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The role of psychological factors in the development of burning mouth syndrome

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Abstract. The psychiatric profiles of 50 patients diagnosed with burning mouth syndrome (BMS) were compared to those of 50 age- and sex-matched individuals as the control group. The Symptom Checklist-90-Revised (SCL-90-R) questionnaire was used to evaluate the role of psychological factors in the development of BMS. Somatization, obsessive-compulsive, depression, anxiety, hostility, phobic anxiety, psychoticism, global severity index (GSI), positive symptom total (PST), and positive symptom distress index (PSDI) scores were significantly higher in the patients with BMS than in the control group. In a subgroup analysis according to sex, women with BMS had higher T-scores for somatization, obsessive-compulsive, paranoid ideation, GSI, PST, and PSDI than women in the control group. In contrast, only the PSDI score was significantly higher in men with BMS compared to men in the control group. There was a significant difference in the T-scores for somatization, psychoticism, and GSI between the three age subgroups ($\leq$50, 51–65, and $\geq$66 years). The obsessive-compulsive and PSDI scores were significantly higher in patients with BMS who also had at least one chronic disease than in patients with BMS who had no chronic disease. In conclusion, psychological factors are correlated with BMS.

Key words: burning mouth syndrome; psychological profile; Symptom Checklist-90-Revised questionnaire (SCL-90-R); co-morbidities.

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Burning mouth syndrome (BMS) is characterized by a burning or stinging sensation in the oral cavity in the absence of a pathology on clinical examination[1]. BMS can affect any part of the oral cavity, but the tongue, anterior palate, and/or lips are the most common sites[2]. BMS is also frequently associated with dry mouth and an abnormal sense of taste[3]. The estimated prevalence in the general population as reported in recent studies ranges from 0.7% to 4.6%[4]. In addition, the lifetime prevalence of BMS ranges from 3.7% to 18%, and is reported to be up to 40% in the elderly[5]. BMS has been shown to frequently affect women, especially perimenopausal or post-menopausal women[6], with a male to female ratio of 1:7[5,7].

BMS can be considered a chronic oral disease related to the activation of a neuropathic mechanism from either unknown causes (primary BMS) or various local and systemic pathologies (secondary BMS)[7]. The pathophysiology of BMS remains poorly understood and its aetiology is thought to be multifactorial[8]. Pathophysiological factors (including local and systemic disease), neuropathological factors (including abnormal processing of somatosensory information), and psychological factors have been suggested to cause BMS[9]. One study reported that patients with BMS were more likely to have psy-

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chiatric symptoms or mental disorders than individuals in the control group[10]. Another study reported that more than 50% of patients with BMS had depression or anxiety[11]. Furthermore, it has been reported that the most prevalent psychiatric disorders in patients with BMS are major depressive disorder, generalized anxiety disorder, hypochondria, and cancerophobia[12]. However, another study did not find any evidence that psychological factors are associated with BMS[13].

Although it has been suggested previously that BMS might be associated with psychiatric disorders[7,8,10–12,14], the psychological profiles of patients with BMS have not yet been fully established. This study analyzed the psychological profiles of patients with BMS using the Symptom Checklist-90-Revised (SCL-90-R) questionnaire to determine whether psychological factors are correlated with the development of BMS, and, if so, which factors are associated with BMS.

Materials and methods

Subjects

The psychiatric profiles of 50 patients diagnosed with BMS (the BMS group) and 50 individuals with no BMS (the control group) were compared, using the SCL-90-R questionnaire. Patients were recruited between December 2014 and June 2015.

The inclusion criteria and diagnosis of BMS were determined using the International Classification of Headache Disorders, third edition beta (ICHD-3), as follows: (a) oral pain fulfilling criteria (b) and (c), (b) recurring daily for >2 h per day for >3 months, (c) the pain has both of the following characteristics: it has a burning quality and is felt superficially in the oral mucosa, (d) the oral mucosa is of normal appearance and clinical examination, including sensory testing, is normal, (e) it is not better accounted for by any other ICHD-3 diagnosis[15].

The control group included 50 individuals who had attended the hospital for a routine health check-up and who had no BMS-related symptoms. The control group was matched to the BMS group for both age and sex. Patients who had any oral/pharyngeal mucosal disease, psychiatric disorders including depression, acute illness, or history of head and neck irradiation were excluded from both the BMS and control groups. Pregnant women, individuals under the age of 18 years, and those who were unable to fill out the questionnaire were also excluded. All individuals were interviewed about their past medical history, including psychiatric disease. The absence of oral and pharyngeal mucosal lesions was confirmed using a flexible fibre-optic endoscope. The study was approved by the Institutional Review Board of Hanyang University Hospital.

Evaluation of psychological profiles

Psychological profiles were evaluated using the SCL-90-R questionnaire, a multidimensional psychological screening inventory that was designed to screen for various psychological problems[16]. It has been reported that the SCL-90-R is a useful tool for measuring psychological status, measuring change in outcome studies, and screening for mental disorders[17].

The SCL-90-R requires patients to rate 90 statements on a five-point Likert scale, which ranges from 'not at all' (0) to 'extremely' (4). The statements are assigned to nine symptom dimensions that describe the following psychopathologies: somatization, obsessive-compulsive, interpersonal sensitivity, depression, anxiety, hostility, phobic anxiety, paranoid ideation, and psychoticism. In addition to the symptom dimensions, the SCL-90-R includes three supplementary global indexes demonstrating the degree of psychological symptoms. The global severity index (GSI) is the average score of the 90 questions and indicates the present state of disease. The positive symptom total (PST) is the number of questions that scored above 0, which indicates the total number of symptoms experienced. The positive symptom distress index (PSDI) is the average score of the questions that scored above 0 and reflects the degree to which each symptom is experienced. Raw scores of these 12 dimensions are converted to standard T-scores, enabling the development of sex-keyed norms and therefore allowing meaningful comparisons to be made between men and women. The normative samples are as follows: community population norms, psychiatric outpatient norms, psychiatric inpatient norms, and adolescent non-patient norms.

The T-scores for the SCL-90-R questions were compared between the BMS group and the control group, and also in a subgroup analysis according to sex. In a further analysis, the T-scores in the BMS group were compared according to age, disease duration, and the presence of comorbid diseases, such as hypertension, diabetes, rheumatoid arthritis, and chronic hepatitis.

Statistical analysis

The statistical analyses were performed using IBM SPSS Statistics version 22.0 (IBM Corp., Armonk, NY, USA). The Student *t*-test was used to compare T-scores between the BMS and control groups, and the Mann–Whitney *U*-test was used in the subgroup analysis when the number of subjects was small. The Kruskal–Wallis test was used to analyze the T-scores of the three subgroups according to age and disease duration in the BMS group. A *P*-value of less than 0.05 was considered statistically significant.

Results

The demographic data for the BMS and control groups are listed in Table 1. The BMS group included 21 men (42%) and 29 women (58%); their mean age was 56.80 ± 15.16 years. The control group included 21 men (42%) and 29 women (58%), and their mean age was 52.76 ± 9.23 years. The mean duration of disease in the BMS group was 12.89 ± 14.10 months. There was no significant difference in sex ratio or age between the two groups.

The T-scores for the BMS and control groups are listed in Table 2. The T-scores for somatization ($P < 0.001$), obsessive-compulsive ($P = 0.003$), depression ($P = 0.001$), anxiety ($P = 0.001$), hostility ($P = 0.033$), phobic anxiety ($P = 0.001$), and psychoticism ($P = 0.003$) were all

Table 1. Demographic data for the BMS and control groups.

	BMS ($n = 50$)	Control ($n = 50$)	*P*-value
Sex ratio, male:female	21:29	21:29	1.000
Age (years)			0.430
Mean ± SD	56.80 ± 15.16	52.76 ± 9.23	
Range	19–78	20–77	
Disease duration (months)			
Mean ± SD	12.89 ± 14.10		
Range	3–52 months		

BMS, burning mouth syndrome; SD, standard deviation.

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