

**ORIGINAL ARTICLE**

# Epidemiological profile of oropharynx cancer in Brazil from 2013 to 2022

José Carlos Barauna Neto<sup>1\*</sup> , Mariana Ronchesel Barauna<sup>2</sup>,  
Karyme Guanaes Aota<sup>1</sup>

## Abstract

**Introduction:** Oropharyngeal cancer, a malignant neoplasm of the head and neck, predominantly presents as squamous cell carcinoma. It is often diagnosed in advanced stages, negatively impacting quality of life. Diagnosis involves biopsy with histopathological examination, clinical staging, and supplementary tests. Major risk factors include alcohol and tobacco use, along with human papillomavirus (HPV) infection. **Objective:** To outline the epidemiological profile of oropharyngeal cancer in Brazil across a decade. **Methods:** This descriptive, observational, epidemiological study utilized DATASUS data on oropharyngeal cancer cases from 2013 to 2022. Data analysis covered the Federative Unit (FU) of residence, patient demographics (sex and age group), and disease stage. Average annual incidence rates were derived from a literature review using the PubMed, SciELO, and INCA databases. **Results:** The study identified 37,124 cases of oropharyngeal cancer. São Paulo emerged as the FU with the highest patient count (7,839; 21.11%). Males accounted for 83.75% of cases, with the most significant sex discrepancy occurring in 2015 (86.37%). The predominant age group affected was those above 50, especially between 55 and 59 (7,360; 19.82%). Stage 4 disease was observed in 43.88% of cases, whereas stage 0 comprised 3.18%. **Conclusion:** Oropharyngeal cancer in Brazil predominantly afflicts men over 50, with most cases diagnosed at advanced stages. There were no data linking alcohol and tobacco consumption or HPV infection to the incidence rates, indicating the need for further studies.

**Keywords:** oropharyngeal neoplasms; epidemiology; head and neck neoplasms.

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## Introduction

Oropharyngeal cancer is a malignant neoplasm of the head and neck region that includes the base of the tongue, vallecula, soft palate, and the posterior and lateral walls of the oropharynx (palatine tonsils)<sup>1</sup>. The most common histological type is squamous cell carcinoma<sup>2</sup>, which is associated with the primary risk factors. Diagnosis is made through a biopsy, and upon histological confirmation, clinical staging is conducted, complemented by imaging tests<sup>1</sup>.

The main risk factors for these head and neck pathologies are tobacco and alcohol consumption, along with the presence of human papillomavirus (HPV) infection. Tobacco is a direct cause, as its smoke contains various carcinogenic substances. Smoking often occurs alongside alcoholism, which increases the

<sup>1</sup> ITPAC PALMAS, Medicina, Palmas, TO, Brasil

<sup>2</sup> Universidade de Taubaté (UNITAU), Medicina, Taubaté, SP, Brasil

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risk of developing cancer more than when each is present independently. HPV—the most well-known sexually transmitted infection because of its high incidence rates among young people—has subtypes, with 16 and 18 posing a high risk for the development of oropharyngeal cancer<sup>3</sup>. Since 2000, when Gillison et al<sup>4</sup>. first established the correlation between oropharyngeal disease and HPV, the positive cases of HPV for oropharyngeal neoplasia have increased, especially with subtype 16 of the virus<sup>3</sup>. They analyzed both positive and negative HPV cases and correlated them with head and neck cancer, as well as with alcohol and tobacco use<sup>4</sup>.

Patients afflicted with this type of cancer often experience a decline in quality of life, primarily due to pain, fatigue, and sleep disorders<sup>5</sup>. It is noteworthy that the timing of the diagnosis influences the symptoms, morbidity, and mortality rates; the earlier the neoplasm is detected, the lower the symptoms, morbidity, and mortality rates<sup>2</sup>.

According to GLOBOCAN, in 2018, there were 18.1 million new cases of cancer worldwide, including non-melanoma skin cancers, and there were 9.6 million deaths caused by them, including non-melanoma skin cancers. In this context, the number of new oropharyngeal cancer cases was 92,887, and the number of deaths from these cases was 51,005<sup>6</sup>.

According to INCA, the estimates for the three years 2023-2025 are that there will be 15,100 new cases of cancers of the lip, oral cavity, salivary glands, and oropharynx, with an estimated 10,900 cases occurring in men and 4,200 in women. Therefore, the estimated risk is 10.3 new cases per 100,000 men and 3.83 new cases per 100,000 women. Excluding non-melanoma skin cancers, these neoplasms are ranked eighth among the most frequent<sup>7</sup>.

Given Brazil's vast territorial size and INCA's forecast indicating a significant number of cancer cases, including oropharyngeal cancers, this study proposes to analyze oropharyngeal cancer cases by federative unit (FU) of residence, sex, age group, and disease staging.

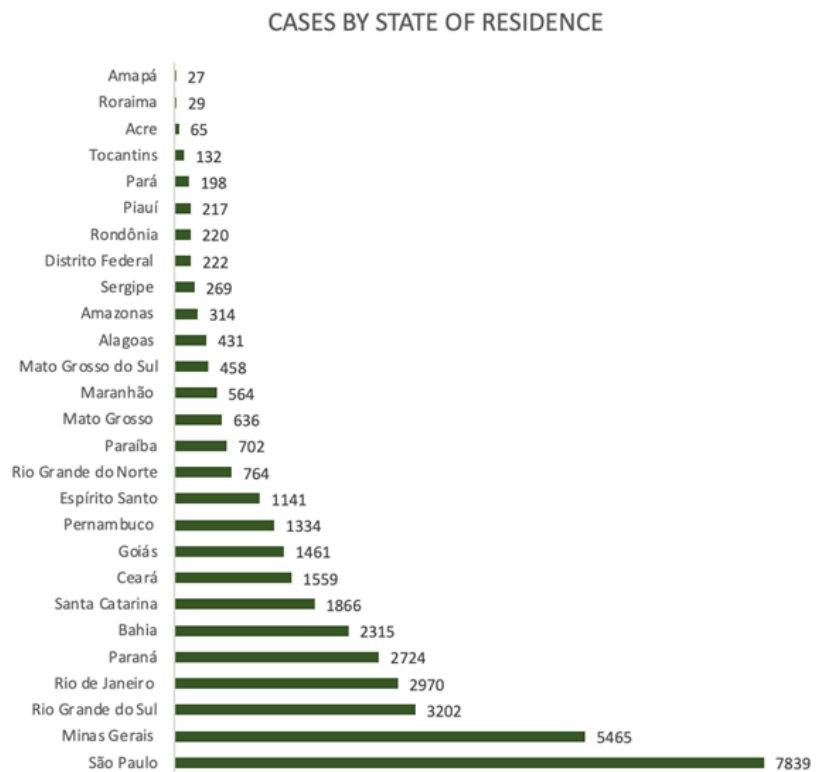
## Materials and methods

The study is a descriptive and observational epidemiological analysis, utilizing data from DATASUS, the Federal Government of Brazil's database. It considered cases of oropharyngeal cancer, accounting for variables such as the FU of residence, sex, age group, and disease staging, from January 2013 to December 2022. Data from the system were analyzed to calculate percentages for each researched topic, aiming to establish correlations. Additionally, bibliographic research was conducted at the PubMed, SciELO, and INCA databases.

## Results

During the analyzed period, 37,124 cases of oropharyngeal cancer were recorded. From the analysis of Figure 1, it is concluded that the FU that reported the most cases during this period was São Paulo, with 7,839 cases (21.11%), and the one that reported the least cases was Amapá, with 27 cases (0.07%)<sup>8</sup>.

Figure 2 shows that during the analyzed period, of the 37,124 cases, 31,093 (83.75%) affected men, with the male sex having the highest discrepancy



**Figure 1.** Generated from the Outpatient Information System (SIA), via the Individualized Outpatient Production Bulletin (BPA-I) and the Authorization for High Complexity Procedures; Hospital Information System (SIH); Cancer Information System (SISCAN). **Data update date:** June 15, 2023.

in 2015, with a predominance of 86.37%, and the lowest discrepancy observed was in 2019, but still with a male predominance (81.59%)<sup>8</sup>.

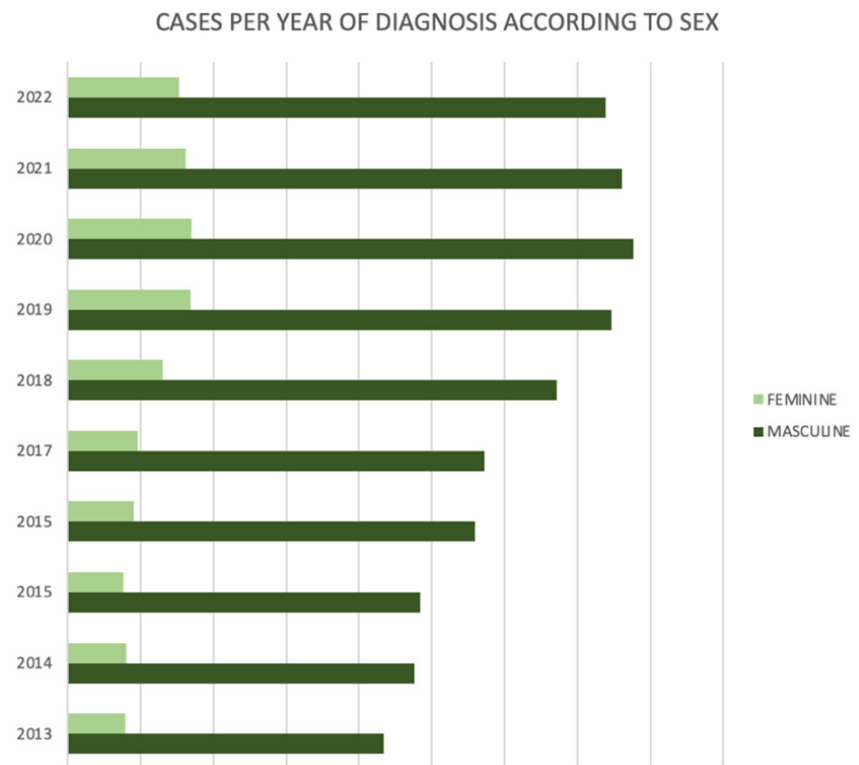
Figure 3 shows that, of the 37,124 cases, 30,776 (82.90%) occurred from the fifth decade of life onwards, with the age group between 55 and 59 years having the most notifications, with 7,360 cases (19.82%)<sup>8</sup>.

Figure 4 shows that, of the 37,124 cases of oropharyngeal cancer, 5,779 (15.56%) were not staged, 16,292 (43.88%) were in stage 4, and only 1,181 (3.18%) were in stage 0.

## Discussion

Oropharyngeal cancer encompasses malignant neoplasms affecting the soft palate, tonsils, base of the tongue, pharyngeal walls, and vallecula. Oropharyngeal squamous cell carcinoma (OSCC) accounts for 90-95% of these tumors<sup>2,9</sup>. OSCC is more closely associated with smoking. Moreover, the combination of smoking and alcohol consumption with HPV-16 has a synergistic effect on the risk of developing OSCC<sup>10,11</sup>.

The molecular biology of OSCC varies; keratinizing OSCC is not associated with HPV but shows mutations in genes such as p53 and CDKN2A. On the



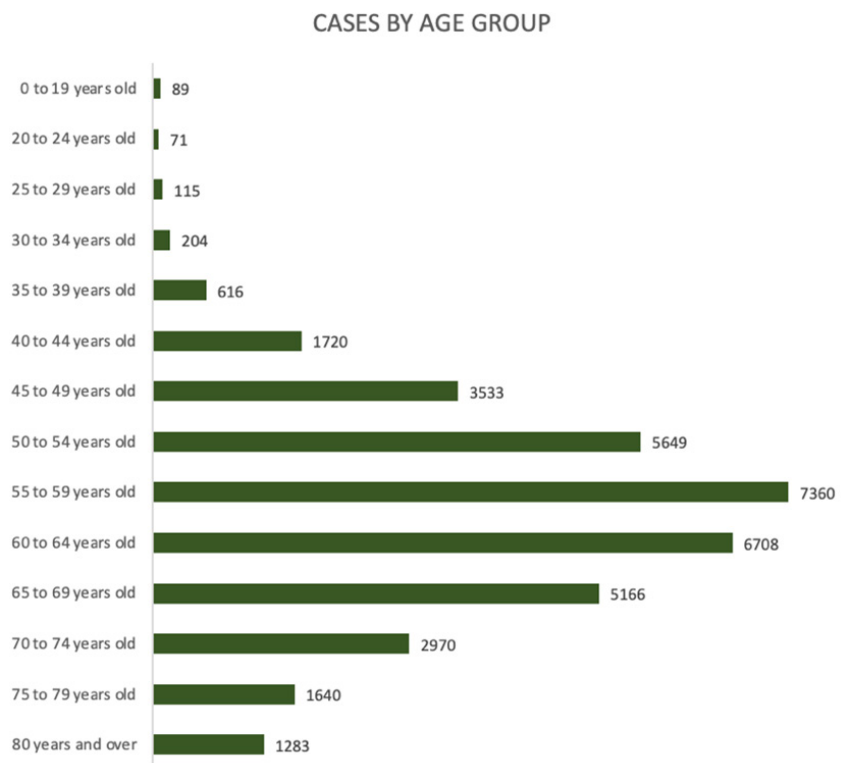
**Figure 2.** Generated from the Outpatient Information System (SIA), via the Individualized Outpatient Production Bulletin (BPA-I) and the Authorization for High Complexity Procedures; Hospital Information System (SIH); Cancer Information System (SISCAN).

**Data update date:** June 15, 2023.

other hand, non-keratinizing OSCC is associated with HPV, and oncogenic mutations of PIK3CA are significantly more common in HPV-positive than in HPV-negative OSCC<sup>9,12</sup>.

Diagnosis begins with a thorough anamnesis, often revealing symptoms like odynophagia and dysphagia. This is followed by a physical examination, especially palpation of the cervical region for nodules. If clinical history raises suspicion, a biopsy is requested. Upon histological confirmation, staging is conducted<sup>13</sup>.

The study revealed that a significant number of oropharyngeal cancer cases in Brazil are diagnosed at an advanced stage, with 16,292 out of 37,124 cases being stage 4. For staging oropharyngeal cancer (TNM), the guidelines of the American Joint Committee on Cancer (1992) are used. These guidelines define Tx as a tumor that cannot be assessed, T0 as no evidence of a primary tumor, Tis as carcinoma in situ, and T1a to T4 based on the size and extent of the primary tumor. Nx represents undiagnosed lymphadenopathy, N0 indicates no lymphadenopathy, and N1 to N3 denote the involvement of lymph nodes, varying by number and extent affected. Metastases are classified as Mx if not assessable, M0 if there are no distant metastases, and M1 if distant metastases are present. Following the TNM classification, cancer is staged as 0, I, II, III, IVA, IVB, IVC, or unknown<sup>14</sup>.

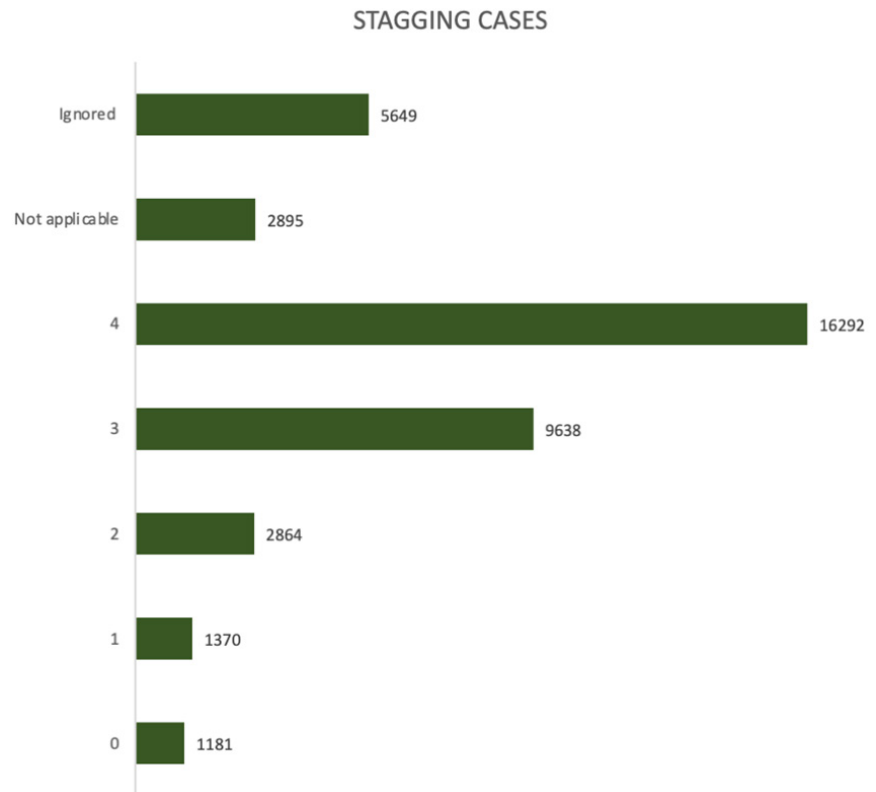


**Figure 3.** Generated from the Outpatient Information System (SIA), via the Individualized Outpatient Production Bulletin (BPA-I) and the Authorization for High Complexity Procedures; Hospital Information System (SIH); Cancer Information System (SISCAN).  
**Data update date:** June 15, 2023.

The 2022 study concluded that a substantial portion of patients with oropharyngeal cancer were male, aged 50 to 59 years, and many were diagnosed at an advanced disease stage. The findings could be correlated with tobacco and alcohol use, but data on HPV status, an important factor for head and neck cancer, were not available<sup>15</sup>. The outcomes of the previous research are consistent with those of this study, showing that 83.75% of the cases affected men, 82.90% occurred from the fifth decade of life onwards, and 43.88% were in stage 4 at the time of diagnosis, indicating late detection.

In the study by Révész et al.<sup>16</sup>, which aimed to compare oropharyngeal cancer, specifically of the oral cavity, in young people and adults, it was concluded that young people had a higher prevalence of HPV infection, while adults exhibited habits such as smoking, and both groups consumed alcohol. Young people have a better prognosis considering their age, the disease stage, and their state of abstinence. However, it is worth highlighting that the most common tumor location was the oral cavity, and it is important to screen patients. Because of the lack of available data in the system, it was not possible to correlate HPV infections with the cases of oropharyngeal cancer in younger patients, nor alcohol and smoking with the adult cases.

The work of Moro et al.<sup>17</sup> showed a low survival rate in the studied patients, with an even lower rate in those who had oropharyngeal cancer. It was not



**Figure 4.** Generated from the Outpatient Information System (SIA), via the Individualized Outpatient Production Bulletin (BPA-I) and the Authorization for High Complexity Procedures; Hospital Information System (SIH); Cancer Information System (SISCAN).  
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possible to correlate the cases with the presence or absence of HPV since this information was not available in the system used. The current study was unable to analyze the survival rate of patients or the correlation with HPV because of the lack of available data.

Another study from 2011 analyzed the influence of socioeconomic factors such as education level and occupation on the incidence of head and neck cancer. It was concluded that in most research, underprivileged populations suffer more from this type of cancer<sup>18</sup>.

Regarding disease staging and early diagnosis, evidence proves that early diagnosis of oral cancer could reduce mortality and morbidity, as a proper physical examination, along with clinical suspicion, assists in achieving an early diagnosis<sup>19</sup>.

When it comes to diagnosing cancer early, it is possible to intervene at the beginning of the carcinogenesis process or when the lesion size has not yet evolved, is relatively small, or soon after symptoms appear, in a short period. Intervening when the tumor is still primary reduces the chances of mortality and cancer spread<sup>2</sup>.

## Conclusion

Thus, it is concluded that most cases of oropharyngeal cancer in Brazil affect males over 50 years old, likely because of the prevalence of consuming tobacco and alcohol in greater quantities in this sex, with symptoms mainly appearing in the fifth decade of life and, for the most part, at advanced stages, possibly due to late diagnosis. Because of the lack of information in the system, this study could not establish relationships between the cases and risk factors such as smoking, alcoholism, and HPV infection, highlighting the relevance of further research on the subject to clarify these correlations.

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**\*Correspondence**

José Carlos Barauna Neto  
ITPAC PALMAS  
Conj. 02 - ACSU SO, Rua NS 1, 70 -  
Lote 3 - Plano Diretor Sul  
CEP 77017-004, Palmas (TO), Brasil  
Tel.: +55 (63) 3216-6300  
E-mail: clinicabarauna@gmail.com

**Authors information**

JCBN - Ph.D. in Medical Sciences,  
University of São Paulo (USP);  
Professor at Faculty ITPAC. MRB  
- M.D., University of Taubaté. KGA -  
M.D., Faculty ITPAC.

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