



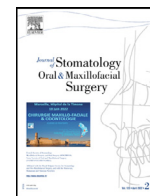
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Original Article

Impact of the COVID-19 pandemic upon patients with burning mouth syndrome



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ABSTRACT

Introduction: The global COVID-19 pandemic has caused changes in the daily life of people, with a particularly relevant impact upon certain groups of individuals that have difficulties in facing stress. A study is made of the impact of the pandemic upon patients with burning mouth syndrome (BMS).

Material and methods: A total of 40 patients with BMS diagnosed in the Unit of Oral Medicine (University of Murcia, Spain) were included. In all cases the study comprised a standardized clinical interview by the same professional and an exploration of the oral cavity. The first visit took place before the pandemic and consisted of the evaluation of anxiety (Hospital and Anxiety Depression Scale [HADS]), the Pain Catastrophizing Scale (PCS), pain intensity (visual analog scale [VAS]) and sleep quality (Pittsburg Sleep Quality Index [PSQI]), while the second visit took place one and a half months after the start of lockdown due to the pandemic in Spain.

Results: The study sample consisted of 36 women (90%) and four men (10%) aged between 39 and 86 years. Statistically significant differences were recorded between the two visits in terms of anxiety ($p < 0.001$), sleep quality ($p < 0.001$) and pain intensity ($p < 0.001$).

Conclusions: The appearance of the COVID-19 pandemic has triggered worsening of anxiety, sleep quality and pain intensity in patients with BMS.

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1. Introduction

The global COVID-19 pandemic caused by the SARS-Cov-2 virus has produced changes in all aspects of daily life [1]. Situations such as lockdown, fear of contagion, the limitation of activities that used to be common, and the associated economic crisis have had a huge impact upon the psychological condition of people [1,2]. Studies from different countries including China, Italy and Spain reported a sharp rise in stress, anxiety and depression in both healthcare professionals and the population as a whole [1–6]. The worsening psychological profile was also related with increased incidence of insomnia [3,4]. These alterations are particularly relevant among people who suffer chronic pain, since psychosocial factors play a key role in the control of the symptoms [6]. Furthermore, possible increase in new cases of chronic pain in patients lacking the mechanisms needed to cope with stressing situations in the context of the changes in lifestyle or difficulties in receiving adequate healthcare observed during the COVID-19 pandemic were reported [7]. In this regard, some authors point to

pain catastrophizing as one of the main factors related to pain intensity and clinical condition of patients, when they are facing stress-generating situations [6].

Burning mouth syndrome (BMS) is a chronic disease that may become exacerbated in this scenario [8]. It is because, although the underlying etiology of the disorder remains unclear, anxiety/depression and sleep disturbances were shown to condition the appearance, course and prognosis of BMS [9–12]. These factors may act as mediators or triggers of symptoms which in most cases lead to chronic burning-type pain sensation within the oral cavity and to psychological alterations, with the consequent chronification of their already affected initial mood state [11]. Therefore, in order to try to prevent pain and/or stabilize its intensity, it is important to take into account the variations which chronic pain symptoms may experience in response to situations that induce changes in the mental state of patients [11]. Particularly, in scenarios where patients may feel “abandoned” due to difficulties or restrictions in receiving adequate healthcare as during quarantine [4].

In view of the above, the present study was carried out to test the hypothesis that the COVID-19 pandemic-related quarantine has produced a worsening of the psychological profile (anxiety/depression), sleep quality and pain intensity among patients with BMS.

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In addition, the influence of pain catastrophizing upon symptoms variability was analyzed.

2. Material and methods

2.1. Study design

A longitudinal descriptive study was carried out in the Unit of Oral Medicine (University of Murcia, Spain) during the period between November 2019 and May 2020. The study was carried out following the recommendations of the Declaration of Helsinki, and was approved by the Bioethics Committee of the University of Murcia (Ref.: 2203/2018). The initial data collection (PreCOVID) was performed as part of previously reported study about salivary biomarkers in BMS [13]. A second control interview was performed by telephone after one and a half months of total lockdown in Spain due to the COVID-19 pandemic.

2.2. Study sample

A total of 40 patients were included in the study. Inclusion criteria were: having a prior diagnosed BMS based on the criteria of the International Headache Society (2018) [14], being over 18 years of age, signing of informed consent of participation, ability to understand and answer the study questionnaires. The patients were excluded if they presented oral symptoms that could be attributed to other but BMS conditions such as oral lichen planus, lichenoid reactions, candidiasis, certain laboratory test alterations (iron, ferritin, vitamin B12, zinc), uncontrolled thyroid disease, dry mouth syndrome. Patients subjected to head and neck radiotherapy, allergy to materials used in dental treatments, and pregnant women were neither included in the study.

In all cases, patients were asked to complete the following previously validated questionnaires with the help of the odontology specialist (CCF):

- Pain intensity (visual analog scale [VAS]): The patients scored current pain intensity (burning sensation) from 0 to 10 (0 = no pain and 10 = extreme pain) on a numbered line scale.
- Hospital and Anxiety Depression Scale (HADS) [11]: This instrument consists of two subscales referred to anxiety and depression; each comprises 7 items with four possible answers scored from 0–3. Probable anxiety or depression is defined as a total score of over 10, possible anxiety or depression as a score of 8–10, and no significant anxiety or depression as a score of 7 or less [15].
- Pittsburg Sleep Quality Index (PSQI): This instrument consists of 19 questions divided into 7 sections, each addressing a specific aspect of sleep: subjective sleep quality, sleep latency, duration of sleep, usual satisfactoriness of sleep, sleep disturbances, use of medication for sleep and daytime dysfunction. Each of these sections are scored from 0 to 3 (0 = no problem and 3 = great problem). The final score is the sum of the scores of the 7 sections, yielding a maximum score of 21 points. A score of 5 or less defines satisfactory sleep quality, while a score of over 5 is indicative of sleep disturbance [16].
- Pain Catastrophizing Scale (PCS): This instrument consists of 13 items referred to thoughts, feelings or sensations experienced by the patient in situations of pain. Each item is scored from 0 to 4 (0 = never and 4 = always). The total score ranges from 0 to 52, with higher scores indicating greater pain catastrophizing [17].

2.3. Statistical analysis

A descriptive statistical analysis was made of the results obtained, and the chi-square test, Wilcoxon test and paired Student t-test were

used to explore possible significant associations and changes in the study variables before (Pre) versus after (Post) lockdown. The IMB SPSS Statistics 25 (Spain) package was used throughout, and statistical significance was considered for $p < 0.05$.

3. Results

The study sample consisted of 40 patients (90% women ($n = 36$)) with a mean age of 61 years (range, 39–86 years).

On comparing the situation before and after the start of the pandemic (Pre vs Post), significant differences were recorded for HADS ($p < 0.001$), PSQI ($p < 0.001$) and pain VAS ($p < 0.001$), with a worsening of the median scores in all cases (Table 1).

Spearman correlation test data are reported in Table 2.

The Pre anxiety scores were positively correlated to Pre pain intensity ($r = 0.351$).

With regard to sleep quality, a positive association was observed between the Pre and Post lockdown scores ($r = 0.991$), i.e., poorer sleep quality scores were associated to poorer sleep quality following the start of the lockdown vs the situation before the pandemic. Pre anxiety scores were positively correlated to the Post anxiety scores ($r = 0.584$) and with pain intensity ($r = 0.672$). Pre anxiety were negatively correlated to the Pre-Post variation in anxiety ($r = -0.324$).

The Pre pain intensity scores were negatively correlated to the Pre-Post variation in pain intensity ($r = -0.654$). Those patients with initially lower pain scores showed a greater Pre-Post variation in pain intensity.

The variation in sleep quality was positively correlated to the variation in pain intensity ($r = 0.374$).

A positive statistically significant association was observed between pain catastrophizing and the Pre-Post variation in both the anxiety ($r = 0.382$) and the pain score ($r = 0.353$).

None of studied parameters were found to be related to patient age.

4. Discussion

Among the etiological factors related to BMS, special attention has focused on a number of psychological aspects [18]. In effect, anxiety, depression, low stress tolerance and high levels of neuroticism cause these patients to be particularly sensitive to any situation capable of adding further stress to their daily lives [18,19]. An example of this is the observation that BMS is often related to some life experience that emotionally destabilizes the patient, there by triggering the onset of symptoms [19]. Other described characteristics are a tendency towards hypochondriac behavior and pain catastrophizing [19] – these features being particularly important in the context of a pandemic (mobility restriction, isolation, fear, and loneliness in the old people). Thus, patients with BMS are vulnerable in the current scenario of the COVID-19 pandemic, which can favor a worsening of their symptoms.

Pain catastrophizing has been seen to play a role in the development and worsening of the symptoms of different chronic disease conditions [3]. In our study, those patients with higher pain catastrophizing scores at baseline suffered greater worsening of their symptoms in the course of the pandemic than those with lower scores. This is consistent with the observations of other authors such

Table 1
Hospital and Anxiety Depression Score (HADS), Pittsburg Sleep Quality Index score (PSQI) and pain intensity score (Pain VAS) before (Pre) and after (Post) lockdown in patients suffering from burning mouth syndrome ($n = 40$).

| Variable | Pre | Post | P |
|----------|------------|------------|--------|
| HADS | 9 (0–19) | 13 (6–21) | <0,001 |
| PSQ | 7 (0–19) | 7,5 (0–19) | <0,001 |
| PAIN VAS | 6,3 (0–10) | 8 (1–10) | <0,001 |

Table 2
Spearman correlation data. Hospital and Anxiety Depression Score (HADS), Pittsburg Sleep Quality Index score (PSQI) and pain intensity score (Pain VAS) before (Pre) and after (Post) lockdown in patients suffering from burning mouth syndrome.

| Variable | HADSHADSPre r;p | HADSPost r;p | HADSPre-PostVariation r;p | PSQIPSQIPre r;p | PSQIPost r;p | PSQIPre-PostVariation r;p | Pain VASPain VASPre r;p | Pain VasPostn VAS r;p | Pain VASPre-PostVariation r;p |
|-------------------------|--------------------|-----------------|------------------------------|--------------------|-----------------|------------------------------|----------------------------|--------------------------|----------------------------------|
| PCS | 0.172;0.289 | 0.334; 0.035 | 0.382; 0.015 | 0.258; 0.108 | 0.233; 0.148 | 0.084;0.608 | 0.089; 0.583 | 0.512; -0.001 | 0.353; 0.025 |
| HADS PRE | | 0.584; <0.001 | -0.324; 0.041 | 0.075; 0.645 | 0.029; 0.858 | -0.115; 0.481 | 0.351; 0.026 | 0.267; 0.096 | -0.248; -0.122 |
| HADS POST | | | 0.470; 0.002 | 0.143; 0.377 | 0.124; 0.444 | 0.083;0.609 | -0.017; 0.919 | 0.221; 0.170 | 0.207; 0.200 |
| Variation HADS PRE-POST | | | | 0.172; 0.289 | 0.175; 0.279 | 0.071;0.664 | -0.334; 0.035 | 0.047; 0.771 | 0.505; 0.001 |
| PSQI PRE | | | | | 0.991; 0.000 | 0.129;0.428 | -0.009; 0.956 | 0.265; 0.098 | 0.277; 0.084 |
| PSQI POST | | | | | | 0.238; 0.140 | -0.038; -0.816 | 0.238; 0.139 | 0.297; 0.063 |
| Variation PSQI PRE-POST | | | | | | | -0.296; 0.063 | -0.104; 0.525 | 0.374; 0.018 |
| Pain VAS PRE | | | | | | | | 0.672; -0.000 | -0.654; 0.000 |
| Pain VAS POST | | | | | | | | | -0.004; 0.979 |
| Pain VAS PRE-POST | | | | | | | | | |

as Matsouka et al. (2010) [19], who examined the cognitive factors with the greatest influence upon the development of BMS symptoms, and found pain catastrophizing to be the parameter most closely related to worsening of the pain. Other authors have investigated the influence of pain catastrophizing in patients with different pain conditions, seeking to establish associations to pain intensity. For example, Yakobov et al. (2018), concluded that patients with lesser pain catastrophizing scores before surgery experienced better recovery and less pain after surgery.

On the other hand, a number of different psychological factors may be inter-related, as occurs with anxiety. In effect, the worsening of anxiety from the start of the pandemic was seen to be greater among those patients with higher pain catastrophizing scores. This observation is relevant, since other authors have proposed a relationship between high pain catastrophizing scores and a poorer response to situations of stress in patients with BMS [20]. In this regard, the COVID-19 pandemic could act as a stressing factor to which patients with higher pain catastrophizing scores respond with increased anxiety and worsening of their symptoms.

On examining the data obtained referred to anxiety, it is clear that patients with initially higher anxiety scores also showed higher anxiety scores following the start of the pandemic, as well as higher initial (baseline) pain scores – though these same patients showed less variation in anxiety over the course of the study period. Such observations may be explained by the high baseline anxiety scores that characterize the BMS population [22,23]. It is interesting to point out that those patients with initially higher anxiety scores also showed initially higher pain scores – corroborating the influence of anxiety states upon pain intensity. These same patients showed lesser variation in the anxiety scores over time, possibly due to the fact that high baseline anxiety scores leave a lesser margin for worsening as measured by the different scales.

The fundamental role of the psychological profile in worsening of the symptoms of patients with BMS [24,25] is evidenced by the observation that the greater the increase in anxiety, the greater the pain intensity score over the course of the pandemic. Kim et al. (2018) [24] studied the differences between BMS patients with psychological problems and BMS patients who were psychologically healthy, and found the former to suffer greater pain intensity, with more affected zones within the oral cavity, and more seriously impaired quality of life.

Another factor related to the worsening of BMS symptoms is sleep quality. Situations of stress cause stimulation of the hypothalamus-hypophyseary-adrenal axis which is related to a shortened and fragmented sleep of low quality [26]. Some authors have reported sleep quality to be poorer among patients with BMS than in the control group [12,26], and consider poor sleep quality to be a risk factor for worsening and chronification of the symptoms of BMS [12].

Chronic pain management during the coronavirus disease 2019 pandemic is a challenging process, especially with growing evidence that COVID-19 infection affecting the craniofacial complex with referred pain, myalgias and widespread hyperalgesia [27–30]

Our own results corroborate these findings, since worsened sleep quality during the start of the pandemic was associated to increased pain intensity.

The current evidence supports some BMS interventions, including alpha-lipoic acid (ALA), clonazepam, capsaicin, and low-level laser therapy (LLLT); however, there is a lack of robust scientific evidence, and large-scale clinical trials with long follow-up periods are needed to establish the role of these BMS management options [31].

In relation to the above, those patients with initially lower pain scores were seen to experience a comparatively greater increase in pain intensity in the course of the study period. In the same way as mentioned above in relation to anxiety, this is possibly due to the fact that high baseline pain intensity scores leave a lesser margin for worsening as measured by the different scales.

It is important to note that it is a pilot study so in subsequent studies the sample size should be increased and a control group should be included. Another important consideration is that this study did not record all of the drugs that the patient was consuming.

It therefore may be concluded that development of the COVID-19 pandemic-related lockdown has contributed to worsen the anxiety, sleep quality and pain intensity profiles of patients with BMS, evidencing an association between pain catastrophizing and deterioration of the psychological parameters and symptoms. This should be taken in account when treatment is implemented to these patients, and a possibility to include psychotherapeutic strategies to reduce pain catastrophizing and help to cope with stressing situations leading to better disease control should be considered.

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