Burning Mouth Syndrome and Its Related Risk Factors in Females

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Abstract

Background: Burning mouth syndrome (BMS) is pain or burning sensation on the tongue or other mucosal membranes with at least 4 - 6 months duration and without clinical or laboratory findings. Its etiology is unknown and the prevalence varies across studies.

Objectives: The current study aimed at evaluating the prevalence of BMS in female patients referred to Al-Zahra Hospital of Rasht, Iran, and investigating its related factors.

Methods: A descriptive cross sectional study was conducted from March to December 2015. A total of 2400 females referred to the gynecological clinic of Al-Zahra hospital were examined and a researcher-made check list was completed. The diagnosis of BMS was based on patients' self-report about burning sensation in the oral mucosa with no clinical symptoms in the oral cavity. After the check list was completed, the SPSS software version 16 was used for statistical analysis using chi-square and the Cramer test.

Results: According to the results of the current study, 3% of patients had burning mouth syndrome. The age range of most patients was 40 to 49 (54.2%) years and 38.9% of them were menopause. The most common sites of involvement were the tip of the tongue (33.3%), and lower lip (19.4%), respectively. The most common type of BMS was type 1 (51.4%). About 63.9% of participants had xerostomia; 9.7% of patients had para functional habits. No significant relationship was observed between oral hygiene, systemic disease, using denture, and BMS. There was a weak relationship between seasonal allergies and BMS.

Conclusions: To the authors best knowledge, BMS prevalence in the current study was consistent with that of international statistics. BMS more commonly affected females younger than 50 years old. About 65% of patients had xerostomia. Several factors may impact on BMS, but the effect is not yet definite.

Keywords: Burning Mouth Syndrome, Xerostomia, Menopause

1. Background

According to the international association for the study of pain (IASP), burning mouth syndrome (BMS) is the burning sensation or pain on the tongue or other mucosal membranes with at least 4 - 6 months duration without clinical or laboratory findings (1-3). It is also known by various terminologies as glossodynia, burning lips syndrome, and glossopyrosis (4, 5). Tip of tongue, lips, lateral border of tongue, posterior part of tongue, palate, and floor of mouth are the most commonly involved sites, respectively (4, 6, 7).

It is more common in middle-aged and elderly females. It has a rare occurrence at the ages less than 30 years (8, 9). Para functional activities increase in premenopausal and postmenopausal periods. Recently, it is confirmed that neuropathy of focal small nerve fibers can contribute to the pathophysiology of primary BMS (10). The pain may vary and associate with difficulty in speaking, nausea, gagging, and headache. There is unexplained pain and burning sensation in soft tissue, xerostomia and painful teeth, temporomandibular joint (TMJ) disorder, muscular dystrophies in jaws, and geographic tongue in oral cavity, but mucosa appears normal with altered taste sensation (9).

Scala et al., classified BMS into 2 categories namely 'primary or idiopathic' BMS, in which local or systemic causes cannot be identified, but involving peripheral or central neuropathological pathways; and "secondary" BMS resulting from local, systemic, or psychological factors (8).

Mainly 2 parameters are used to diagnose this syndrome: 1, Triad of mild oral pain, dysphagia and dry mouth and, 2, The absence of lesions or other changes in oral mucosa even in painful areas (8, 11).

The prevalence of BMS is estimated 2.6% - 5.1% by epidemiological studies. The prevalence varies in different studies due to the lack of consensus in BMS diagnosis. In-

ternational studies reported a range of 0.7% - 4.6% for BMS prevalence (4, 7). The mean age for BMS occurrence is 55 to 60 years and its occurrence is rare under 30 years. The females to males occurrence ratio is 3:1 to 16:1 (7). Furthermore, about 90% of female patients with BMS are in the perimenopausal period (3 years before to 12 years after the menopause onset) (12). Baharvand et al., reported that BMS in Iranian population has low prevalence (1.3%) and is more frequent in females (13).

Generally, patients with BMS show 1 of the 3 types of irritations as follows:

- Type 1 BMS (35%) is usually without any symptoms during early morning hours, but as the day progresses the symptoms appear and there are different symptoms at night (nutritional deficiencies and diabetes).

- Type 2 BMS (55%) is recognized by continuous symptoms on day time, but there is no symptom at night (chronic anxiety).

• Type 3 BMS (10%) symptoms are recognized at irregular intervals with symptom-free days (dietary or prosthetic allergies) (11). Type 1 response to treatment is better than the other 2 types (8).

The etiology remains unclear and numerous local, systemic and psychological factors are implicated in its etiology. The recent researches throw light on the underlying neurological disorders (2, 4, 5, 7, 13).

2. Objectives

The current study aimed at evaluating the prevalence of BMS in females referred to Al-Zahra hospital of Rasht, Iran, and investigating its related factors.

Due to higher prevalence of BMS in females than males and lack of proper studies on BMS prevalence and related factors in the North of Iran, the current study was conducted to help its proper diagnosis and treatment.

3. Methods

The current cross sectional, descriptive study was conducted on females with BMS referred to the gynecological clinic of Al-Zahra hospital in Rasht from March to December 2015; a total of 2400 female patients agreed to participate in the current study. The exclusion criteria were inflammatory connective tissue diseases such as Sjogren syndrome, systemic lupus erythematosus, rheumatoid arthritis, dermatomyositis, and lichen planus. After giving a description about the project and its objectives, and acquiring the informed consent form, the participants were examined. A researcher-made check list was completed. The questions included the date of menopause and its period,

type and severity, history of chronic diseases such as diabetes, hypertension, oral health status, and xerostomia. The current study defined menopause as the cessation of menstruation for 6 to 12 months earlier than the study onset. The diagnosis of BMS was based on patients' self-report about burning sensation in oral mucosa with no clinical symptoms in oral cavity. Visual analogue scale (VAS) was used to assess burning pain intensity in patients with BMS, in which 0 indicates no pain and 10 indicates severe pain. The criteria for oral hygiene such as brushing twice daily, and flossing once a day were also considered. Xerostomia was evaluated by Fox et al. criteria (14).

After completion of the check-list, the SPSS software version 16 was used for statistical analysis using Chisquare, the Cramer test, and backward stepwise logistic regression (15).

4. Results

Seventy-two patients (~ 3%) were classified as having BMS. The statistical analysis showed that most patients with BMS in the study aged 40 to 49 years (54.2%) with the mean age of about 46.5 years (Table 1). Table 1 shows the age categories in patients with BMS and without BMS.

Of the 72 females under study, 38.9% were postmenopausal and 61.1% non-menopausal. The most common sites of involvement were tip of tongue (33.3%), lower lip (19.4%), tip of tongue and lower lip (16.7%), tip and lateral border of tongue (13.9%), and other sites of oral mucosa (16.7%), respectively.

In the current study, it was observed that the most common types of BMS were type 1 (51.4%), type 3 (41.7%), and type 2 (6.9%), respectively.

In the current study, the most intensive burning sensation reported by participants ranged from grade 4 (18.1%) to grade 5 (54.2%) based on VAS scale. The mean intensity of burn was 5.11 ± 0.8. It was also observed that half of the patients with BMS in the current study had dysphasia and 63.9% of them were afflicted by dry mouth. In terms of oral hygiene evaluation, it was observed that 83.3% of the patients with BMS brushed twice a day and 2.8% of them used floss at least once a day. None of them used mouthwash solutions.

The current study found that 9.7% of patients with BMS had parafunctional habits, 19.4% of them used dentures, and 4.4% of the subjects had bleeding gums. In terms of medical history, it was identified that 18.1% of participants had diabetes, 22.2% hypertension, 19.4% gastritis, 15.3% respiratory diseases, 13.9% thyroid disease, 12.5% psychological disorder, and 19.4% seasonal allergies. Table 2 shows the frequency of these factors in patients with and without BMS.

Table 1. Comparison of Age Category in Patients with and Without BMS

Age Group (Years)	Patients				P Value	OR
	With BMS		Without BMS			
	Number	%	Number	%		
Less than 30	2	2.8	512	22		1
30 - 39	14	19.4	406	17.4		8.83
40 - 49	39	54.2	195	8.4	0.004	51.2
50 - 59	8	11.1	1029	44.2		1.99
Above 60	9	12.5	186	8		12.39

In the current study, there were significant statistical differences between patients with and without BMS in terms of age range (P = 0.04) (Table 1). There was no significant relationship between oral hygiene, systemic disease, using dentures, and BMS (Table 2). There was a weak relationship between seasonal allergies and BMS (P = 0.01, v^2 coefficient = 0.3) (Table 2).

Seasonal allergy (OR = 1.04), diabetes mellitus (OR = 486.38), psychological disorder (OR = 6.91), menopause (OR = 1.62) was considered as a forecasting variable (Table 3).

5. Discussion

The current study aimed at investigating the prevalence of BMS and its related risk factors in females referred to Al-Zahra hospital of Rasht in 2015. BMS is a complex and controversial topic in dental and medical sciences and its etiology is very complicated and several physiological and psychological factors are involved in its outbreak. Age and hormonal changes are among factors that may play a role in the occurrence of BMS (2, 4, 7, 11).

In a study by Heydari et al. in Zahedan, Iran, the most common age group affected by BMS was 50 - 59 years (34.3%) (16); their results were inconsistent with those of the current study, because the most affected age group in the present study was one decade lower than that of Heydari's study.

In the current study, the most common site of BMS was tip of tongue, which was consistent with the results of most studies such as the ones by Heydari (16), Baharvand (13), and Eguia (17). In BMS pathology, Chorda tympanic hypofunction may have a significant role (18).

Life style, rural-urban divisions, and economic status have main effects on signs and symptoms of menopause. Some of the common problems in postmenopausal females are oro-dental problems, gingival bleeding, receding gums, loose teeth, and burning sensation in oral mucosa (9). The more common occurrence of BMS in postmenopausal females (9, 19, 20) is due to the age-related reduction of estrogen and progesterone levels. During menopause the level of neuroprotective gonadal and adrenal steroids decrease and it may also lead to a continuous reduction in neuro-active steroids and, therefore, lead to degeneration of oral mucosal small nerve fibers and brain areas involved in oral somatic sensations (8).

In the current study, no significant relationship was observed between diabetes and BMS (Table 2), but diabetes was considered as a predicting factor for BMS (Table 3). In the current study, approximately 18.1% of females with BMS had diabetes that was consistent with the results of Eguia (17) (13.3%). Diabetic neuropathy and Candida induced stomatopyrosis may be misdiagnosed as glossodynia (8, 21, 22).

One of the theories about the relationship between dentures and BMS is based on the assumption that some elements in dentures can be allergic. Monomeric methyl methacrylate, epoxy resin, bisphenol A, and other acrylic products are probably allergens.

In the current study, statistical analysis revealed that 19.4% of patients with BMS had dentures, but statistically there was no significant relationship between BMS and dentures (Table 1). However, Maresky et al., found that denture-related problems among males were significantly related with BMS, but all patients in the current study were females (20).

In the current study, about 63.9% of patients with BMS had mouth dryness, which was higher than that of the study by Baharvand with 37.8% xerostomia (23). It was also noteworthy that perhaps the high incidence of xerostomia among the patients in the current study was related to hypertension and seasonal allergens. Since patients with hypertension have medications to control their blood pressure, one of the side effects of such medicines is mouth dryness. It is believed that there can be statistically significant decrease in unstimulated salivary flow rate in patients with BMS and the rate of reduction in stimulated salivary

Table 2. Comparison of Risk Factors in Patients With and Without BMS

Risk Factors			Patients				
			With BMS	**%**	**Without BMS**	**%**	**P Value**	**OR**
Menopause	Yes		28	38.9	686	29.6	0.09	1.52
	No		44	61.1	1642	70.4		
Diabetes Mellitus	Yes		13	18.1	447	19.2	0.81	0.93
	No		59	81.9	1881	80.8		
Respiratory disease	Yes		11	15.3	262	11.3	0.28	1.42
	No		61	84.7	2066	88.7		
Gastritis	Yes		14	19.4	307	13.2	0.16	1.59
	No		58	80.6	2021	86.8		
Thyroid disorders	Yes		10	13.9	271	11.7	0.57	1.22
	No		62	86.1	2057	88.3		
Psychological disorder	Yes		9	12.5	391	16.8	0.33	0.71
	No		63	87.5	1937	83.2		
Use of denture	Yes		14	19.4	349	15	0.29	1.37
	No		58	80.6	1979	85		
Use of toothbrush	Yes		60	83.3	1911	82.1	0.97	1.09
	No		12	16.7	417	17.9		
Flossing	Yes		2	2.8	194	8.3	0.09	0.31
	No		70	97.2	2134	91.7		
Bleeding gums	Yes		32	44.4	1059	45.5	0.84	0.96
	No		40	55.6	1269	54.5		
Oral habits	Yes		7	9.7	255	11	0.75	0.87
	No		65	90.3	2073	89		
Seasonal allergies	Yes		14	19.4	185	7.9	0.01	2.80
	No		58	80.6	2143	92.1		
Hypertension	Yes		16	22.2	446	19.2	0.90	1.21
	No		56	77.8	1882	80.8		
Dry mouth	Yes		46	63.9	1544	66.7	0.90	0.90
	No		26	36.1	784	33.7		

flow rate is non-statistically significant in such patients. Using medicines that their side effect is dry mouth may lead to more decrease in salivary flow rate in patients with BMS. Therefore the hyposalivation may play a role in causing dry mouth in BMS and it may be responsive to treatment with sialogogue (24). Savage et al., (25) and Maresky et al., (20) found no significant relationship between BMS and mouth dryness, but all patients in the study by Baharvand had xerostomia (13).

One of the cases investigated in other studies was the frequency of BMS types. In the studies by Heydari (16) and Baharvand (13, 23), the prevalence of BMS type 3 was dominant. Eguia (17) recorded BMS type 2, but in the current study the most common type of BMS was type 1 (51.4%). the current study did not find any statistically significant relationship between systemic diseases such as respiratory disease, hypertension, gastritis, psychological disorder, and BMS (Table 2), which was consistent with the results of the study by Heydari (16). In the current study psychological disorder were considered as a predicting variable for BMS (Table 3). Psychological disorder can be associated with sensory disorders.

Table 3. Regression and Correlation Coefficients of BMS Predictors

BMS Predictors	Regression Coefficient	P Value	OR	Lower Bound	Upper Bound
Menopause	0.485	0.007	1.62	0.288	0.817
Diabetes Mellitus	6.187	0.004	486.38	1.792	21.361
Psychological disorder	1.933	0.026	6.91	1.138	7.559
Seasonal allergy	0.04	0.0001	1.04	0.016	9.010

The current study was the only study that found a significant relationship between seasonal allergies and BMS (Table 2). The magnitude of the correlation was relatively weak. Seasonal allergy was considered as a BMS predictor in the current study.

In the study by Heidari (16), the pain severity based on VAS was about 8.1, while in that of Eguia it was 7.6 (17). In the current study, the average pain intensity was 5.11 that was less than the reported rates in Heydari and Eguia's studies (16, 17).

5.1. Conclusions

In the current study, no statistically significant relationship was observed between oral hygiene and BMS. To the authors best knowledge, BMS prevalence in the current study was consistent with those of the international statistics. BMS affected more commonly the females younger than 50 years old. About 65% of the patients in the current study had xerostomia. Seasonal allergy may impact on burning mouth syndrome, but this effect is not yet definite. Finally, it was suggested that further research should be done in this area and effecting factors on BMS should be determined more definitely.

Acknowledgments

Footnote

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