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ORIGINAL ARTICLE

Prevalence of Oral Lesions Diagnosed at a Pathology Institute: A Four-year Analysis

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ABSTRACT

Objective: To identify the most prevalent oral lesions based on reports from a pathology institute's reports and associations between malignant and oral potentially malignant disorders with patient's demographic variables and the anatomical location. **Material and Methods:** All 1,298 histopathological reports of oral lesions recorded in the database were reviewed. Demographic variables, anatomical location of the lesion, histopathological diagnosis of the lesions, and their biological behavior were analyzed. **Results:** Regarding the biological behavior of the identified lesions, benign lesions were predominant (70%), followed by lesions of undetermined behavior (14.3%), malignant lesions (14.2%), absence of histological alteration (1.2%), and finally, oral potentially malignant disorders (0.5%). The anatomical locations of the most prevalent oral lesions potentially malignant disorders and malignant were in the following structures of the oral cavity: gums, buccal mucosa, floor of the mouth and hard palate (p=49.2%), and tongue (p=48.7%). **Conclusion:** The probability of malignant and premalignant lesions was higher among males (PR= 4.21; 95% CI 2.08-6.22), the increase in age (PR = 1.06; 95% CI 1.05-1.08), and in the tongue region (PR = 5.48; 95% CI 1.67; 17.92). Identification of malignant and potentially malignant oral conditions is higher in older men and in tongue specimens.

Keywords: Biopsy; Neoplasms; Diagnosis, Oral; Pathology, Oral.

Introduction

Oral lesions are often identified during routine clinical examinations and may be of traumatic, neoplastic, congenital, immunological, or infectious origin. As for their biological behavior, they can be benign, malignant, oral potentially malignant disorders, or indeterminate [1,2]. The correct and early diagnosis of these lesions is fundamental for their correct management to avoid patient discomfort and improve quality of life [1].

It is not always possible to establish the diagnosis or biological behavior of an oral lesion by clinical examination alone, and histopathological evaluation using a biopsy is required [2]. From the clinical evaluation, the clinician should determine diagnostic hypotheses and then confirm them [2]. Thus, the purpose of a biopsy is to perform a microscope exam on the collected material to identify changes to confirm the diagnosis [3].

Histopathological evaluation is also indicated when a lesion persists for more than two weeks when inflammatory lesions have not regressed with local treatment, and when bone lesions not identified by clinical or imaging examination are suspected [4]. Persistent swelling, infiltration, or other signs of malignancy can be present when the hyperkeratosis changes [1,4]. Some lesions can precede oral cancer and are called oral potentially malignant disorders; however, not all potentially malignant disorders progress to cancer, and not all cancer originates from them. In 2005, the WHO recommended abandoning the terminology premalignant and instead proposed to use the term 'oral potentially malignant disorders' (OPMDs) [5].

Mouth cancer is the most frequent in the head and neck region [6,7], with the tongue being the anatomical location most affected. In Brazil, its incidence is considered one of the highest in the world [8-10]. Males between 60 and 79 who smoke, chew tobacco, or drink alcohol are the most affected [1]. Mouth cancer includes malignant tumors that affect the lips, gums, tongue, buccal mucosa, hard palate, and floor of the mouth (under the tongue) [11]. Its etiology is multifactorial, emphasizing environmental factors, lifestyle, and habits, mainly alcohol and tobacco consumption [12]. When concomitant, these harmful habits are responsible for about 60% of oral cancers [6,11,12]. Cultural and regional differences also seem to interfere with the epidemiology of oral cancer. Thus, individuals who habitually chew tobacco are more likely to develop cancer [6]. Early detection of oral lesions increases the patient's chance of healing, reducing morbidity and mortality rates. Therefore, clinical examinations should not be restricted to the teeth but cover the entire cheek mucosa [13].

This study aimed to identify the most prevalent oral lesions based on reports from a pathology institute's reports and associate their biological behavior with sociodemographic variables, such as gender, age, municipality of origin, and anatomical location.

Material and Methods

The research was submitted for approval by the Research Ethics Committee of ATITUS and approved under number 3,571,690, CAAE 20330719.7.0000.5319, on September 12, 2019.

Study Design and Population

This study used a quantitative descriptive cross-sectional approach. All histopathological reports of oral lesions that were biopsied and recorded in the Pathology Institute of Passo Fundo (PIPF) database between 2016 and 2019 were reviewed. In total, 1,298 histopathological reports were examined. The PIPF, a reference center in pathology, is located in the north of Rio Grande do Sul, Brazil and serves more than 70 municipalities.

Procedures for Data Collection

For data collection, all histopathological reports filed in the PIPF database were reviewed. Data regarding the histopathological diagnosis, gender, city of residence, age, and anatomical location of the lesion were collected.

Histopathological diagnoses were grouped according to biological behavior and classified as follows: absence of oral lesion - examination within the normal limits for the biopsied anatomical area or physiological, anatomical variations; benign lesions - oral lesions with indolent behavior (hyperplastic pericoronal follicle, irritation fibroma, dentigerous cyst fibroepithelial hyperplasia, papilloma, keratocyst odontogenic tumor, periapical granuloma, pyogenic granuloma, and mucocele); oral potentially malignant disorders - oral lesions with a potential risk of malignancy (actinic mucositis, squamous intraepithelial dysplasia, actinic cheilitis); malignant lesions - primary cancers of the oral cavity or metastases (*in situ* and invasive carcinomas, lymphomas, sarcomas).

The reports were also divided according to the biopsies' anatomical location into four categories: oral cavity (gums, buccal mucosa, floor of the mouth and hard palate), tongue, lips, and dental/bone structures (dental crown, tooth root, root apex, periodontal ligament, bones - maxilla, mandible).

Outcome Variable

The outcome variable of this study was the histopathological diagnosis of the lesions, being grouped into two categories: benign oral lesions (= 0) and oral potentially malignant disorders e/or malignant oral lesions (= 1).

Exposure Variables

The exposure variables analyzed were gender (male and female), municipality of origin, Passo Fundo (where the PIPF is located), age (continuous variable), and anatomical location of the lesion (oral cavity, tongue, lips, and dental/bone structures). This municipality, Passo Fundo, is located in the north of Rio Grande do Sul, Brazil, and is considered the largest city in the northern region, with a population of 204,722 inhabitants.

Data Analysis

The data from the histopathological reports were recorded in Microsoft Office Excel 2016 and later exported and analyzed using the statistical program IBM SPSS® software, version 20.0 (IBM Corp., Armonk, NY, USA). For data analysis, the relative and absolute frequencies of the variables were observed. Pearson's chi-square test was used for bivariate analysis, and crude and adjusted Poisson regression with robust variance was used for the multivariate analysis, obtaining the prevalence ratios (PR) and respective 95% confidence intervals (95% CI). To adjust for confounding variables, all exploratory variables entered the model (gender, age, city of residence, and anatomical location), but only those with a p-value of <0.05 remained.

Results

Of all 1,298 patients, 56.2% were female, and 43.8% male. Of these, 26.5% were up to 30 years old, 43.9% were 31 to 60 years old, and 29.6% were 61 to 98 years old, with a mean age of 46.17 years (± 20.22). In total, 42.5% of the patients came from the city of Passo Fundo, while 57.5% came from other cities in the interior of the state. Benign lesions were predominant (70.0%) over malignant and oral potentially malignant disorders (14.2% and 0.5%, respectively). Reports were categorized as indeterminate (14.3%) when they were inconclusive or nonspecific or the sample had no histopathological changes (1.2% of the tests). Regarding the lesions'

anatomical location, 55.5% were located in the oral cavity (gums, buccal mucosa, floor of the mouth, and hard palate), 21.3% in the dental/bone structures, 20.3% in the tongue, and 2.9% in the lip (Table 1).

Table 1. Distribution of descriptive variables reported in the histopathological reports.

Variables	N	%
Gender		
Female	729	56.2
Male	569	43.8
Age		
Up to 30 years	344	26.5
31 to 60 years	570	43.9
61 to 98 years	384	29.6
City of Origin		
Passo Fundo	552	42.5
Other Cities	746	57.5
Histopathological Diagnosis		
Without changes	15	1.2
Benign	908	70.0
Malignant	184	14.2
Oral potentially malignant disorders	6	0.5
Indeterminate	185	14.3
Anatomical Location of the Lesion		
Oral cavity (gums, buccal mucosa, floor of the mouth and hard palate)	720	55.5
Tongue	263	20.3
Lip	38	2.9
Dental/bone structures	277	21.3
Period of the Reports		
2016	374	28.8
2017	373	28.7
2018	257	19.8
2019	295	22.7

Table 2 shows the prevalence of oral potentially malignant disorders and malignant oral lesions observed in the reports of the histopathological exams associated with the variables of interest in the study. The prevalence of oral potentially malignant disorders and malignant lesions was higher among males (67.9%), in specimens biopsied in the oral cavity (49.2%), followed by the tongue (48.7%), and in individuals from inland towns (68.4%).

Table 2. Crude and adjusted prevalence (%) and prevalence ratio of the histopathological exams of the oral lesions identifying malignant and oral potentially malignant disorders.

Variables	Prevalence	p-value*	Crude PR (95% CI)	p-value**	Adjusted PR (95% CI)	p-value**
Gender						
Female	32.1	<0.001	1.00	<0.001	1.00	<0.001
Male	67.9		3.48 (2.49; 4.85)		4.21 (2.85; 6.22)	
Age	-	-	1.06 (1.05; 1.09)	<0.001	1.06 (1.05; 1.08)	<0.001
City of Residence						
Passo Fundo	31.6	0.002	1.00	0.002	1.00	0.828
Other Cities	68.4		1.68 (1.02; 2.34)		1.04 (0.69; 1.57)	
Oral Lesion Location						
Oral Cavity	49.2	<0.001	1.00	<0.001	1.00	<0.001
Tongue	48.7		5.05 (1.71; 14.86)		5.48 (1.67;17.92)	
Lips	2.10		1.34 (0.46; 3.91,)	0.616	1.60 (0.49; 5.17)	0.426

*Chi-square test; **Wald test; PR: Prevalence Ratio; 95% CI: 95% Confidence Interval; Adjusted for gender, age, city of residence, and anatomical location of the oral lesions.

It is important to note that there were no malignant or oral potentially malignant disorders in the dental/bone structures. Thus, they did not enter the statistical analysis. After adjusting for confounders in the regression analysis, the association between malignant and oral potentially malignant disorders and the municipality of origin (residence) were excluded from the model ($p>0.05$). In the final model, males (PR = 4.21; 95% CI 2.08-6.22) and advanced age (in years) (PR = 1.06; 95% CI 1.05-1.08) were found to be risk factors. The anatomical location most likely for oral potentially malignant disorders and malignant lesions was the tongue (PR =5.48; 95% CI 1.67; 17.92) (Table 2).

Discussion

This study aimed to identify the most prevalent oral lesions based on reports from a pathology institute's reports. We also sought to associate sociodemographic variables with the biological behavior of the lesions (benign, oral potentially malignant disorders, and malignant), genders, and city of dwelling. In the population studied, from the data provided by the diagnostic center, there was a predominance of females, people aged between 31 and 60 years old, and people from cities in the interior of the state. Benign lesions were the most prevalent, with the oral cavity being the most frequently biopsied location.

In the model of logistic regression, the male gender presented itself as a factor associated with the biggest occurrence (PR=4.21) of lesions malignant and oral potentially malignant disorders when compared to the female gender. In a study, the authors also found a higher frequency of occurrences of cancer of the oral cavity in males, and the predominant age group was between 41 and 60 years old [6].

In addition, the results obtained in the Multiple Logistic Regression model show the increase of age as a factor associated to the occurrence of lesions malignant and oral potentially malignant disorders (PR=1.06). Age is an important factor in predisposition to oral cancer, regardless of other factors. A study also found that males over 63 years of age presented the largest number of primary oral tumors [14]. Another study that evaluated different types of head and neck cancers in several regions of India highlighted that mouth cancer was the most frequent in males, particularly after 40 years of age, with smoking being the most reported habit [6]. Similar results were described in temporal research of the Hospital Cancer Registries in Brazil [15]. Data from a survey at the Oral Pathology Laboratory of the Health Institute identified that males aged 45 to 80 were the most likely to have malignant lesions of the mouth [1]. In this same study, when harmful habits such as tobacco smoking and alcohol drinking were excluded, oral cancer was predominant in older females [1]. Another study identified a higher prevalence of oral potentially malignant disorders in females (58.6%). However, in another study, the prevalence of benign and malignant lesions was similar in both genders [16].

Still, according to the Multiple Logistic Regression model, the anatomical location of the tongue was associated with a higher prevalence of lesions malignant and oral potentially malignant disorders (RP=5.48) when compared to oral cavity. One study found that the average age at diagnosis of oral cancer was 58 years in several countries, such as the United Arab Emirates, Thailand, Iran, Malaysia, Jordan, and Japan. In Nigeria, Libya, and India, the average age of diagnosis was earlier, which can be explained by chewing and smoking tobacco [13]. These habits were also observed in an Indian study of 279 patients with cancer in the oral cavity, especially tongue carcinoma. India has the highest oral cancer rate globally, which can be attributed to smoking and chewing tobacco. These are considered responsible for about 50% of cases [6]. Data from a survey involving 90 patients, 21 smokers, and 27 alcoholics found precursor lesions of oral cancer, such as actinic cheilitis and leukoplakia, in five and three patients, respectively [17]. They considered smoking and alcohol consumption to

be the factors most associated with the appearance of cancer in the tongue and lip, both for active users and for those who stopped the habit [15].

A survey using data from patients with oral cancer registered between 2005 and 2014 in the National Cancer Hospital Records Information System found that the tongue was the most affected anatomical region in all Brazilian states, which agrees with the current study. One study reported that the most affected areas were the tongue, followed by the floor of the mouth in 778 patients with oral cancer identified in specialized cancer centers in Medellín between 2000 and 2011 [18]. In another investigation in Chile between 2002 and 2012, the tongue was the region most affected, followed by the parotid gland [19]. According to one study, 90% of head and neck cancers are represented by epithelial neoplasms such as squamous cell carcinoma, with leukoplakia being the main oral potentially malignant disorders that precede squamous cell carcinoma [12].

There are several limitations to this study. First, it was not possible to analyze important patient data, such as the presence of harmful habits, including smoking, alcoholism, repetitive trauma, sun exposure, carcinogenic agents, and nutrition. Second, this study has a cross-sectional design and uses secondary data. Therefore, it was not possible to clinically examine the patients or access the diagnostic hypotheses suggested by the clinical that requested each examination. Third, no reports were included that had an indeterminate diagnosis. These cases usually require complementary exams, such as immunohistochemistry, immunofluorescence or genetic markers, or even serial biopsies for diagnostic clarification [20].

However, this research presents a representative sample of retrospective reports over a four-year period and provides relevant epidemiological information on a serious public health issue. Epidemiological studies are valuable instruments in describing the population's health conditions and investigating determinants and actions to change them [4]. Habits such as chewing or smoking tobacco, drinking alcohol, and sun exposure are known to be risk factors for oral potentially malignant disorders and malignant lesions, even if they were not evaluated in the current study. Thus, in addition to studies that provide information on the main risk factors, epidemiological surveys of malignant lesions are effective tools to reduce discrepancies between knowledge and clinical practice.

Conclusion

This study found that the probability of identifying malignant and oral potentially malignant disorders is greater in males, the increase in age, and in biopsied specimens from the tongue.

Authors' Contributions

JZ	https://orcid.org/0000-0002-8244-7759	Conceptualization and Investigation.
RRG	https://orcid.org/0000-0002-9771-1209	Writing - Original Draft, Writing - Review and Editing and Visualization.
MTV	https://orcid.org/0000-0003-0370-0048	Methodology, Formal Analysis and Writing - Review and Editing.
LR	https://orcid.org/0000-0003-3725-3047	Conceptualization, Methodology, Formal Analysis, Data Curation, Writing - Original Draft, Writing - Review and Editing and Project Administration.

All authors declare that they contributed to critical review of intellectual content and approval of the final version to be published.

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None.

Conflict of Interest

The authors declare no conflicts of interest.

Data Availability

The data used to support the findings of this study can be made available upon request to the corresponding author.

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