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Burning Mouth Syndrome in a Sample of Turkish Population

SUMMARY

Objectives: *The purpose of this study was to investigate and compare age, gender, menopause, duration of symptoms, laboratory results, location of burning symptoms, type of denture and the psychological aspects according to the type of burning mouth syndrome (BMS) in a sample of Turkish population.*

Methods: *63 patients complaining of burning, pain and xerostomia over the last 6 months or longer were examined clinically and radiographically; laboratory evaluation was performed as well. Non-stimulated whole salivary flow rate was determined. Psychological disturbances were evaluated by the Speilberger State-Trait Anxiety Inventory for anxiety and Zung Self-Rating Depression Scale for depression.*

Results: *Of the total of 63 cases, 50 (79.4%) were females and 13 (20.6%) were males. 34 of these subjects were Type 1 and 29 were Type 2 BMS. There was no statistically significant difference for age, gender, menopause, location of burning symptoms and type of denture between Type 1 and Type 2 groups ($p>0.05$). Non-stimulated whole salivary flow rate and all data were within normal ranges for both groups. For anxiety and depression, there were no statistically significant differences between Type 1 and Type 2 BMS patients ($p>0.05$), but anxiety scores (SAI and TAI) of both groups were found to be significantly higher than normal ranges. However, Zung Depression Scores for both groups were within normal ranges. All patients had cancer-phobia, and the mean VAS scores were 3.32±0.91 and 3.55±0.95 for Type 1 and Type 2 BMS patients, respectively.*

Conclusion: *The psychological element has been an important aspect of the pathological picture for BMS, and anxiety is the most important factor in both types of BMS.*

Keywords: Anxiety; Depression; Psychological Disturbance; Visual Analogue Scale

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Introduction

The term *Burning Mouth Syndrome* (BMS) is in widespread use, although in the past, terms such as glossodynia, glossalgia, stomatodynia, stomatopyrosis and oral dysaesthesia have been used to describe patients complaining of intra-oral burning symptoms. When the burning symptoms persist for over 6 months, and objective clinical findings of local and systemic disorders have not been demonstrated, in contrast to the clinically normal appearance of the oral mucosa, patients with burning symptoms pronounce excessive complaints, often accompanied by other phenomena, such as dryness, paraesthesia and changes in the sensations of taste (predominantly bitter or metallic) and smell. This condition is known as BMS[7-10,18,19,25-27,36,40,42]. The aetiology and pathogenesis are unknown[2,3,5,6,16,21,23,26-28,32,34,38-41], but recently, the psychological element has been an important aspect of the pathological picture[4,12,15,17,18,32,37,42]. The prevalence of BMS is unknown[25], but international estimates of the prevalence vary from 0.7% to 15%[27,35,40], and a higher prevalence is found among middle-aged women[8,18,20,36], mean age ranging between 55-60 years[8,18,36]. The site of burning is variable, but most often affects the

tongue, followed by the palate, upper alveolus, lips and the lower denture bearing area. More than 1 site is usually affected and there is nearly always a bilateral involvement. Other sites in the oral mucosa and the throat may be involved[8,9,20,30,33,35,37,38].

The pattern of daily symptoms seems fairly stable for the individual patient. The symptoms of BMS tend to fall into three broad categories: Type 1, Type 2 and Type 3. There are similarities between these subtypes. In Type 1 BMS, patients suffer no symptoms on waking, but the burning begins and increases in severity as the day goes on; in Type 2 BMS, patients suffer from burning on waking and it persists throughout the day; in Type 3 BMS, patients have symptom-free days and also complain of involvement at unusual sites, such as the floor of the mouth or the throat[21].

The purpose of this study was to investigate and compare the age, gender, menopause, duration of symptoms, laboratory results, location of burning symptoms at the oral mucosa, type of dentures and the psychological aspects in relation to the type of BMS in a sample of Turkish population

Material and Methods

A total of 63 patients with burning or pain symptoms were examined in the Department of Oral Diagnosis and Radiology, Faculty of Dentistry, Marmara University in Istanbul, Turkey. The diagnosis of BMS was based on established diagnostic criteria[7,12,20,21,24,27,31]: (1) Patients were initially interviewed for complaints of dysgesia, xerostomia, burning, and/or painful sensations in the oral cavity; (2) All patients underwent a thorough clinical examination of the head and neck region to the oral cavity and dental status. If dentures were worn then their design and condition were assessed; (3) All patients underwent radiographic examination including panoramic radiographs and additional radiographs as necessary to exclude organic findings; (4) Laboratory evaluation included fasting blood glucose, haemoglobin, haematocrit, levels of vitamin B12, serum iron, total iron binding capacity, folic acid; (5) Non-stimulated whole salivary flow rate (UWSFR) was determined in all patients; 6. Patients suffering from systemic or local conditions, such as diabetes mellitus, lichen planus, neuralgia, chronic pain conditions in other regions and geographic tongue were excluded from the study; (7) Patients were interviewed if the complaints could be relieved by eating or drinking; (8) History of regularity of BMS over the last 6 months or longer; (9) Type of the BMS was recorded - in Type 1 BMS, patients suffer no symptoms on waking, but the burning begins and increases in severity as the day goes on; in Type 2 BMS, patients suffer from burning on waking and it persists throughout the day; in Type 3 BMS, patients have symptoms-free days.

The patients were requested to sign a written informed consent statement. The study was carried out according to the recommendations of the Helsinki declaration.

At their first examination, the patients were given a chart containing a 10 cm horizontal visual analogue scale (VAS) to record the degree of their discomfort due to the pain. The left end of the scale indicated “no discomfort” and the right end “unendurable discomfort”[7,20]. Patients were asked about possible “symptoms of the climacteric” and “cancer-phobia”[20].

Saliva collections were always performed between 9 and 11 am. Subjects were instructed not to eat, consume fluids, brush teeth and smoke for 1 hour prior to the investigation. Non-stimulated whole saliva was collected from all of the patients. The patients were asked to bend their heads forward and after an initial swallow, to allow saliva to flow into the mouth. Subjects expectorated the saliva into a test tube once per min for 5 min, and the flow rate was recorded in ml/min. UWSFR of <0.1 ml/min was considered very low, 0.1-0.2 ml/min low, and >0.2 ml/min normal[24].

In this study, we investigated 63 patients using the Speilberger State-Trait Anxiety Inventory for anxiety (SAI-TAI)[18] and Zung Self-Rating Depression Scale for depression (ZDS)[44]. The border line of the SAI-TAI for adults is 33.97 and 42.65, respectively. The answers given to each question in ZDS were graded from 1 to 4. According to this, the following grading system was used to determine the severity of depression: less than 50 - within normal range, no psychopathology; 50-59 - mild depression; 60-69 - moderate depression; 70 and above - severe depression.

Statistical analysis of the study was performed by using GraphPad Prisma V.3 programme. Descriptive statistical methods (mean, standard deviation) were used for the evaluation of the data. Independent t-test was used for the comparison of 2 groups and the quantitative data was compared by chi-squared test. The value of $p<0.05$ was considered significant.

Results

Of the total of 63 cases of BMS identified, 50 (79.4%) were females and 13 (20.6%) were males. No statistically significant difference was found in relation to age between female and male patients (Tab. 1). Type 1 BMS was detected in 34 and Type 2 BMS in 29 of these subjects; no Type 3 BMS patients were detected in this study (Tab. 2).

The comparison of Type 1 and Type 2 BMS patients was performed using independent t-test. The mean ages

of Type 1 and Type 2 BMS patients were 49.41±13.45 and 52.45±9.69, the mean duration of symptoms reported by these patients were 2.54±3.21 and 3.24±2.38 years, and the mean UWSFR of 2 groups were 0.45±0.06 and 0.33±0.04 ml/min, respectively. There were no statistically significant differences in age, duration of symptoms and UWSFR between Type 1 and Type 2 BMS patients (Tab. 2). In addition, UWSFR were within normal ranges for both groups.

Table1. Comparison of male and female patients with BMS according to age

Patients	Male (n:13) mean±SD	Female (n:50) mean±SD	t	p
Age	52.08 ± 7.53	50.48 ± 12.81	0.42	>0.05

Table 2. Comparison of type 1 BMS and type 2 BMS patients according to age, duration of symptoms and non-stimulated salivary flow rate (UWSFR)

	Type 1 (n:34) mean±SD	Type 2 (n:29) mean±SD	t	p
Age	49.41 ± 13.45	52.45 ± 9.69	-1.01	>0.05
Duration of stimulation (yr)	2.54 ± 3.21	3.24 ± 2.83	-0.91	>0.05
UWSFR (ml/min)	0.45 ± 0.06	0.33 ± 0.04	-0.21	>0.05

A chi-square test was applied to determine whether there was a difference in relation to gender, menopause, location of burning symptoms and types of denture between Type 1 and Type 2 BMS patients. No statistically significant relationships were observed in relation to all these parameters (Tab. 3).

Table 3 Evaluation of type 1 BMS and type 2 BMS patients according to gender, menapouse, type of denture and sites

		Type 1 (n: 34)	Type 2 (n: 29)	
Gender	Male	8 (23.5%)	5 (17.2%)	χ^2:0.37 p>0.05
	Female	26 (76.5%)	24 (82.8%)	
Menopause	Post-menopause	9 (26.5%)	6 (20.7%)	χ^2:2.33 p>0.05
	Menopause	9 (26.5%)	13 (44.8%)	
	Non-menopause	8 (23.6%)	5 (17.3%)	
Type of denture	No denture	5 (14.7%)	1 (3.4%)	χ^2:6.80 p>0.05
	Full removable denture	6 (17.6%)	5 (17.2%)	
	Partial removable denture	4 (11.8%)	7 (24.1%)	
	Fixed denture	13 (38.2%)	6 (20.7%)	
	Partial removable + fixed denture	6 (17.6%)	10 (34.5%)	
Sites	Buccal mucosa + lips	12 (46.2%)	4 (19%)	χ^2:3.80 p>0.05
	Buccal mucosa + tongue	9 (34.6%)	11(52.4%)	
	Buccal mucosa + palate + lips	5 (19.2%)	6 (28.6%)	

Table 4. The laboratory tests of all BMS patients

	Type 1 (n: 34) Mean ± SD	Type 2 (n: 29) Mean ± SD	t	p
Fasting blood glucose	91.65 ± 13.34	91.08 ± 15.63	0.16	>0.05
Hb	13.72 ± 1.90	13.38 ± 1.68	0.76	>0.05
Hct	40.24 ± 3.65	39.31 ± 4.53	0.91	>0.05
Fe+2	99.29 ± 32.75	87.28 ± 35.75	1.39	>0.05
Fe+2 binding	356.76 ± 71.62	335.59 ± 87.14	1.06	>0.05
Vit. B12	332.76 ± 149.51	397.55 ± 181.69	-1.55	>0.05
Folic acid	8.47 ± 3.30	8.72 ± 4.47	-0.26	>0.05

Normal values: Fasting blood sugar:70-120mg % Hb:14-17gr % male, 12-14gr% female
Hct: 40-54ml % male, 37-47ml % female Fe+2: 40-150 UG/DL
Fe+2 binding: 200-460 UG/DL Vit B12: 150-825 PG/ML
Folic acid: 3-17 ng/ml

Table 4 presents the laboratory results of Type 1 and Type 2 BMS patients. There were no statistically significant differences in relation to the laboratory results between the investigated groups ($p>0.05$), and all laboratory results were within normal ranges.

Table 5 summarizes psychological component for Type 1 and Type 2 BMS patients. For anxiety and depression, there were no statistically significant differences between the groups ($p>0.05$), but anxiety scores (SAI and TAI) for both groups were found to be significantly higher than the normal ranges. However, mean Zung Depression scores for 2 groups were determined as 45.85±8.45 and 43.52±8.68, respectively, e.g. within normal ranges. In addition, all patients in this study had cancer-phobia, and the mean VAS scores were 3.32±0.91 and 3.55±0.95 for Type 1 and Type 2 BMS patients, respectively. There were no significant differences in relation to VAS scores ($p>0.05$).

Table 5. Comparison of type 1 BMS and type 2 BMS patients according to Visual Analogue Scale (VAS), The State and Trait Anxiety Inventory (SAI-TAI) and Zung-self Rating Depression Scale (ZDS)

	Type 1 (n:34) mean ± SD	Type 2 (n:29) Mean ± SD	t	p
VAS	3.32±0.91	3.55±0.95	-0.97	>0.05
SAI	41.12±8.43	39.34±10.73	0.73	>0.05
TAI	48.44±10.14	43.76±11.09	1.75	>0.05
ZDS	45.85±8.45	43.52±8.68	1.08	>0.05

Discussion

In the present study, Type 1 and Type 2 BMS patients participating the study were mostly women (76.5% and 82.8%, respectively), and the mean ages of patients were 49.41±13.45 and 52.45±9.69, respectively, which is similar to the data published in the previous studies[8,18,20,25,27,35,36].

The pain is mainly located in the anterior two thirds of the tongue (71-78%), followed by the dorsum and the right and left sides of the tongue, the anterior part of the hard palate and lips. Other sites in the oral mucosa and the throat may also be involved. More than one site is usually affected and there is nearly always bilateral involvement[13,21,33,35,37,38]. In the present study, we noted that more than one site was usually affected. The burning sensation was mostly in the buccal mucosa and lips for Type 1 and in the buccal mucosa and tongue for Type 2 BMS patients.

In previous studies, BMS was considered as a diagnosis in which a dental or medical cause has been excluded. The clinically normal appearance of the oral mucosa, which contrasts with the patient's pronounced complaints, and the time constitute important factors in differential diagnosis[10,19,26,30,40].

This study showed that there seemed to be no correlations between denture usage, hormonal effects, nutritional disturbances, vitamin deficiency, anaemia, salivary flow rate and the type of the BMS. All data was within normal ranges. Clinically and radiographically, the soft and hard tissues were observed to be within normal limits. Therefore according to our study it can be mentioned that dental or medical reasons did not cause BMS.

The presence of a psychological component in the symptoms of the BMS patients has been suggested, such as elevation in anxiety, depression, somatic reactions to stress, neuroticism, and psychiatric disorders[1,4,7,11,12,15,17,18,29,37,42]. Psychometric studies have discovered more severe psychiatric symptoms in BMS patients than in normal populations and other chronic patients, but less severe symptoms than in other psychiatric populations[10,25,29,30,37]. Zilli et al[43] reported depression in 75% of cases and anxiety in 41% of cases. Similarly, Rojo et al[29] reported that depression was the prevalent psychiatric diagnosis among patients with BMS (31%), anxiety was much less common and affected only 8 patients (10.8%). Contrary, anxiety was found to be a more important psychological factor in BMS than depression by Lamey and Lamb[22] and Pekiner et al[27].

In the present study, psychological component of BMS patients was measured by the Speilberger State-Trait Anxiety Inventory for anxiety and Zung Self-Rating Depression Scale for depression. No psychopathologic phenomenon was detected in Type 1 and Type 2 BMS patients and Zung Depression scores were within normal ranges; however, Speilberger State Anxiety Inventory and Speilberger Trait Anxiety Inventory score were significantly higher, which is in accordance to other studies[29,43].

This condition may lead to cancer-phobia, and it is important that the dentist working with BMS patients cooperates with the patients' physician, psychologist or a multidisciplinary pain clinic[14,26].

In conclusion; many organic causes have been proposed as possible aetiological factors for burning symptoms, including local irritation by environmental factors, but the psychological element has been an important aspect of the pathological picture for BMS, and anxiety is the most important factor in all types of the condition. Detailed and correct history of the patients with psychosomatically originated BMS is an obligation for the definite diagnosis and skills of the clinician is required for that process. In addition, reference of such patients to experienced clinics or dentists is important in achieving the life quality standards and the proper treatments of all types of BMS patients.

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