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Research Article

Incidence and Epidemiological Distribution of Cancers of the Oral Cavity: A Retrospective Review in Guyana

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Abstract

Objective: To determine the incidence and epidemiological distribution of cancers of the oral cavity in Guyana from the period January, 2010 to December, 2021.

Methods: A descriptive-retrospective study was conducted at Georgetown Public Hospital Corporation and Woodlands Hospital Ltd, to analyze the biopsy reports of patients from January, 2010 to December, 2021. Total population sampling was conducted to determine the number of patients diagnosed with cancer of the oral cavity. The distribution of cancers of the oral cavity according to age, sex, type, and location was analyzed and the data was presented using descriptive statistics.

Results: This study included a total of 128 patients. The annual incidence of cancers of the oral cavity during the 12 years ranged from 0.13 to 2.51cases per 100,000 persons, with an average annual incidence of 1.2, which was found to be significantly higher in males (74.2%) than females (25.8%) with a M: F ratio of 2.9:1. There was a more significant occurrence of squamous cell carcinoma (94.5%) with a higher frequency in males between 51-60 years. The tongue emerged as the most frequently affected anatomical site, accounting for 79 of the 128 study population (61.7%).

Conclusion: The average annual incidence of cancers of the oral cavity reported was 1.2 cases per 100,000 persons. Generally, oral cavity cancers were more frequent in males between 51-60 years. There was a greater occurrence of squamous cell carcinoma than other oral cavity cancers. The tongue was the most common anatomical site involved.

Keywords: Oral Cavity Cancer; Squamous Cell Carcinoma; Incidence; Epidemiological

Abbreviations

GPHC: Georgetown Public Hospital Corporation; ICD-10: International Classification of Diseases.10th edition; IRB: Institutional Research Board; M: F: Male to Female; OC: Oral Cancer; OCC - Oral Cavity Cancer; OSCC- Oral Squamous Cell Carcinoma; SCC: Squamous Cell Carcinoma; SPSS: Statistical Package for the Social Sciences; WHO: World Health Organization

Introduction

Background and Rationale

Guyana lies on the northeastern coast of South America and borders Suriname, Venezuela, and Brazil [1]. It is the sole English-speaking nation in South America, with a population of 746,955 people as per the latest census conducted in 2012 [2]. Nevertheless, the 2022 update of the World Population Prospects indicates that the total population had grown to 804,567 by 2021 [3].

Cancer, alternatively referred to as malignant tumors or neoplasms, involves the rapid growth of abnormal cells with the capacity to invade neighboring tissues and spread to distant organs [4]. It stands as a prominent global cause of mortality, with approximately 10 million deaths recorded in 2020 [4]. According to Guyana's Ministry of Health Statistical Unit, cancer has consistently ranked among the top five leading causes of death in the country over the past fifteen years [5].

Head and neck cancer, encompassing lip and oral, oropharyngeal, hypopharyngeal, and laryngeal cancers, stands as one of the most widespread malignancies on a global scale [6]. In 2020, GLOBOCAN documented 744,994 new cases of head and neck cancer, accounting for 9.6% of all newly diagnosed cancer cases worldwide [6].

OC is a highly relevant problem for global health. It includes cancers of the lip, oral cavity, and oropharynx. When combined, these cancers rank as the 13th most common cancer worldwide [7]. Papua New Guinea had the highest overall rate of mouth and oral cancers in 2020, followed by Bangladesh, Romania, Hungary, and Cuba [8]. Oral cavity and pharyngeal cancers are the fifth most common type of cancer in men and the sixth most common type in women in South America and the Caribbean. The highest incidence levels are seen in Argentina, Southern Brazil, and Uruguay. However, Brazil has the highest rates overall [9].

OC demonstrates a higher prevalence in men and older individuals with a greater fatality rate among men than women, and varies significantly by socioeconomic status [7]. Compared to industrialized nations, oral cancer incidence and mortality are higher in developing nations with the peak age of onset occurring in the later decades of life [10]. According to the National Institute of Dental and Craniofacial Research, OC is most common in people over the age of 40 years [11]. Similar findings have been reported in Pakistan, India, Saudi Arabia, and Brazil [12-15].

Ninety percent (90%) of oral and pharyngeal cancer cases are classified as squamous cell carcinomas. Approximately 70% of OC is preceded by premalignant oral lesions commonly affecting the tongue, buccal mucosa and the floor of the mouth [16].

The definition of oral cancer often varies between studies, with many combining oral and oropharyngeal cancer subsites, although differences in the etiology, management and response to treatment mean they should be considered distinct disease entities [17]. Therefore, for this review, the term "oral cancer" will exclusively refer to cancer of the oral cavity.

By definition, the oral cavity extends from the vermilion border of the lips to the circumvallate papillae of the tongue inferiorly and the junction of the hard and soft palate superiorly. The lip, tongue, floor of the mouth, buccal mucosa, upper and lower gingiva, retromolar trigone, and hard palate are among the anatomical subsites of the oral cavity [18]. According to the International Classification of Diseases, 10th revision (ICD-10), oral cavity cancer is classified into six sites: lips (ICD-10:C00), tongue (ICD-10:C02), gingiva (ICD-10:C03), floor of the mouth (ICD-10:C04), palate (ICD-10:C05), and other unspecified parts of the mouth (ICD10:C06) [19].

Oral cavity cancer is among the most prevalent malignancies, affecting both industrialized and developing nations [18]. In 2020, the global incidence of lip and oral cavity cancers was estimated to be 377,713 new cases and 177,757 deaths [7]. Lip and oral cavity cancers are the 16th most common cancers overall, the 11th most common in men, and the 18th most common in women [8]. Various studies conducted in Western Australia, Brazil, Asia, Saudi Arabia, India, Northern Italy, and the United States of America reported an overall increasing trend in the number of OC and OCC patients over varying periods [20-26].

To gain a comprehensive understanding of the incidence and demographics of oral cavity cancers, it is essential to consider epidemiological studies. These studies provide valuable insights for evaluating the effectiveness of cancer prevention measures, ultimately leading to the development and implementation of oral cavity cancer prevention and control programs based on their findings.

Based on the researchers' initial review of related literature, no known studies were conducted on oral cancer in Guyana. This implies that we cannot adequately identify persons who are most susceptible to this disease, nor can we assess the effects of oral cancer on our population and its contribution to our morbidity and mortality rates. Therefore, we cannot implement effective preventive measures to combat this disease. Hence, this research seeks to determine the annual incidence of patients diagnosed with OCC from January, 2010 to December, 2021, the distribution of OCC according to age and sex, the most frequent type of OCC, and the anatomical areas most affected.

GPHC and Woodlands Hospital are the only hospitals in Guyana that performed biopsy testing during the study period. An average of 3670 biopsies were recorded annually at GPHC and 1864 at Woodlands Hospital for the period in question.

Dental surgeons, oral and maxillofacial surgeons, and oncologists are some of the healthcare professionals who stand to gain valuable insights from the information presented in this study. This knowledge can be utilized to facilitate the early diagnosis of oral cavity cancer (OCC) patients.

Furthermore, the broader population, including individuals at heightened risk for developing this condition due to factors like age and gender, can be educated about their susceptibility.

Moreover, the data analysis conducted may inspire individuals to make informed decisions, such as undergoing regular OCC screenings, leading to the earlier detection of OCC lesions and subsequently improving survival rates. Additionally, this research will establish trends that contribute to national cancer statistics pertaining to oral cavity cancers and lay the groundwork for future studies in this field.

Problem statement

Numerous countries across the globe have conducted extensive research on the impact of oral cancer within their populations. These research endeavors have enabled them to ascertain the incidence, morbidity, and mortality rates associated with this condition, leading to the development of pertinent initiatives aimed at mitigating the consequences of oral cancer. In contrast, Guyana lacks comprehensive national records detailing the impact of oral cavity cancer on its population. Consequently, there has been a deficiency in the establishment of effective programs to combat the repercussions of this disease. Moreover, oral health has not received equitable attention within Guyana's public healthcare system when compared to other health concerns. The researchers aspire to address this issue and contribute to the global efforts aimed at preventing oral cavity cancers.

Purpose of study

In this study, the researchers aimed to conduct the initial comprehensive evaluation of individuals in Guyana diagnosed with oral cavity cancer from January 2010 to December 2021. The primary objectives were to identify the most common type of oral cavity cancer and the site most frequently affected, assess annual inci-

dence rates, and analyze the distribution based on age and gender. The findings from this research will contribute to the existing national statistics regarding oral cavity cancer, facilitating discussions and collaboration among stakeholders in this field.

Objectives

General objective

To determine the incidence and epidemiological distribution of cancers of the oral cavity in Guyana from January, 2010 to December, 2021.

Specific objectives

- To determine the annual incidence of patients diagnosed with oral cavity cancer in Guyana from January, 2010 to December, 2021.
- To determine the distribution of patients with cancer of the oral cavity according to age and sex.
- To determine the most frequent type of cancer of the oral cavity in these patients.
- To identify the anatomical areas in which cancer of the oral cavity occurs most frequently.

Methodology

Study Area and Period

This study was conducted at the pathology department of Georgetown Public Hospital Corporation and Woodlands Hospital Ltd., Georgetown, Guyana. Georgetown Public Hospital Cooperation is the government-owned pioneer tertiary hospital, while Woodlands Hospital Ltd is a private tertiary hospital. These institutions have the only histopathological laboratories in Guyana, from which all the data on oral cavity cancer was obtained. However, Woodlands Hospital only started performing biopsy tests in 2016. This study was conducted from January 2010 to December 2021.

Study design

A descriptive-retrospective study was conducted by analyzing the biopsy reports of patients with a positive diagnosis of cancer of the oral cavity at GPHC from January, 2010 to December, 2021 and at Woodlands Hospital from January, 2017 to December, 2021.

Procedure

Data was retrieved from the handwritten ledgers at Woodlands Hospital Ltd. for the period, January 2016 to December 2021. We perused the ledger/logbook containing all biopsy reports entering the pathology department and cross-referenced it with their critical report ledgers to identify all specimens with a positive diagnosis for cancer of the oral cavity. Once the specimens were confirmed to have been obtained from the oral cavity with a positive diagnosis for oral cavity cancer, the biopsy reports were retrieved digitally, and the necessary information, that is, the date, patients' names, age, type of cancer, and location of cancer was documented on our data record sheet. The patients' names were only used to eliminate the possibility of duplication of the data collected. In instances where the logbooks did not specify where the specimens were taken from, digital reports were used to eliminate or confirm whether the specimen originated from the oral cavity. The total biopsies reviewed for 2016- 2021 were 9,323.

At the Georgetown Public Hospital Corporation, information from the pathology department was retrieved from a database that was created by an oral and maxillofacial specialist. The data pool consisted of all the biopsy tests that were done at the hospital for the period January 2010 to December 2021. This data set consisted of 44,040 biopsy reports. A total of 792 biopsies were conducted on specimens from the oral cavity. Biopsy reports with a positive diagnosis of cancer of the oral cavity were retrieved digitally and the necessary information, which is the date, age, type of cancer, and location of cancer were documented on our data record sheet.

Population and sample

A total population sampling method was used to select all data records of patients with a positive biopsy for cancer of the oral cavity from January, 2010 to December, 2021. The medical records (biopsy reports) selected were based on the inclusion and exclusion criteria. Of the 53,365 records reviewed, only 128 were selected to be included in the study.

The following inclusion criteria were established: individuals with a confirmed diagnosis of oral cavity cancer via biopsy reports done at GPHC and Woodlands Hospital between January 2010 and December 2021. Additionally, the patient's identification, age, sex, definitive diagnosis, and date of biopsy should be on the report.

The following exclusion criteria were established: OCC due to metastasis from other sites, i.e., the oral cavity was not the primary site, and biopsies that were duplicated, meaning more than one biopsy report with identical data present for a patient with the same positive biopsy.

Dependent variable

Oral cavity malignancy

Independent variables

Age, sex, definitive diagnosis, and localization of OCC.

Patients were classified into eight age groups, a) ≤ 20, b) 21-30, c) 31-40, d) 41-50, e) 51-60, f) 61-70, g) 71-80, and h) >80 years. The location of the OCC was identified by ICD-10 as being in one of eight parts of the oral cavity: the lip, tongue, floor of the mouth, gingiva, buccal mucosa, alveolus, retromolar trigone, and the hard palate.

Data processing and analysis

The total number of positive biopsies for cancers of the oral cavity in Guyana for the twelve years from 2010-2012 was gathered together with related demographic data (age, sex, type, and localization). Each biopsy report was carefully screened to ensure all criteria were met. Subsequently, all the relevant information re-

quired for this study was extracted and regurgitated onto the data record sheet; this data was then entered and stored in Microsoft Excel. Statistical analysis was conducted in SPSS software (version 20) and consisted of descriptive analysis, including frequency, percentage, and mean ± standard deviation (SD).

The World Bank Official website provided the annual population of Guyana from 2010-2021 to assess the incidence of oral cavity cancers. The incidence of OCC per 100,000 people for each year was calculated by using the formula shown below

$$\text{Incidence: } \left(\frac{\text{Total number of patients diagnosed with OCC per year}}{\text{Total population of Guyana per year}}\right) \times (100)$$

Ethical Aspect

This study was approved by the Institutional Review Board (IRB), Ministry of Health, Georgetown Public Hospital Corporation Research Committee and Woodlands Hospital.

A nondisclosure document was signed by each member of the research team at Woodlands Hospital. Patients' information remained confidential and data were anonymized and de-identified for analysis.

Results

A total of 53,365 biopsies were reviewed in the Department of Pathology at GPHC and Woodlands Hospital during January, 2010 to December, 2021. The total number of cancer cases identified during this study period was 6,102. Of this total, 128 cases (2.1%) were cancers of the oral cavity.

Year	Total Population	No. of Cases
2010	747932	1
2011	744230	3
2012	743966	13
2013	747420	10
2014	751115	6
2015	755031	10
2016	759087	8
2017	763252	18
2018	785514	6
2019	798753	14
2020	797202	20
2021	804567	19
Total		128

Table 1: Number of Cancers of the Oral Cavity Cases per Year in Guyana from 2010-2021.

Figure 1 depicts the annual incidence during the study period. From 2010-2021 the incidence per 100,000 persons fluctuated. The incidence in each year (2010-2021) ranged from 0.1-2.4 per 100,000 individuals, with an average annual incidence of 1.2 per 100,000 persons. In 2010, the incidence was 0.1 and it gradually increased to a peak of 1.7 in 2012 before declining to 0.8 in 2014. The incidence continuously fluctuated from 2014 to 2018 while also reaching a high peak of 2.4 in 2017. In 2020, the incidence of OCC was 2.5, accounting for the highest incidence during the 12 years.

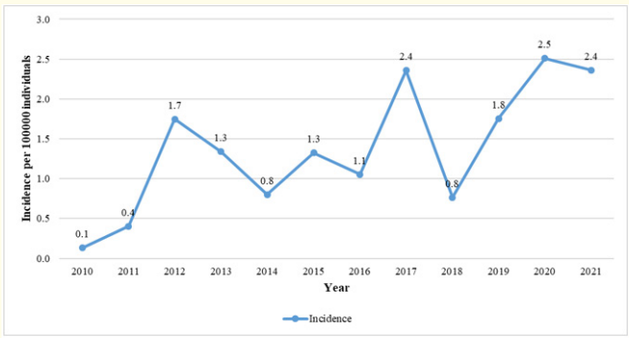

Figure 1: Incidence of Patients with Cancers of the Oral Cavity in Guyana from 2010-2021.

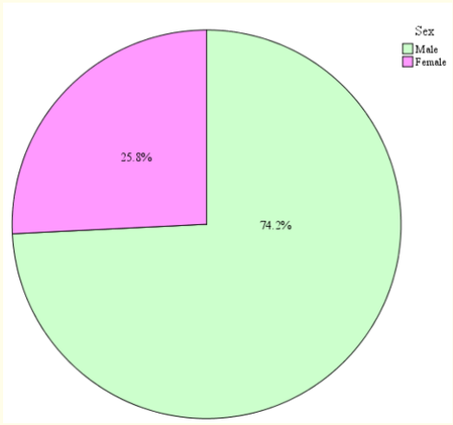

Figure 2: Distribution of Patients with Cancers of the Oral Cavity by Sex.

Figure 2 shows the distribution of cancers of the oral cavity according to sex. It was found that cancer of the oral cavity has a strong predilection in males. Ninety-five of the patients affected were males, accounting for 74.2% of the 128 OCC cases. Females only accounted for 25.8% of the study population, resulting in a male-to-female (M: F) ratio of 2.9:1.

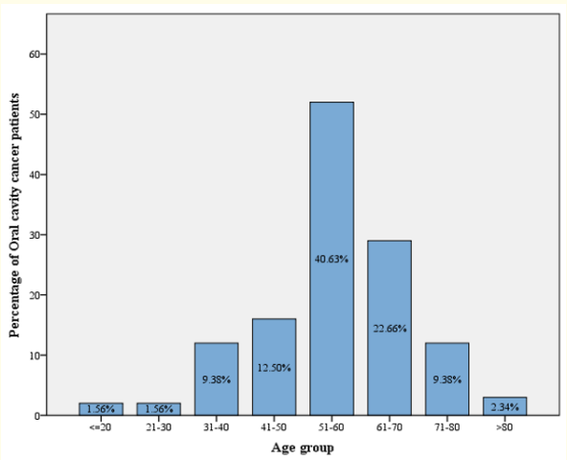

Figure 3: Distribution of Patients with Cancers of the Oral Cavity by Age.

Cancer of the oral cavity was found to occur more frequently in older age groups. The majority of the patients affected by this disease were between 51-60 years old, representing 41.4% of the study population. The second most affected age group was between 61-70 years followed by patients between 41–50 years, accounting for 22.7% and 13.3% of OCC cases, respectively. OCC was less likely to occur in persons 20 years of age and younger. The mean age at diagnosis was 55.9 years.

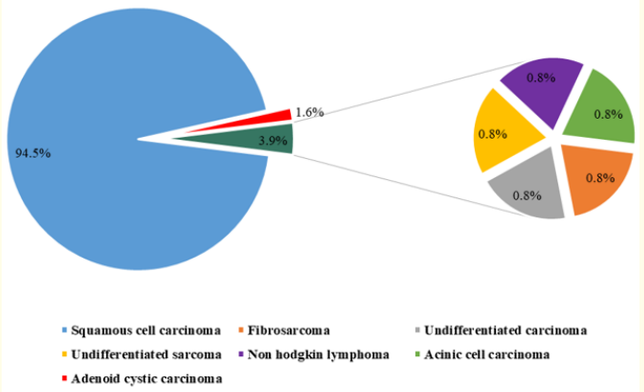

Figure 4: Most Frequent Type of Oral Cavity Cancer.

The pie chart above depicts the most frequent type of OCC. Squamous cell carcinoma was found to be the most frequent type, accounting for 94.5% (n = 121) of the study population. This was followed by adenoid cystic carcinoma at 1.6% (n=2). Undifferentiated sarcoma, fibrosarcoma, undifferentiated carcinoma, non-hodgkin lymphoma, and acinic cell carcinoma all accounted for 0.8% of each OCC case.

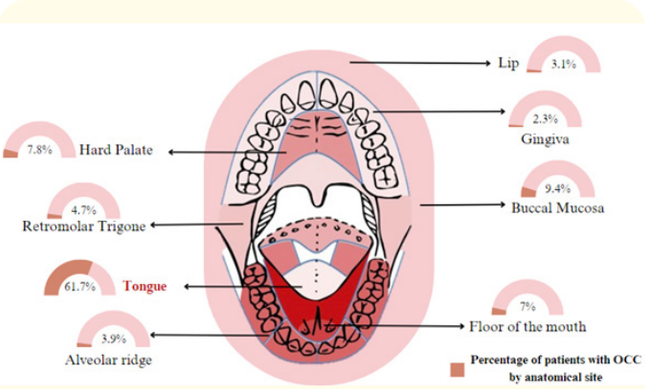

Figure 5: Distribution of Patients with Cancers of the Oral Cavity by Anatomical Site.

The tongue was found to be the most frequent anatomical site involved in oral cavity cancer, with 61.7% of the cases occurring here. This was followed by the buccal mucosa, hard palate, floor of the mouth, retromolar trigone, alveolar ridge, lip and gingiva.

Discussion

A review of cancer of the oral cavity data at the Georgetown Public Hospital Corporation and Woodlands Hospital Ltd., Georgetown, Guyana, for the period January, 2010 to December, 2021 showed an overall fluctuating trend in the number of oral cavity cancer patients. This study included a total of 128 patients. The incidence data trends for cancer of the oral cavity had three high peaks in 2012, 2017, and 2020 of 1.7, 2.4, and 2.5 per 100,000 population, respectively. The year 2020 had the greatest peak accounting for the highest number of OCC patients, and the highest incidence of 2.5 during the 12 years. Overall, the data showed, though not steady, an increasing trend in the number of patients diagnosed annually.

The average incidence over the 12 years was 1.2 per 100,000 population. Guyana has a significantly lower incidence of OCC in comparison to Taiwan with a standardized incidence rate of 13.8 cases per 100,000 population [6]. Contrary to Taiwan, other countries with a relatively low annual incidence of OCC, for example, the Netherlands with an annual incidence of approximately 5.5 cases per 100,000 population recorded a higher incidence than Guyana [6].

Guyana's incidence of OCC, though more comparable to that recorded in Brazil and Italy, is still relatively low. Lima., *et al.* in their study conducted in Brazil, observed an incidence of 3.99 per 100,000 Brazilians in 2017 [15]. Similarly, Mangone., *et al.* observed a 3.8 per 100,000 incidence of oral cavity cancer in Northern Italy in 2020 [25]. The possible reasons for our incidence rate being lower than that of other studies may be due to patients being underdiagnosed, died with OCC, and were never diagnosed, or they may have migrated and were tested outside of Guyana.

Oral cancer was found to be significantly higher in males than females. Of the 128 OCC patients, ninety-five were males (74.2%) and thirty-three were females (25.8%) with a M: F ratio of 2.9:1. This finding is significantly similar to a study conducted in Northwest Pakistan which produced a 73.4% male predominance of OCC with a M: F ratio of 2.8:1 [12]. In a thirty year study of the oral cavity and oropharyngeal SCCs in Jamaica, a M: F ratio of 2.6:1 was recorded [27]. Studies conducted by Iype., *et al.* and Raj., *et al.* also reported similar findings with a M: F ratio of 2.3:1 and 3:1, respectively [28,29]. This discrepancy between males and females may be brought about by sex-specific exposure disparities to OC risk factors. For example, men typically participate in cigarette smoking and alcohol consumption more than women, both of which are known contributors to oral cancer. This is in congruence with many studies that found the major aetiological factors to be tobacco and alcohol use [30,31].

As with many other types of cancer, this present study found a correlation between the occurrence of cancer of the oral cavity and age, with 75% of cases diagnosed above the age of 50 years.

The age group mostly affected for both males and females was 51-60 years, corresponding to 32.8% and 8.6% of the sample, respectively.

The age of the patient in the study ranged from 2 to 86 years with a mean of 55.91 ± 12.8 years. Similar findings were reported by Vibhakar., *et al*. [30] in their study in India where the majority of the patients with oral cancer were between the ages of 51 to 60 years. Similarly, Pawar., *et al*. [32] and Thavarool., *et al*. [13], reported that the mean age of patients was 51 years and 59 years, respectively. Nyi Nyi., *et al*. [27] found that the majority of patients (85.4%) were 50 years of age or older and the 60–69-year age group exhibited the highest frequency. Due to cumulative exposure to environmental and behavioral risk factors, aging is accompanied by increasing sensitivity to cancer-causing genetic mutations. The influence that aging has on cancer can be significantly reduced by avoiding certain risk factors [14].

Histopathologically, out of 128 OCC, 121 patients (94.5%) tested positive for squamous cell carcinoma. Squamous cell carcinoma was found to be the most prevalent OCC in both males and females, accounting for 71.1% and 23.4% respectively, of the study population. Shekar., *et al*. [24], in their study also found oral squamous cell carcinoma to be the most frequent tumor of the oral cavity. The remaining 7 patients in our study (5.5%) were positive for non-squamous cell carcinomas such as adenoid cystic carcinoma, acinic cell carcinoma, non-hodgkin lymphoma, fibrosarcoma, undifferentiated sarcoma and undifferentiated carcinoma. This finding is comparable with Begum., *et al*. [12] findings in their study in Pakistan of which 96.6% of OCC patients reported positive for squamous cell carcinoma and 3.5% were non-squamous cell carcinomas. Similar cases were also reported by Delagranda., *et al*. [33] and Thavarool., *et al*. [13].

The most common anatomical site affected by OCC was the tongue, affecting 79 of the 128 study population (61.7%). The second most common site affected was the buccal mucosa (9.4%) followed by the hard palate (7.8%) and floor of the mouth (7.0%). The retromolar trigone (4.7%), alveolar ridge (3.9%), lip (3.1%) and gingiva (2.3%) were the least affected anatomical areas. This finding is comparable with a study conducted by Iype., *et al*. [28] in India; The tongue was the most common site in the presentation of OC (52%), followed by the buccal mucosa (26%), alveolus (10%), palate (4.5%), lip (2.3%), floor of the mouth (1.9%) and other intraoral non-specified sites (3.8%). Similarly, as reported earlier, the tongue was the most prominent area affected in studies conducted in Japan [22], Taiwan [22], Thailand [22], Yemen [22], Brazil [15] and Grenada [34]. Nyi Nyi., *et al*. [27], also had similar findings with the tongue being the most common oral cavity site, accounting for 50% of their cases.

In this study, all the OCC cases affecting the tongue were found to be SCC. According to Stepan., *et al*. [26], most oral cavity SSC arise from the oral tongue (41.7%). However, in this study, the buccal mucosa (8%) was the second most common site affected by oral cavity SSC followed by the hard palate and floor of the mouth (6.2% each), retromolar trigone (4.7%), lips (3.1%), gingiva and alveolar ridge (2.3% each). This varied in comparison to the findings reported by Stepan., *et al*. [26], in which the lips and floor of the mouth (each 16.5%) were the second most commonly affected sites followed by the gingiva (10.6%), buccal (6.7%), retromolar trigone (5.6%), and hard palate (2.3%). This finding is also in contrast to Shekar., *et al*. [24] reports which stated that the site chiefly affected by oral squamous cell carcinoma was the non-keratinized mucosa i.e., buccal mucosa.

Limitations

- Time constraints due to late approval by the required organizations to carry out the research.
- Improper documentation of patient information - data retrieved from Woodlands Hospital was heavily reliant on handwritten records, this posed some amount of difficulty since we relied on legibility to understand the data.
- Lack of published data in Guyana relating to oral cavity cancer. Also, the lack of published data from countries with similar demographics to Guyana highlights the incidence of OCC such as Caribbean countries and countries in South America. Additionally, for the countries that highlighted incidence, a comparison was difficult since an incidence percentage was used instead of a proportion while others classified their time frame in block periods.
- Countries that published research on OCC were more generalized to the head and neck region and not specific to the oral cavity. Also, many researchers looked only at trends in SCC of the oral cavity and oropharynx which made comparison difficult.
- Data that was kept in books did not take into account the patient's race or address. This made it virtually impossible to study these trends.
- Lack of direct examination and insufficient data on tumor stage, grade, and prognosis.
- Not everyone in Guyana has access to GPHC and Woodlands Hospital, i.e. persons may have lacked the finances to do a biopsy test privately or they were geographically too far from GPHC. Therefore the possibility exists that there are persons in Guyana that never had a biopsy report done but may have oral cavity cancer, hence they would have not been included in our study.

Conclusion

Over the course of 12 years, the average annual incidence of cancer of the oral cavity was 1.2 cases per 100,000 persons. In 2020, the highest number of oral cavity cancers were diagnosed, accounting for the highest incidence. Generally, a higher frequency of OCC was found in males between 51-60 years old. Squamous cell carcinoma exhibited a notably greater occurrence compared to other OCCs. The tongue was found to be the most frequently affected site anatomically.

Recommendations

Investigations should be done to determine the epidemiological distribution of OCC in relation to ethnicity, and geographical variations, and the prevalence and risk factors associated with OCC as we were unable to ascertain these due to unavailability of required data and time constraints. Additionally, the findings from this study may serve as a baseline for further investigations into this disease.

Programs for oral cavity cancer prevention and control should be developed and implemented using the findings of epidemiological studies as a guide.

Citizens should be encouraged to make regular visits to the dentist, so any irregularities in the oral cavity can be detected early. Additionally, dental surgeons should pay close attention to the oral mucosa in addition to teeth, particularly in areas with a high prevalence of cancer of the oral cavity, as early detection of precancerous lesions or malignancies in the early stages increases the likelihood that a patient will be treated and significantly lowers mortality and morbidity. Therefore, early detection and treatment programs need to be established that will help to combat the devastating effects of late diagnoses and ultimately poor prognosis of these cancers.

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Regards, Allyah King, Petra Langevine, Nekeisha Simon, Russian Tayler.

Conflict of Interest

The Authors declare that there is no conflict of interest.

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