Methods:** This study included 220 women, whom were asked about their bruxism behaviour during day and during sleep. Besides, all of them assessed with Short-Form Fonseca's Anamnestic Index for myogenous temporomandibular disorder and the Edinburgh postnatal depression scale for peripartum depression. **Results:** The results showed that, self-reported bruxism was observed at a statistically significantly higher rate (94.3%) in peripartum depression group. 86.5% of the patients with self-reported bruxism had myogenous temporomandibular disorder ($p < 0.001$). As a result, 80.0% of the patients with peripartum depression had myogenous temporomandibular disorder ($p < 0.001$). **Conclusions:** In conclusion, a significant relationship has been found between peripartum depression and self-reported bruxism, self-reported bruxism and myogenous temporomandibular disorder; and peripartum depression and myogenous temporomandibular disorder. The present study is the first to evaluate the relationship between peripartum depression, self-reported bruxism, and myogenous temporomandibular disorder so it could be considered as a pilot attempt, and further studies using more representative samples are encouraged.

Key words: Self-Reported Bruxism, Peripartum Depression, Myogenous Temporomandibular Disorder, Fonseca Anamnestic Index, Edinburgh Postnatal Depression Scale

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Introduction

The temporomandibular joint (TMJ), which is one of the most complex joints in the human body, is the location where the temporal bone articulates with the mandible¹. Temporomandibular disorders (TMD) are defined by the American Academy of Orofacial Pain as disorders involving TMJ, masticatory muscles, and related structures^{2,3}. The signs and symptoms of TMD include

pain (such as in the preauricular region, head, face, and TMJ), fatigue in the stomatognathic system muscle, limited mouth opening and/or mandibular movement, and joint noise^{4,5,6}. Trauma, pathological lesions, and parafunctional habits are the etiological factors of TMD⁷.

Bruxism is defined by the American Academy of Orofacial Pain as "parafunctional activity including clenching, bracing, gnashing, and grinding of the teeth"⁸. Bruxism, which has no functional and physiological role

in the stomatognathic system, causes hyperactivity of the muscle groups and pain in the masticatory muscles⁹. It is divided into two subgroups: awake bruxism (AB) and sleep bruxism (SB)¹⁰. SB is defined as activity of the masticatory muscles during sleep that may be rhythmic (phasic) or non-rhythmic (tonic). AB is defined as activity of the masticatory muscles during wakefulness that is characterised by sustained or repetitive tooth contact and/or by bracing or thrusting of the mandible. Neither SB nor AB is not a movement disorder in otherwise health individuals.

Psychology is an important influence among the etiological factors of bruxism and/or TMD^{6,11-13}. In particular, anxiety, manic symptoms, and depression can cause bruxism, which might be an important factor for the pathogenesis of TMD^{12,14,15}.

Peripartum depression (PPD), previously called "postpartum depression" by the Diagnostic and Statistical Manual of Mental Disorders-V (DSM-V), is considered to be one of the most common complications of labor and is defined as a subtype of major depression that occurs during pregnancy or within the four weeks postpartum period¹². Untreated PPD not only affects the mother, but can also lead to cognitive, psychological, social, and behavioral problems for the child¹⁶.

The objective of this study was to evaluate the association between PPD, bruxism, and myogenous TMD (mTMD) among postpartum women. The researchers hypothesized that there was a correlation between PPD, bruxism, and mTMD among postpartum women.

Material and Methods

Study design and subjects

This study included 220 women who had given birth within the four weeks in the Gynecology and Obstetrics Clinic of Uşak University Education and Research Hospital. The study was carried out between October 2019 and February 2020. Their ages ranged from 17 to 45. This study was approved by the Ethics Committee of Uşak University (Reference number: 237-04). Written consent forms were taken from all of the women involved in the study.

Demographic information for the study participants was recorded. Having given birth within the previous four weeks was sufficient for the inclusion criteria. The exclusion criteria were as follows: 1) Systemic disorders, 2) having previously received psychiatric support, 3) having previously used antidepressants or sleeping pills, 4) having undergone orthodontic treatment, orthognathic surgery, or TMJ surgery, 5) having experienced trauma in the TMJ, 6) having received treatment for TMJ pain or having been diagnosed with pathologic lesions or symptoms in the TMJ 7) and using partial or total dental prosthesis, or had tooth loss.

Signs of bruxism were diagnosed in consideration of the patient's history during their first visit to the gynecology and obstetrics clinic. According to international consensus recommendations, the diagnosis of possible bruxism was based on self-reports¹⁷. The questionnaire items for self-reported bruxism were as follows:

- (1) Are you aware that you grind your teeth during sleep?
- (2) Has anyone ever told you that you grind your teeth during sleep?
- (3) Upon awakening in the morning or during the night, do you have your jaws thrust or braced?
- (4) Do you clench your teeth while awake?
- (5) Do you grind your teeth while awake?^{18,19}. The responses to all questions were yes/no.

Fonseca anamnestic index (FAI)

A questionnaire based on FAI was used to categorize the severity of each participant's TMD. The participants were asked to answer questions without any time restrictions. Only one answer was requested for each question, with the value of each answer being "yes = 10," "no = 0," and "sometimes = 5." In this study, this total score was not considered, since the authors evaluated mTMD with a few questions of FAI (items 1, 2, 3, 6, and 7)¹⁸ (Table 1). These questions constitute the Short-Form FAI (SFAI) and include the following questions respectively. 1) Do you have difficulty opening your mouth, 2) Do you have difficulty moving jaw to the side?, 3) Do you have muscle fatigue/pain when you chew?, 6) Do you have pain in your ear or your joints?, 7) Have you ever noticed if you have noises in the TMJ when you chew or when you open your mouth?

Table 1. Fonseca's Anamnestic Index Questionnaire

Questions	Yes	No	Sometimes
1. Is it hard for you to open your mouth?			
2. Is it hard for you to move your mandible from side to side?			
3. Do you get tired /muscular pain while chewing?			
4. Do you have frequent headaches?			
5. Do you have pain on the nape or stiff neck?			
6. Do you have earaches or pain in craniomandibular joints?			
7. Have you noticed any TMJ clicking while chewing or when you open your mouth?			
8. Do you clench or grind your teeth ?			
9. Do your feel your teeth do not articulate well?			
10. Do you consider yourself a tense (nervous) person?			

Edinburgh Postnatal Depression Scale (EPDS)

The EPDS was used to assess the patient's PPD. It is a 10-item self-report scale with four response categories for each item, ranging from a score of 0 (no

presence of the symptoms) to three (marked presence or change) (Table 2). The global score of questionnaire was determined between 0 and 30 points. Those who scored 13 or more were considered women with depression²⁰.

Table 2. Edinburgh Postnatal Depression Scale

<p>1. I have been able to laugh and see the funny side of things As much as I always could Not quite so much now Definitely not so much now Not at all</p> <p>2. I have looked forward with enjoyment to things As much as I ever did Rather less than I used to Definitely less than I used to Hardly at all</p> <p>3. I have blamed myself unnecessarily when things went wrong Yes, most of the time Yes, some of the time Not very often No, never</p> <p>4. I have been anxious or worried for no good reason No, not at all Hardly ever Yes, sometimes Yes, very often</p> <p>5. I have felt scared or panicky for no very good reason Yes, quite a lot Yes, sometimes No, not much No, not at all</p> <p>6. Things have been getting on top of me Yes, most of the time I haven't been able to cope at all Yes, sometimes I haven't been coping as well as usual No, most of the time I have coped quite well No, I have been coping as well as ever</p> <p>7. I have been so unhappy that I have had difficulty sleeping Yes, most of the time Yes, sometimes Not very often No, not at all,</p> <p>8. I have felt sad or miserable Yes, most of the time Yes, quite often Not very often No, not at all</p> <p>9. I have been so unhappy that I have been crying Yes, most of the time Yes, quite often Only occasionally No, never</p> <p>10. The thought of harming myself has occurred to me Yes, quite often Sometimes Hardly Never</p>
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Results

A total of 220 patients participated in the present study. Their mean age was 28.4±7.4 and ranged from 17 to 45. Among the participants, 70 (31.8%) were considered with PPD according to EPDS and 150 (62.2%) were psychologically healthy. Self-reported bruxism prevalence was 47.3% and mTMD prevalence was 45.3% among woman in postpartum period. The prevalence of participants with both self-reported bruxism and mTMD was 40%. Descriptive statistics were presented in Table 3.

Table 3. Descriptive statistics

	Mean± SD	Frequency (N)	Percentage (%)
Age	28.4±7.4		
PPD		70	31.8
Self-reported bruxism		104	47.3
mTMD		100	45.5
Self-reported bruxism+mTMD		90	40.0

SD: standard deviation, PPD: peripartum depression, mTMD: myogenous temporomandibular disorder

Table 4. Association between SFAI questions and bruxism among postpartum woman

		Self-reported bruxism		P*-value
		Yes	No	
1. Is it hard for you to open your mouth?	Yes	43 _a (89.6%)	5 _b (10.4%)	<0.001
	No	8 _a (18.6%)	35 _b (81.4%)	
	Sometimes	1 _a (5.3%)	18 _b (94.7%)	
2. Is it hard for you to move your mandible from side to side?	Yes	44 (89.8%)	5 (10.2%)	<0.001
	No	7 (13.2%)	46 (86.8%)	
	Sometimes	1 (12.5%)	7 (87.5%)	
3. Do you get tired /muscular pain while chewing?	Yes	40 (88.9%)	5 (11.1%)	<0.001
	No	11 (17.2%)	53 (82.8%)	
	Sometimes	1 (100.0%)	0 (0.0%)	
6. Do you have earaches or pain in craniomandibular joints?	Yes	24 (75.0%)	8 (25.0%)	<0.001
	No	27 (41.5%)	38 (58.5%)	
	Sometimes	38 (58.5%)	12 (92.3%)	
7. Have you noticed any TMJ clicking while chewing or when you open your mouth?	Yes	31 (43.1%)	41 (56.9%)	0.157
	No	17 (63.0%)	10 (37.0%)	
	Sometimes	4 (36.4%)	7 (63.6%)	

**Chi Square, SFAI: short form of Fonseca Anamnestic Index

There was a significant association between SFAI questions (1, 2, 3, 6) and self-reported bruxism p<0.001, but no association was found for question 7 (p=0.157) (Table 4).

Table 5. Frequency (%) distribution and association self-reported bruxism with mTMD results (n=220)

Self-reported Bruxism	mTMD		P*-value
	Yes	No	
Yes	90 ^a (86.5%)	14 ^b (13.5%)	<0.001
No	8 ^a (7.0%)	106 ^b (93.0%)	

mTMD: myogenous temporomandibular disorder

*Chi Square. Same superscript lowercase letters represent no significant difference in columns at the 0.05 level

mTMD was observed at a statistically significantly higher rate in patients with self-reported bruxism. As a result, 86.5% of the patients with self-reported bruxism had mTMD (p<0.001) (Table 5).

In PPD group, self-reported bruxism was observed at a statistically significantly higher rate. As a result, 94.3% of the patients with PPD had self-reported bruxism (p<0.001) (Table 6A). mTMD was observed at a statistically significantly higher rate. As a result, 80.0% of the patients with PPD had mTMD (p<0.001) (Table 6B). The prevalence of participants with both self-reported bruxism and mTMD was 79.4%.

Table 6A. Frequency (%) distribution and association self-reported bruxism with PPD results (n=220)

	Self-reported bruxism		P*-value
	Yes	No	
PPD	66 ^a	4 ^b	<0.001
Yes	94.3%	5.7%	
No	38 ^a	112 ^b	
	25.3%	74.7%	

mTMD: myogenous temporomandibular disorder

*Chi Square. Same superscript lowercase letters represent no significant difference in columns at the 0.05 level

Table 6B. Frequency (%) distribution and association PPD with mTMD results (n=220)

	mTMD		P*-value
	Yes	No	
PPD	56 ^a	14 ^b	<0.001
Yes	80.0%	20.0%	
No	44 ^a	106 ^b	
	29.3%	70.7%	

PPD: peripartum depression, mTMD: myogenous temporomandibular disorder

*Chi Square. Same superscript lowercase letters represent no significant difference in columns at the 0.05 level

In physiologically healthy group, self-reported bruxism was observed at a statistically significantly lower rate. As a result, the prevalence of self-reported bruxism was 25.3% ($p < 0.001$) (Table 6A). mTMD was observed at a statistically significantly lower rate. The prevalence of mTMD was 29.3% ($p < 0.001$) (Table 6B). The prevalence of participants with both self-reported bruxism and mTMD was 24%.

Discussion

PPD is considered to be one of the most common labor complications and is defined by the DSM-V as a major episode of depression occurring during pregnancy and within four weeks of childbirth¹⁹. It has been reported that the rate of PPD is 3.5–40% worldwide²⁰⁻²² and 6.3–50.7% in Turkey¹⁵. The PPD rate in the present study was 31.8%, which was consistent with the existing literature. The substantial differences in the frequencies of PPD that were reported by the above studies can be explained by the significant differences in their designs, evaluation times after childbirth, sample sizes, and populations¹⁵. Although PPD and non-perinatal major depressive disorders have the same DSM diagnostic criteria, a few symptoms are more prominent in PPD than in major depressive disorders^{23,24}. Among these symptoms, high-level anxiety is particularly more prevalent in PPD than in major depression^{24,25}. The EPDS, which consists of

self-reported questionnaires, was used instead of having psychologists conduct interviews with the patients. The EPDS was preferred because of factors such as the large number of patients in the present study and the patients' inability to spare time for interviews. In addition, the EPDS has been widely used for screening PPD and it has been stated that this scale is a method that gives simple, fast, and reliable results^{26,27}.

In this study, there were 2 main reasons for the self-reported diagnosis of bruxism. The first is that because of the number of participants in the present study it was not possible to make assessments by performing PSG or clinical examinations. In the literature, studies involving large numbers of participants included patients who had also been diagnosed with bruxism based on self-reports, as in the present study^{28,29}. The second reason is that the authors of the study had to carry out patient assessments at the Uşak University Medical Faculty Education and Research Hospital, Obstetrics and Gynecology Unit, since the patients who were in the postpartum period were not able to come to the Uşak University Faculty of Dentistry. Therefore, it was only possible to assess bruxism (awake and sleep) through taking chairside histories that led to diagnoses of "possible" bruxism.

According to our knowledge, there was no study that evaluate the relationships between PPD, bruxism, and mTMD in the literature. It is, however, possible to find numerous studies in the literature that show the effects of psychological factors such as depression, anxiety, and stress on the stomatognathic system, particularly with regard to bruxism^{9,30}. The relationship between the occurrence of bruxism and depression is still controversial due to the lack of scientific proof that depression can be the cause of bruxism⁹. However, in their study, Smardz *et al.*⁹ evaluated the relationship between nocturnal bruxism and stress and depression. The results revealed no relationship between sleep bruxism and self-reports of perceived stress and depression. In the present study, the participants were diagnosed with sleep bruxism through PSG⁹. Owczarek *et al.*²⁸ evaluated the effects of stress, anxiety, and depression on the stomatological systems in students in the departments of dentistry and physiotherapy. The study reported a significant relationship between self-reported bruxism and depression, anxiety, and stress factors²⁸. In the results of another study assessing the relationship between anxiety, depression, and bruxism, Gungormuş *et al.*³¹ reported that anxiety and depression were statistically significantly higher among bruxers than in non-bruxers³¹. In this study, the rate of self-reported bruxism was 94.3% in individuals with PPD, while it was only 25.3% in individuals without PPD, and this difference was statistically significant ($p < 0.001$). Also, the prevalence of bruxism in all participants was 47.3%. The relationship between bruxism and depression was explained in two ways in the literature. First, bruxism could be induced

by some drugs used in the treatment of depression. Uca *et al.*³² reported an increased incidence of bruxism in patients taking antidepressants than in those in the control group³². In the present study, however, no participants were taking antidepressants. The second explanation involves the assumption that a “vicious circle” can occur between depression, bruxism, and TMD. This assumption can be explained by the work of Fernandes *et al.*³⁰ who reported that the frequency of depression in individuals with bruxism was associated with TMD. The researchers stated that bruxism was a major risk factor for painful TMD, and that painful TMD caused depressive symptoms in individuals because of its substantial impact on their qualities of life³⁰. Therefore, in the present study, the prevalence of mTMD was also investigated. It was observed that the rate of mTMD in patients with PPD was 80%. A statistically significant difference was found between the incidence of mTMD between patients with and without PPD ($p < 0.001$). The rate of mTMD in patients with PPD was 80%, and a statistically significant difference was found between patients who had PPD and those who did not ($p < 0.001$).

The relationship between bruxism and TMD remains controversial and complex³³⁻³⁵. Most of the previous studies of the relationship between bruxism and TMD reported positive relationships between them. However, in their review Jimenez-Silva *et al.*³⁴ reported a low-to-moderate level of evidence for this relationship. TMD is an umbrella term and involves a series of clinical alterations involving the masticatory muscle, TMJ, and associated structures¹⁷.

Indexes such as the research diagnostic criteria for temporomandibular disorders (RDC/TMD) and the FAI have been developed for the purpose of establishing a diagnosis of TMD. However, although the RDC/TMD has demonstrated a high level of accuracy and reliability in diagnosing TMD, this index is difficult to apply as it requires face-to-face evaluation, lengthy protocols, and evaluator training and experience¹⁷. The FAI is an index based on patient discourse, and evaluations are made according to the answers given by the volunteers¹⁷. In addition, the FAI is a reliable and simple method to apply. The results of the studies conducted by Berni *et al.*³⁶ and Pires *et al.*¹⁷ revealed that the SFAI, which consists of questions 1, 2, 3, 6, and 7 of the FAI, has a high reliability rate, especially in the diagnosis of mTMD^{17,36}. Gender factors are known to have an effect on bruxism and the incidence of TMD¹⁷. In his study, Berni *et al.*³⁶ stated that SFAI can be used reliably in the diagnosis of mTMD only in females, and likewise, Pires *et al.*¹⁷ and Rodrigues *et al.*³⁷ conducted their studies only with the participation of female individuals^{17,37}. It is important to note that the participation of only women in the present study is compatible with the literature with regard to diagnosing mTMD using the SFAI. The present study revealed statistically significant differences between self-reported

bruxism and non-bruxism among individuals in all questions except for the 7th: “Have you noticed any TMJ clicking while chewing or when you open your mouth?” Muscle pain was emphasized in all of these questions, and it was found that individuals whose self-reports indicated bruxism had significantly greater muscular pain than those whose self-reports indicated non-bruxism. Among the studies evaluating the relationship between bruxism and TMD, there are those who argue that there is a particular relationship between bruxism and muscle-induced pain^{33,38}. Although these studies were conducted using RDC/TMD for evaluation, the result of the present study appears to be compatible with the literature. Moreover, in the 7th question no statistically significant difference was seen between self-reported bruxism and non-bruxism among the individuals. Previous studies reported inconsistent results about the effects of bruxism on TMJ clicking³⁹⁻⁴¹. The results of the present study suggested no association between bruxism and TMJ clicking. Also, although Sakaguchi *et al.*⁴⁰ found that TMJ clicking was 3.7 times more likely to occur in adolescents with sleep bruxism⁴⁰, Prado *et al.*⁴¹ reported no association between clicking and sleep bruxism⁴¹. Bruxism in the peripartum period could be considered to be relatively short, and the effect of bruxism on TMJ tissues might not be observed.

Among the etiological factors for TMD, the evaluation of psychological factors is still a matter of debate. Some researchers have claimed that there is a relationship between psychological factors and TMD, while others have disagreed. For example, Owczarek *et al.*²⁸ reported that TMD positively correlates with the occurrence of depression and anxiety²⁸. In addition, Slade *et al.*⁴² stated that factors such as depression and intense stress increase a patient’s susceptibility to TMD pain⁴². However, Lopes *et al.*⁴³ found no direct relationship between major depression and TMD⁴³. The present study revealed a significant relationship between PPD and mTMD. As mentioned above, this can be explained by the vicious circle theory. The present study, which aimed to evaluate the associations between PPD, self-reported bruxism, and mTMD, could be considered as a pilot attempt, and further studies using more representative samples are encouraged.

There are a few limitations regarding the present study. Bruxism was not evaluated in terms of whether participants were awake or asleep. Therefore, the distinction between PPD and mTMD could not be made in individuals with bruxism in relation to when they were awake and asleep.

Conclusions

In conclusion, a significant relationship has been found between PPD and bruxism, bruxism and mTMD,

and PPD and mTMD. Future long-term studies are needed to evaluate the effects of PPD as a psychological factor in the relationship between bruxism and mTMD. Bruxism and mTMD should be counted among the risk factors for women who have complaints of orofacial pain in the peripartum period.

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