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Habit Distribution Among Oral Cancer Patients in South Indian Population- A Retrospective Analysis

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Abstract:
Introduction: Of all the head and neck cancers, oral cancer is the most prevalent. It is of major concern in India primarily because of the prevalence of oral habits such as smoking and betel quid chewing. **Methodology**: This was a retrospective observational study conducted among 240 patients reporting to the Department of Oral Oncology at Saveetha Dental College and hospital, Chennai during the time period December 2021 to February 2024. **Results**: Oral cancers were more prevalent in males as compared to females with majority belonging to the 51-70 year age group. Habitual oral cancer was more common compared to non-habitual. Tobacco chewing was observed to be the most common etiology of cancer. **Conclusion**: In the Indian population, oral malignancies are common. Because of the rising usage of tobacco products, it has also been observed in younger populations. It is imperative to implement preventive strategies based on epidemiological characteristics in order to lower the burden of disease.
Keywords: Oral cancer, Smoking, Tobacco, smokeless tobacco

INTRODUCTION

The term "oral cancer" refers to cancer of the lips, tongue, and mouth. This case definition is accepted and supports the definition of malignancies of the oral cavity provided by the International Agency for Research and Cancer, the World Health Organization, and the International Classification of Diseases (ICD) coding scheme [1]. It is the sixth most frequent cancer globally and varies significantly by region. [2] For dental practitioners, oral cancer is extremely important. According to Indian cancer registries, oral cavity is a prevalent cancer site and a significant public health concern in India [3]. Head and neck cancer accounts for only 1-4 percent of all cancer cases in Western countries, compared to the region of Southeast Asia [4]. In South-east Asia, oral cancers are the most common type of head and neck squamous cell carcinoma (HNSCC), but tongue and oropharyngeal cancers are more common in Western countries [5]. The varying habits that are common in the different locations may be a major factor in the differences in the sites where malignancies are most common [6].

As one of the five most common cancers in either sex, oral cancer is disproportionately more common in India. It is linked to alcohol consumption, tobacco use in various forms, and low socioeconomic status, which is attributed to issues with diet, hygiene, and viral infections [7, 8]. Chewing tobacco, which is the most common form of tobacco use, has been shown to be a significant risk factor for oral cancer [8]. One of the main independent risk factors for oral cancer, regardless of tobacco use, is betel quid [8, 9]. Oral cancer can be caused due to certain habits like tobacco chewing and use of smokeless tobacco. The non- habitual etiology of oral cancer includes diet and nutrition, viral infections, fungal infections, immunosuppression, occupational risk factors, dental factors (poor oral hygiene, sharp tooth), radiation or genetic factors.[10]

Kerala has the lowest epidemiologically reported incidence of oral cancer in India, whereas West Bengal has the highest. The age group of 60 years and above is found to have the highest incidence of oral cancer in Maharashtra's

western districts.[11] Since about 70% of cases are recorded in advanced stages, oral cancer is a far bigger problem in India than it is in the west (American Joint Committee on Cancer, Stage III-IV). Due to late-stage discovery, there are extremely few, if any, possibilities of a cure, with five-year survival rates only being 20% [12].
For a number of reasons, including comprehending the scope of the issue, identifying the population groups most and least at risk, and comparing the incidence of oral cancer to other cancers to assess how best to allocate resources for research, prevention, treatment, and support services, descriptive data on oral cancer for each particular geographic area is crucial [13]. The current retrospective study was conducted using 27 months of worth of institutional records due to the abundance of readily available comprehensive information on the incidence of oral cancer and the lack of previously published studies from this region of the country regarding the disease's characteristics and severity.

METHODOLOGY

The present study was a retrospective observational study conducted among 240 patients reporting to the Department of Oral Oncology at Saveetha Dental College and hospital, Chennai during the time period December 2021 to February 2024. The study design was approved by the "Institutional Ethical committee, SIMATS Review Board".

Inclusion and Exclusion Criteria

Patients of all ages and gender diagnosed with oral cancer were included in the study. Individuals who have undergone radiation treatment or surgery, as well as those whose cancer spread to their oral cavity from other locations were excluded from the study

Data Collection

The patient demographic details and data pertaining to study parameters were retrieved from "DIAS- Digital Information Archive System" maintained by the institution. Two of the authors obtained authorization from the university to retrieve data from the database. The following data was extracted for the purpose of the study: socio-demographic characteristics of the patient at the time of diagnosis (age, gender) and habitual history pertaining to oral cancer (frequency/duration), Chewing habit: Betel quid alone; Betel quid + tobacco, alternative chewing mixtures (Gutkha, khaini, pan masala), Tobacco smoking, beedi, cigarette, snuff and alcohol.

Diagnostic criteria

After a thorough physical and radiological examination carried out by two head and neck oncology fellows and confirmed by a professor, biopsy was advised. The Histopathological sections were examined by an oral pathologist to come to a conclusive diagnosis. The most reliable method for identifying oral cancer is tissue biopsy combined with histological evaluation. [14]

Statistical analysis

The data obtained was subsequently tabulated in excel spreadsheet and was exported to IBM SPSS version 20 for statistical analysis. The data being non-parametric were analysed descriptively measuring mean, standard deviation, percentage, and frequency. The output was generated in tabular and graphical representation.

Results

Figure 1: Gender distribution of the subjects

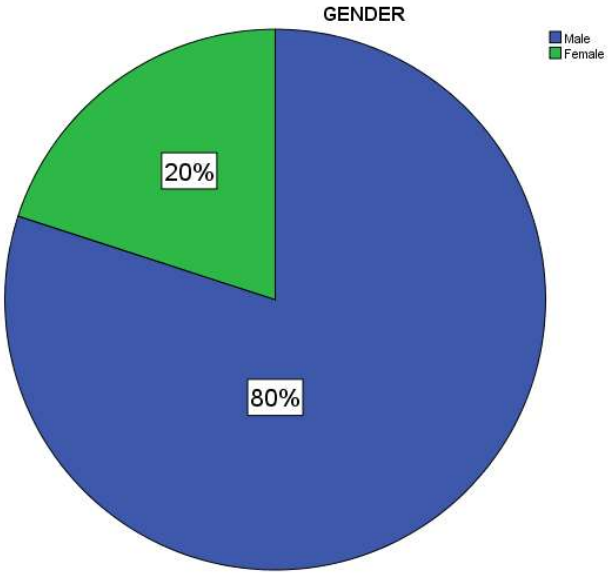

Figure 2: Graph depicting the etiology (habitual and non-habitual) of the participants

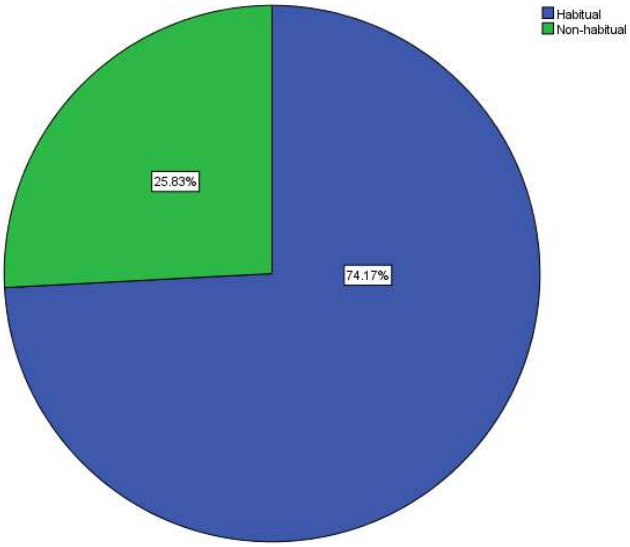

Figure 3: Graph depicting the causes of cancer in non-habitual subjects

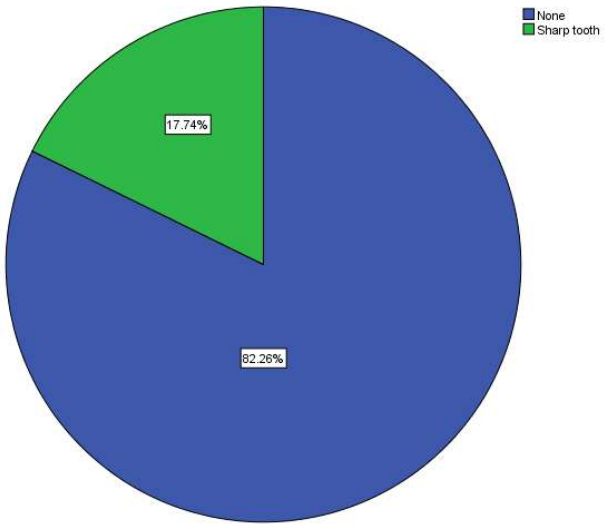

Table 1:Mean age of the participants

	MEAN ± STANDARD DEVIATION	MINIMUM	MAXIMUM
AGE	51.58 ± 10.424	24	78

Table 2: Distribution according to age group

	FREQUENCY	PERCENT
< 30 YEARS	4	1.7
>70 YEARS	13	5.4
31-50 YEARS	99	41.3
51-70 YEARS	124	51.7

Table 3: Table showing the distribution of habit in the habitual population

	FREQUENCY	PERCENT
ALCOHOL	11	4.2
BIDIS	21	7.9
CHUTA	7	2.6
CIGAR	16	6
CIGARETTE	92	34.7
MAWA	17	6.4
TOBACCO	101	38.1

There were 80% male and 20% female subjects present (Figure 1) with the mean age being 51.58 ± 10.424 years. (Table 1) Majority of the participants belonged to the age group of 51-70 years (51.7%) followed by 31-50 years (41.3%) (Table 2) Of the 240 patients, 178 had a habitual history. Of the 62 with non-habitual history, 11 presented with sharp teeth. (Figure 2 and 3). Majority of the participants were tobacco users (38.1%) followed by cigarette smokers (34.7%) and bidi smokers (7.9%) (Table 3)

DISCUSSION

According to the Fact Sheet of the Global Adult Tobacco Survey 2 (2016–2017), 266.8 million individuals in India use tobacco in one way or another, with the prevalence of tobacco use being at 28.6%, or 42.4% for men and 14.2% for women.[15] Oral cancer prevalence in South India in males is 61.8% while in females it is 18.5%, with tongue being the most common site of oral cancer. [16] A male predominance was observed in the current study with 80% males with the mean age of all the participants being 51.58 ± 10.42 years. Similar results were obtained in a study by Sahu and Kumar [17], although it was conducted in the North Indian population. Larizadeh et al. [18] and Bhattacharjee et al. [19] also gave similar results.

A mean age of 47.62± 12.18 years was observed in a study by Anwar et al. [20] Oral cancer becomes more common as people age, especially in those over 50. This has generally been linked to indiscriminate substance

misuse, especially when it comes to long-term usage of tobacco-related products. [21]A lower mean age of patients with oral cancer in the present study could be attributed to two factors: either better screening programs that detected the lesion earlier or a higher incidence of the disease among younger age groups as a result of early exposure to risky behaviors. Majority of the participants belonged to the age group of 51-70 years (51.7%) followed by 31-50 years (41.3%). Similarly Sahu and Kumar [17] observed 51.56% subjects belonging to the 51-70 year age group.

Of the 240 patients, 74.17 % had a habitual history. Of the 62 with non-habitual history, 17.74% presented with sharp teeth. Similarly, 75% patients in a study by Aruna et al [13] presented with risk habits. The increased percentage of patients who have habits is most likely caused by the early onset of tobacco usage and cigarette smoking, due to its accessibility, affordability, and social acceptance. While there was no specific age mentioned, data from many cancer centers in India indicated that the mean age at which oral cancer patients began chewing was 25 years for female patients and 22 years for male patients. Stepwise analysis revealed that duration of the risk habit was more significant than frequency in assessing the potential risk of the habit for oral cancer causation, with the majority of patients (55%) having risk habits for more than ten years [6]. Developing countries show a 50% prevalence of tobacco related cancers in males and 9% in females. [16] There has been a 0.35% increase in the percentage of patients with tongue cancer, from 2.73% to 3.08%. It has gone up from 4.46% to 5.06%, a 0.6% increase, for patients with buccal mucosa cancer.[22]

Majority of the participants were tobacco users (38.1%) followed by cigarette smokers (34.7%) and bidi smokers (7.9%). Similarly, Sahu and Kumar [17] in their study observed 64.84% of their subjects engaging in tobacco chewing followed by 41.41% who would chew tobacco as well and consume alcohol. Anwar et al [20] in their investigation on in Pakistan revealed 43% to be paan chewers followed by 31.7% gutka chewers. n India, according to the Global Adult Tobacco Survey (GATS, 2009–2010), one-third of the Indian population ≥15 years of age use tobacco in some form [23]. People between 15 and 49 years of age are habitual of using some form of tobacco and 32.9% and 18.4% of men and women respectively, are smokeless tobacco users. [24]

Bidi produces higher levels of carbon dioxide, nicotine, tar, and alkaloids than conventional cigarettes. The low combustibility and filter-less design of beedi may also lead to larger toxin yields than those of cigarettes. [25, 26]The research by Muwonge et al. found that chewing tobacco was a significant risk factor for the development of oral cancer. [27] Tobacco that is eaten orally or nasally without burning is referred to as smokeless tobacco. The two oral tobacco preparations that are most commonly used in India are pan (betel quid) and khaini (dry tobacco leaves slaked with lime). More than 30 recognized carcinogens have been linked to smokeless tobacco, with nitrosamines and nitrosamic acids being the most common. Smoking tobacco can alter the epigenetic makeup of oral epithelial cells, impede a number of host immune system functions, and produce oxidative stress in tissues that can result in OSCC by releasing harmful metabolites [28]. Chewing areca nut habitually is associated with more aggressive cancer morphologies, high rates of metastasized cancer, recurrence, and poor patient survival. Areca nut is the fourth most frequent psychoactive substance taken in the globe [20].

According to research conducted in India [6, 29], the buccal mucosa was the anatomic site most affected by oral cancer, followed by the tongue and gingivobuccal mucosa. Higher rates of buccal mucosa cancers in patients from Bangalore, Madras, and Singapore Indians (who are ethnically south Indians) may be related to the highly common habit of chewing tobacco and betel quid, which affects the oral cavity's anatomic site where the tobacco and betel quid are habitually kept and act as contact carcinogens [13].

According to a study by Asmin et al.[30], there has been an increase in cancer incidence overall in all three states, with Kerala having the greatest number of cases per lakh population, followed by Karnataka, and Tamil Nadu having the lowest. These forecasts show an increase in cancer incidence for all major sites due to changes in population growth and composition. Taiwan, Bangladesh, India, Pakistan, Sri Lanka, and other South Asian countries have the highest incidence rates of oral cancer in the world. These nations chew tobacco and betel nuts, and they also lack information and access to medical care. While Sri Lanka [31] has lately exhibited a decreasing trend of about 1.9% per year ($P < 0.05$) in oral cancers, Taiwan [32] and Pakistan [33] have consistently shown rising trends in both men and women.

A study by Asmin et al [30] revealed a progressive rise in the proportion of patients with cancer of the tongue and buccal mucosa. Buccal mucosa cancer grew by 2.11 percent, compared to a 2.55 percent increase in tongue cancer. This suggests that the most common addiction in the Indian subcontinent is still probably chewing tobacco. A substantial association between chronic mechanical irritation and oral squamous cell carcinoma was observed, regardless of the presence of concomitant variables such alcohol and tobacco use . Additionally, CMI is a

conditioning factor for the oncogenesis and infectious cycle of HPV. It results in basal keratinocytes expressing more syndecan 1, which improves HPV attachment and internalization capacity, which is essential for long-term infection, viral replication, and carcinogenesis. [34].

All intra-oral cancers developed in the sites in contact with teeth and/or appliances, according to Lockhart et al. [35] This may be explained by the fact that inflammatory cells are essential components of the tumor microenvironment, supporting the growth, survival, invasion, and metastasis of cells. Available literature suggests that lateral border of the tongue was found to be the most frequent site of chronic trauma associated oral cancer. [35–37] A meta-analysis revealed that wearing dentures was linked to a higher risk of cancer, but wearing ill-fitting dentures seemed to significantly raise that risk by nearly four times. [38] In a metaanalysis by Haeggblom et al, [39] it was noted that oropharyngeal cancer sites that were HPV positive were primarily the tonsils and base of the tongue sub-sites.

Yoithapprabhunath et al examined the genetic damage (micronuclei) that results from sharp teeth contacting the tongue's lateral edge and creating persistent mechanical irritation in healthy persons. In the study group, the frequency of micronuclei was shown to be higher when the lateral border of the tongue of healthy individuals without harmful habits—such as chewing areca nuts, smoking or smokeless tobacco usage came into contact with sharp teeth. It was concluded that with cytogenetic analysis, doctors can identify DNA damage in patients with pointed teeth early on and stop carcinogenesis by treating and monitoring the patient appropriately.[40]

This baseline data offers a great starting point for future hospital/population based prospective epidemiological investigations and offers hope for preventing oral cancer through risk habit modification. This study highlights how important it is to put in place and maintain effective oral cancer preventive measures, such as public health education that emphasizes early symptoms, quitting smoking and chewing tobacco, self-examination guidelines, routine dental checkups, and community oral cancer screening programs.

Conclusion

The lower socioeconomic level, shortage of healthcare workers, inability to pay for treatment, illiteracy, ignorance of risk factors, and pervasive cultural beliefs that cause treatment delays are the main obstacles to the management of oral cancer in India. Programs for cancer control have been started in response to the rising number of cancer patients in an effort to achieve early detection, prevention, and treatment. Therefore, it is crucial to comprehend different epidemiological traits in order to plan and implement cancer control programs more effectively.

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