

# Prevalence of oral lesions among patients in the dental faculty of the University of Santiago de Compostela, Spain

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## Abstract

### Background

The main objective of this study was to evaluate the prevalence of white, red and pigmented lesions of the oral cavity among patients attending the dental faculty of the University of Santiago de Compostela, Spain.

### Materials and methods

We designed an epidemiological, cross-sectional, descriptive and observational study. White, red and pigmented lesions were evaluated randomly in a total of 100 patients. Data such as patient's demographics, smoking habit, presence or absence of oral lesions (and their features) and whether the patient was aware of the presence of the lesion were collected. Descriptive statistics were calculated, and contingency tables were constructed using the chi-squared test. Analytical statistics were performed by comparing means in nonparametric analyses using the Mann-Whitney *U* test.

### Results

The total prevalence of oral lesions was 22% ( $n = 100$ ). The average age of the patients was 54.68 years ( $SD = 14.64$ ). Most patients with oral lesions were women (60%) and the average size of the lesions was 1.83 cm. Most of the lesions were red (almost 60%) and asymptomatic (> 90%). There was a known causal link for almost all lesions, with a percentage of higher than 80%. Most patients (69.2%) were aware of the presence of the lesion when it was red ( $P = 0.016$ ).

### Conclusion

The most frequent type of lesion in this study population was a red lesion, located on the lip, with a hypertrophic surface, asymptomatic and with a known causal nexus. Periodical check-ups are fundamental to be able to make an early diagnosis of any lesions, as no patient with a white lesion was aware of the risk of it being a premalignant or malignant lesion.

### Keywords

Oral mucosa; lesion prevalence; Spanish population.

## Introduction

An oral mucosal lesion is defined as any abnormal alteration in color or surface appearance, swelling or loss of integrity of the oral mucosal surface, which may interfere with the quality of daily life of the persons affected. Etiological factors of oral mucosal lesions include infection, local trauma and metabolic, immunological and neoplastic diseases.<sup>1,2</sup> Socio-demographic factors and behavior too have been associated with oral mucosal lesions.<sup>3</sup>

Studies on distribution of oral lesions allow us to estimate disease prevalence in a population and thus identify a subpopulation of high risk. For these subpopulations, we can then prepare health strategies in the different areas.<sup>4</sup> In several regions of the world, studies have confirmed the wide variation in both prevalence and the most common types of lesions in the oral cavity (**Table 1**).

The oral mucosa can be affected by a great variety of injuries and conditions. Oral cavity lesions are considered a general health indicator. Early identification is essential for integral medical care. Therefore, soft-tissue examination must be done systematically to include the whole cavity.<sup>14</sup> Although most oral lesions are benign and do not need active treatment, some of them can involve a significant pathology. Those lesions

associated with a high risk of malignant transformation are especially important. Oral cancer is a malignant tumor with an increasing prevalence. Despite technological and biological advances, its prognosis has not improved in the last decades. Early diagnosis is the most important factor for an improved survival rate. Information about risk factors of oral lesions is the first step toward investigating oral cancer prevention.<sup>16</sup>

Prevalence of oral mucosal lesions and their associated factors have not been previously registered in the Santiago de Compostela population. This prevalence varies significantly between geographic locations and the extrapolation of other studies' results would not be meaningful. Accordingly, the main aim of this study was to evaluate the prevalence of white, red and pigmented lesions in the oral cavities of patients attending the dental faculty of the University of Santiago de Compostela. A secondary aim was to analyze patients' variable features and awareness of their lesions.

## Materials and methods

An epidemiological, cross-sectional, descriptive and observational study was designed to determine prevalence of white, red and pigmented lesions among patients attending the dental faculty of the University

Country	Year of publication	Sample size	Identified oral lesions (%)
Malaysia	1997 <sup>5</sup>	11-707	9.7
Slovenia (Ljubljana)	2000 <sup>6</sup>	1-692	61.6
Spain (Oviedo)	2002 <sup>7</sup>	308	51.1
U.S.	2004 <sup>8</sup>	17-235	27.9
Italy (Turin)	2008 <sup>9</sup>	4-098	25.09
India (Karnataka state)	2008 <sup>10</sup>	1-190	41.2
Saudi Arabia	2009 <sup>11</sup>	2-552	15
Turkey	2009 <sup>4</sup>	5-000	15.5
North India	2013 <sup>12</sup>	8-866	16.8
Sweden	2013 <sup>13</sup>	6-448	14.7
Kuwait	2013 <sup>14</sup>	530	58.1
Iran	2013 <sup>1</sup>	1-581	19.4
Australia	2014 <sup>3</sup>	3-551	20.5
China (Shanghai)	2014 <sup>2</sup>	11-054	10.8
Brazil	2015 <sup>15</sup>	801	46.9

**Table 1:** Prevalence of oral mucosal lesions in general populations.

Descriptive data		Frequency in % (n)
Sex	Male	40.9 (9)
	Female	59.1 (13)
Educational level	No education	4.5 (1)
	Primary education	13.6 (3)
	Secondary education	22.7 (5)
	Sixth form	27.3 (6)
	Further education	9.1 (2)
	Higher education	4.5 (1)
	University	18.2 (4)
Smoking habit	No	54.5 (12)
	Yes	45.5 (10)
Cigarettes per day	3	30 (3)
	4	20 (2)
	6	10 (1)
	15	10 (1)
	20	20 (2)
	40	10 (1)
Lesion localization	Gingiva	27.3 (6)
	Lip	31.8 (7)
	Oral mucosa	4.5 (1)
	Alveolar crest	4.5 (1)
	Palate	9.1 (2)
	Tongue	18.2 (4)
	Multiple	4.5 (1)
Lesion type	White	27.3 (6)
	Red	59.1 (13)
	Pigmented	13.6 (3)
Lesion surface type	Atrophic	22.7 (5)
	Hypertrophic	77.3 (17)
Symptoms	No	90.9 (20)
	Yes	9.1 (2)
Causal nexus	Unknown	18.2 (4)
	Yes	81.8 (18)
Evolution time	Unknown	59.1 (13)
	Indeterminate	27.3 (6)
	Determinate	13.6 (3)
Number of lesions	Single	72.7 (16)
	Multiple	27.3 (6)
Lesion awareness	No	50 (11)
	Yes	50 (11)

**Table 2:** Descriptive statistics.

of Santiago de Compostela. The study was conducted over a period of 8 months between September 2016 and April 2017. All of the procedures were carried out with the proper understanding and written consent of the patients in accordance with the Declaration of Helsinki.

### Eligibility criteria

Inclusion criterion: all adult patients attending the dental faculty of the University of Santiago de Compostela.

Exclusion criterion: patients younger than 18 years old.

### Data extraction

Two specific operators performed data collection and extraction, after previous calibration for correct evaluation of the variables. In cases of discrepancy, a third operator corroborated the results. The agreement in this process was calculated using Cohen's kappa coefficient, and a  $\kappa$  score of 0.8 was obtained.<sup>17</sup> Patient exploration was carried out using an exploration kit consisting of a mirror, an exploration probe and a CP12 periodontal probe.

### Clinical parameters

Clinical parameters noted from patients were as follows:

- demographic data (age, sex and educational level);
- smoking habit (yes/no and cigarettes per day);
- presence of oral lesions (yes/no);
- lesion features (type, localization, size, presence of symptoms, single/multiple, atrophic/hypertrophic surface, causal nexus [if the patient or the operator found any causal factor], evolution time and presumptive diagnosis);
- whether the patient was aware of the presence of the lesion (if the patient thought that he or she may have a lesion this was considered to demonstrate awareness).

We classified the type of lesion (white/red/pigmented) and surface (atrophic/hypertrophic) according to the most prevalent aspect or the more serious aspect in terms of clinical prognosis in cases of mixed lesions.

### Sample size

To estimate the sample size, the greater proportion of patients affected by oral lesions was taken into account according to the literature, that is, 35%. To obtain a

Main variable	Secondary variable	P value
Lesion type	Sex	0.607
	Educational level	0.117
	Smoking habit	0.653
	Cigarettes per day	0.183
	Lesion localization	0.511
	Lesion surface type	0.080
	Symptom	0.467
	Causal nexus	0.642
	Evolution time	0.491
	Number of lesions	0.184
	Lesion awareness	0.016
	Presumptive diagnosis	0.077
	Age	0.226
	Lesion size	0.714

Table 3: Chi-squared test.

statistic potential of 80%, we needed a total of 86 patients. Finally, we analyzed a randomized sample of 100 patients.

### Statistical analysis

All data were coded and analyzed using IBM SPSS Statistics software (Version 20). Descriptive statistics were calculated using frequencies and percentages for the categorical variables and means and standard deviations for the quantitative variables. Contingency tables were constructed using the chi-squared test. Analytical statistics were performed by comparing means in nonparametric analyses, using the Mann–Whitney *U* test and 1-way analysis of variance. All of the differences in which the *P* value was  $\leq 0.05$  were considered statistically significant.

## Results

A total of 100 patients were examined. **Table 2** summarizes descriptive data of the patients with oral lesions. The patients' mean age was 54.68 years (SD = 14.64). Most patients with oral lesions were women (almost 60%). The mean lesion size was 1.83 cm (SD = 41.79). In the bivariate analysis, in which the main variable was the type of lesion, white, red or pigmented (**Table 3**), we observed that the patient was aware of the lesion when

the lesion was red (69.2%) or pigmented (66.7%), but not when it was white (0%). Regarding the influence of sex on the type of lesion, we observed that more than 60% of pigmented lesions occurred in males, while red and white lesions were predominant in women.

According to smoking habit, 66.7% of the total pigmented lesions were in smokers. Of those smokers with pigmented lesions, all smoked more than 10 cigarettes per day.

The location affected the type of lesion in the following way: In the case of red lesions, most were located on the lip. In white lesions, most were located on the palatal mucosa. The pigmented ones appeared in the gingivae.

All of the white lesions diagnosed had a hypertrophic surface. Of the red lesions, almost 80% had a hypertrophic surface. However, most of the pigmented lesions had an atrophic surface (66.7%). More than 80% of the white lesions and more than 70% of the red lesions had a known causal nexus. All of the pigmented lesions in this study had a known causal nexus.

More than 80% of the red lesions presented singularly. In the case of white lesions, the majority were also single lesions (66.7%). The pigmented ones, however, presented in multiples. No patient with a white lesion was aware of the lesion. However, almost 70% of patients with red lesions were aware that they had them. These differences are statistically significant, according to the chi-squared test ( $P = 0.016$ ). Red lesions tended to appear in older patients, and white and pigmented lesions affected younger patients. Pigmented lesions were less frequent than white lesions and white lesions were less frequent than red lesions.

## Discussion

Our results revealed a prevalence of 22% of oral lesions in patients attending the dental faculty. Previous studies show that prevalence varies significantly in general populations (range: 9.7–61.6%; **Table 1**). The majority of the lesions were red (59.1%), followed by white (27.3%) and pigmented ones (13.6%).

According to our study, red lesions are more frequent in older people than white or pigmented ones. A study carried out in an elderly Chilean population agrees with our finding of a higher frequency of red lesions at older ages.<sup>18</sup> In the total number of patients diagnosed with

any type of lesion, white, red or pigmented, there was a greater number of women (59.1%). In other studies, a higher prevalence of lesions in women had already been reported.<sup>6</sup> Other studies have reported a higher prevalence of lesions in males.<sup>12, 19</sup> However, there are studies that support no significant difference in prevalence between women and men.<sup>14</sup>

In our study, 63.6% of patients with lesions had only sixth form and secondary education. We would think that patients with a higher educational level would have a greater concern for oral health and therefore come to the consultation with a suspicion of a lesion. In other studies, a higher prevalence of oral diseases was reported in patients of lower socio-economic status, which may be the result of a lower educational level.<sup>20</sup>

A slightly higher percentage of patients who participated in this study were nonsmokers. We could attribute this to the growing antismoking campaign of recent decades, increasing gradual awareness of the dangers of this habit. In a study conducted in 2001 in Italy, 88% of the sample were already aware of the damage caused by smoking.<sup>16</sup> In another study conducted in Kuwait in 2013, smoking participants reported that they would consider quitting if an improvement of oral health could be demonstrated as a result.<sup>14</sup>

The relative risk of oral cancer increases proportionally with the level and duration of tobacco use. It has been reported that the benefit of stopping smoking is large and can be realized in a relatively short period.<sup>21</sup> Two pathogenic factors are fundamentally involved in the development of pigmented lesions: race and smoking.<sup>21</sup> Regarding tobacco, it stands out in this study that 66.7% of the total pigmented lesions were in smokers who smoked more than 10 cigarettes per day. Regarding the influence of race, in the Asian population, the prevalence of pigmented lesions was 79%,<sup>22</sup> while in this study it was 3%, similar to that in other studies in European populations.<sup>23</sup>

The location of the most frequent lesions in the present study was the lip (31.8%). We suggest that this is related to the lips being the first barrier to the oral cavity. Because of this, they are constantly exposed to various irritants, which play an important role in the etiology of lesions in this location.<sup>24</sup> Most of the lesions had a hypertrophic surface, almost 80%, which could be related to the higher prevalence of traumatic injuries. Only 9.1% of patients reported symptoms. This result was similar to that of other studies.<sup>13</sup>

More than 70% of the lesions diagnosed were single lesions, a fact that coincides with the study of the population of Oviedo, where single lesions also predominated.<sup>7</sup>

None of the patients with white lesions in this study were aware of them, probably because this type of lesion is usually asymptomatic. However, those with red lesions were aware of these (69.2%), as were those with pigmented lesions (66.7%). This is a very important result because it indicates that patients may miss some types of premalignant lesion, resulting in a delay in seeking diagnosis and treatment. The knowledge of risk factors and the recognition of symptoms by patients are crucial factors. A study conducted in Scotland in 2010, which assessed the initial recognition of symptoms in oral cancer patients, described a great variety of symptoms, among which were “bulto” and “white spot.”<sup>25</sup> Many of the patients stated that they used self-medication obtained from a pharmacy after noticing the initial symptoms, which generally resulted in delayed diagnosis and treatment.<sup>25</sup>

## Conclusion

The prevalence of lesions in the oral cavity found in this study was 22%. Most lesions appeared in women. The most frequent type of lesion in this study population was red; in terms of location, the lip was the most prevalent site. Hypertrophic and asymptomatic lesions were more frequent. In more than 80% of the patients, we could identify a known causal nexus. No patient with a white lesion was aware of it. Periodical check-ups are fundamental to be able to make an early diagnosis of any lesions, as no patient with a white lesion was aware of the risk of it being a premalignant or malignant lesion.

## Competing interests

The authors declare that there are no conflicts of interest in connection with this article, including there being no funding sources.

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