Prevalence of oral mucosal lesions among patients with diabetes mellitus types 1 and 2

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Abstract: BACKGROUND: Patients with diabetes mellitus have been associated with a number of changes in the oral cavity, such as gingivitis, periodontitis, mucosal diseases, salivary dysfunction, altered taste, and burning mouth. OBJECTIVES: To determine the prevalence of oral mucosal lesions in patients with diabetes mellitus. METHODS: A cross-sectional observational study between August and October 2012 with a convenience sampling was performed for 51 patients with diabetes mellitus (type 1 and type 2). The study consisted of two phases: 1) a questionnaire application; 2) intraoral clinical examination. For the analysis of data, we used descriptive statistics, Fisher’s exact test in bivariate analysis (significance level of 0.05), and Poisson Regression. RESULTS: The prevalence of oral lesions was 78.4%. Traumatic ulcers (16.4%) and actinic cheilitis (12.7%) were the most prevalent lesions. The lips (35.3%) and tongue (23.5%) were the most common location. The bivariate analysis showed an association with the type of diabetes, and two variables (age and comorbidity) were quite close to the significance level. In the Poisson Regression analysis, only diabetes type 2 remained significant after adjusting the model. CONCLUSIONS: The results of this study show a high prevalence of oral mucosal lesions in diabetic patients. The oral mucosal lesions are mostly associated with diabetes type 2.

Keywords: Dentistry; Diabetes mellitus; Diabetes mellitus, Type 1; Diabetes mellitus, Type 2; Mouth diseases; Mouth mucosa

INTRODUCTION

Diabetes mellitus is a metabolic syndrome considered to be caused by multiple factors resulting from a deficiency of insulin, which may be absolute due to pancreatic β-cell destruction (type 1) or relative due to an increased resistance of the tissues to insulin (type 2).1 In Brazil, it is estimated that about 7.5 million people are diagnosed with diabetes, though the actual number is certainly larger, in view of the great number of individuals with the syndrome but without the diagnosis.2

A series of alterations in the oral mucosa in diabetic patients have been reported, including gingivitis, periodontitis, oral mucosal diseases that favor infections such as candidiasis, salivary gland dysfunction, altered taste, glossodynia, and stomatopyrosis.3-12 The presence of oral mucosal lesions such as lichen planus and recurrent aphthous ulceration has frequently been diagnosed in diabetic patients, although the actual prevalence is rarely addressed in clinical studies.12,13 Some studies have shown a prevalence of 80% of oral mucosal lesions in patients with diabetes mellitus.

Thus, the aim of this study was to determine the prevalence of oral mucosal lesions among diabetic patients in a health center. We then described the type and location of these lesions, as well as investigating their possible association with socio-demographic factors, general health and oral health among patients.

MATERIAL AND METHODS

We conducted a cross-sectional observation study with a convenience sampling of 51 diabetic patients (type 1 and type 2) from the Francisco Pinto Health Center in Campina Grande (Paraíba State, Brazil). Data were collected from August to October 2012. The patients included in this...
The study comprised two stages. Stage one involved data collection through a questionnaire. Initially the data were collected via a questionnaire that featured the sample, overall health of the patients, and questions about their oral health. After data collection, intraoral examinations were performed by an experienced professional in an office at the Health Center.

During intraoral examinations, researchers wore lab coats, caps, masks, goggles, and gloves. For the clinical procedure, a wooden spatula, clinical mirror and gauze were used. In order to find the presence of lesions, all regions of the oral mucosa were evaluated in detail and in the following order: lips, labial mucosa, tongue, gingival mucosa, palate, floor of mouth, and mouth mucosa.

In this study, the independent variables were age, sex, educational level, race, type of diabetes, comorbidity, dentist monitoring, “the patient said to the dentist he was diabetic”, and self-rated oral health. The age variable was initially collected as a numeric variable, and then dichotomized by the median (Median = 66). The dependent variable analyzed in this study was the presence of lesions on the oral mucosa.

This research was approved by the Research Ethics Committee of the University of Paraiba under number 5275.0.133.000-10. According to Resolution 196/96 of the National Health Council, the study followed ethical principles and considerations for the conduct of research involving humans.

The data analysis consisted, firstly, of a descriptive analysis, followed by the analytical phase. Data were expressed as a function of their frequency and prevalence ratio (PR), with their respective confidence intervals of 95% (95% CI). The bivariate association between variables was performed using Fisher’s exact test. Variables with \( p < 0.10 \) in the bivariate analysis were then adjusted in a Poisson Regression. In all analyses, we adopted the significance level of 0.05 \( (p < 0.05 \) was considered significant) and used the SPSS 13.0 program.

**RESULTS**

The prevalence of oral mucosal lesions among patients with diabetes mellitus was 78.4\% \( (n = 40; \text{CI } 95\%: 65.4-87.5) \), and their average age was 64.1 years \( (SD = 12.18) \). There was a predominance of ulcerative lesions, while oral mucosal lesions occurred mainly in the lip mucosa. Table 1 shows the lesion types as well as their anatomical localization in the oral mucosa.

Table 2 displays the results of a bivariate data analysis, showing statistical significance only for patients with diabetes mellitus type 2 \( (p < 0.05) \). Table 3 presents the results of Poisson Regression analysis with only one significant remained variable, type of diabetes \( (p = 0.01) \).

**DISCUSSION**

This research identified a high prevalence of oral mucosal lesions among patients with diabetes mellitus. In the literature, a preliminary study with diabetic patients reported a prevalence of 80\% . This finding, which is close to that found in the present study, highlights the importance of dentists monitoring the oral health of patients with diabetes mellitus, since a high incidence of lesions indicates a need for urgent treatment.

In this study, the most common lesions in the oral mucosa were ulcerative lesions. We found a prevalence of 24.6% of both types of ulcers (traumatic and aphthous). A case-control study, similar to the present study, reported a prevalence of 22% for ulcerative lesions in the oral cavity among patients with diabetes type 2.

The prevalence of oral lesions among diabetics in this study was actinic cheilitis, along with the cases of melanin pigmentation (Figure 1 and 2). This is an important finding because of the malignant potential of actinic cheilitis, mostly found in the elderly population. Furthermore, other lesions (angular cheilitis, fissured tongue, and hairy tongue) found in the study facilitate the emergence of opportunistic infections such as candidiasis.

The sociodemographic characteristics of the population such as age, gender, education, and skin color were not statistically associated with the presence of oral lesions among diabetics. The literature describes no striking differences between these variables, especially between genders. Brazilian clinical studies have also not shown significant differences as regards age, gender, and skin color among diabetic patients with oral lesions. It is more likely that other factors such as obesity are associated more with diabetes, especially diabetes type 2.

Other factors such as monitoring by dentists, family history of diabetes, informing a dentist of one’s diabetic condition, and self-perception of oral health, were not associated with the presence of oral lesions (Table 2). This highlights the need for close checks, as
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Among the variables included in the multivariate analysis, only type 2 diabetes revealed significance when compared to age and comorbidity (Table 3), indicating an association between diabetes type 2 and the presence of an oral mucosa lesion. Type 2 diabetes has been associated more with the occurrence of oral manifestations than type 1.14,22,23 In addition, oral lesions may also be present in type 1 diabetes patients, though to a lesser extent.8

Despite the limitations of the present study, namely the inability to establish cause-effect relations, the results highlight dentists must monitor closely diabetic patients, especially patients with type 2 diabetes, who are more prone to lesions in the oral mucosa, such as ulcers and actinic cheilitis. The occurrence of oral lesions in patients with diabetes represents an opportunity for joint care offered by physicians and dentists. Increasing referrals to dental professionals can help to improve the oral health status of these patients.24

TABLE 1: Description of type of oral mucosal lesion and anatomical site among patients with diabetes mellitus.

| Type of lesion | Number of patients | % of patients | Type of lesion | Number of lesions | % of lesions |
|----------------|--------------------|---------------|----------------|------------------|-------------|
| Traumatic ulcer | 13                 | 25.5          | Traumatic ulcer | 18               | 16.4        |
| Lingual varicosities | 10             | 19.6          | Actinic cheilitis* | 14             | 12.7        |
| Actinic cheilitis* | 7                | 13.7          | Melanin pigmentation | 14             | 12.7        |
| Melanin pigmentation | 7                | 13.7          | Lingual varicosities | 10             | 9.1         |
| Angular cheilitis | 6                | 11.7          | Recurrent aphthous ulceration | 9             | 8.2         |
| Fissured tongue | 6                 | 11.7          | Angular cheilitis | 6               | 5.5         |
| Recurrent aphthous ulceration | 5         | 9.8           | Fissured tongue | 6               | 5.5         |
| Nevus             | 5                 | 9.8           | Nevus           | 5               | 4.5         |
| Hairy tongue     | 4                 | 7.8           | Hairy tongue    | 4               | 3.6         |
| Hyperplasia      | 4                 | 7.8           | Hyperplasia     | 4               | 3.6         |
| Leukoplakia*     | 4                 | 7.8           | Leukoplakia*    | 4               | 3.6         |
| Papule           | 4                 | 7.8           | Papule          | 4               | 3.6         |
| Benign migratory glossitis | 1           | 1.9           | Benign migratory glossitis | 1             | 1.0         |
| No lesions       | 11                | 21.6          | No lesions      | 11              | 10.0        |
| TOTAL PATIENTS   | 51†               | 100.0†        | TOTAL LESIONS   | 99†             | 100.0       |

Anatomical site

| Anatomical site   | Number of lesions | % of lesions |
|-------------------|-------------------|--------------|
| Lip               | 22                | 43.13        |
| Tongue            | 14                | 27.4         |
| Mouth mucosa      | 10                | 19.6         |
| Alveolar ridge    | 6                 | 11.7         |
| Palate            | 6                 | 11.7         |
| Mouth floor       | 3                 | 5.9          |
| Lingual frenum    | 1                 | 1.9          |
| No lesions        | 11                | 21.6         |
| TOTAL PATIENTS    | 51†               | 100.0†       |

Anatomical site

| Anatomical site   | Number of lesions | % of lesions |
|-------------------|-------------------|--------------|
| Lip               | 24                | 35.3         |
| Tongue            | 16                | 23.5         |
| Mouth mucosa      | 12                | 17.7         |
| Alveolar ridge    | 6                 | 8.8          |
| Palate            | 6                 | 8.8          |
| Mouth floor       | 3                 | 4.4          |
| Lingual frenum    | 1                 | 1.5          |
| TOTAL LESIONS     | 68†               | 100.0        |

*Potentially malignant oral lesions. †The patients could have more than one lesion. ‡Some data on anatomical site were lost.

Figure 1: Clinical aspects of actinic cheilitis

Figure 2: Clinical aspects of melanin pigmentation

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CONCLUSIONS

The results of the present study demonstrate that the prevalence of oral mucosal lesions was higher in patients with diabetes type 2 than in patients with diabetes type 1. The data emphasize the importance of dentists monitoring the oral health of patients with diabetes mellitus.

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