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Age and gender demographic and statistical analysis in oral squamous cell carcinoma in Eastern India

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ABSTRACT

Background: Oral squamous cell carcinoma (OSCC) continues to dominate all the oral cancer cases with premalignant disorders, which can also be predictable at the pre-clinical phase of malignancy. Chewing behaviors such as betel quid, areca nut& tobacco are all major risk factors. The majority of OSCC patients present with advanced disease and a poor prognosis. Despite the high prevalence of this cancer, there is a scarcity of rigorous data from Eastern India on its relationship with known risk factors.

Objectives: The aim of this study was to evaluate the features at specific ages and gender that could play a major role in the development of oral squamous cell carcinoma.

Materials and methods: Demographics and habitual behavior were both subjected to expressive analysis. In patients with oral squamous cell carcinoma, categorical and continuous variables regarding gender were scrutinized.

Results: Age with gender cross tabs results reflects the maximum patients 245 (57.24%) were female at the age of 45-64, followed by the same age group male 480 (51.39%). The highest 654 cancer sites were found in the buccal mucosal region, and we found the total number of 349 (53.36%) were in the same age group between 45-64 years. Precisely we got the age mean±SD of 61±9 male and 64±12 female OSSC patients with statistical significance of <0.001 respectively.

Conclusion: Finally, the majority of OSCC cases in our area of eastern India were female patients who had been using gudhakhu for a long time and it was found correlating with site of OSCC in female.

Introduction

In both developed and developing countries, cancer is the top cause of mortality.[1] The oral mucosa is the most prevalent cancer site in India, according to cancer registries.[2] Tobacco use is usually connected to oral cancer in initiation of infection followed by disease progression.[3] Tobacco is widely used in India, both for chewing and smoking.[4] Because of interconnected structures, the histology of OC is crucial, so for a long period, carcinomas of the oral cavity & oropharynx were classed as OSCCs, which affected the epidemiological statistics.[5] In many ways, translational & clinical research was able to distinguish both.[6] Tumors of the oropharynx affect the root of a tongue, palatine tonsils, soft palate, or adenoids,[7] whereas OC affects the gums and alveolar ridge, the frontal 2/3rd of the tongue, buccal

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mucosa, palate, the retromolar trigone as well as hard palate.[8] Tongue and buccal mucosa cancers are the most frequent OSCC locations followed by lip and palate tumors.[5] The alcohol in-taking, smoking, various chewing habits as well as infection with significant human papillomaviruses are the risk factors for OSCC that differ by geographic region.

The most common chew intoxications are betel quid which includes tobacco, betel leaf slaked lime, and areca nut, gutka like tobacco, areca nut, slaked lime, paraffin wax, and any flavoring. Similarly, the pan masala such as slaked lime, tobacco, areca nut &musk ketones, the answer like lime, tobacco, and ash, Manipuri, tobacco, and males such as areca nut, tobacco, and lime.[9] There are around 28 recognized carcinogens in these chemicals, the most important of which arecoline, nitrosamines, tannins volatile aldehydes, nonvolatile alkaloid-derived, and flavonoids.[10,11] In Odisha, the rural people mostly women are habituated with gudakhu, which is glue-like tobacco prepared by using fine leaf dust of tobacco, sheera is known as (red soil), and the lime. Women in our state use this gudakhu for their early morning tooth brushing. Messaging the buccal area damages the epithelial cells, leading to the invasion of the carcinogenic substances to the inner tissue. All these chemicals affect the normal shape of cells, resulting in chromosomal or genetic changes. With such a high prevalence of squamous cell carcinoma in our community, there is a scarcity of data on the incidence and relationship of these practices with OSCC. So, our aim from this descriptive analysis is to understand the relationship of the OSSC cancer with age and gender, tapping importance on the habitats of the patients in eastern India.

Materials and methods

This is a retro-prospective study that has extracted data of OSCC cases from three different hospitals in eastern India from 2009 to 2019. The data were taken mainly from a dental hospital, cancer hospital, and tertiary care teaching hospital in Eastern India. Permission was granted by all heads of institutes for the retrieval of data from their archives. All Head and neck cancer involving buccal mucosa, alveolus (maxilla, mandible), gingivobuccal sulcus, solid and indulgent palate, the bottom of mouth, pharynx, larynx, and other areas of the mouth were included in this study. The retrieved data was entered into an MS Excel sheet and subjected for statistical analysis. Information gathered was assembled, and quality checks were performed. The results of the variables of interest were reported with and without confounding variables. The effect of interaction between variables of interest and confounders was also obtained to understand the validity of modifications. All the information gathered was entered into spreadsheets. For the data analysis, the statistical package for social sciences (SPSS) software version 11.0 was utilized. The tests used were t test (continuous) & chi-square (categorical).

Results

This observed based analysis was carried out and all the important correlations were obtained among 1363 total patients. The distribution of age with the gender of oral cancer patients study shows a maximum of 245 (57.24%) of females and 480 (51.39%) of the males are associated with this cancer in the age group between 45-64 years (Figure 1). Between the ages group 25-44, a total of 353 (25.89%) male and female patients. A number of 18 (i.e., 1.32% of the total number) were found in the age below 24 years. Interestingly, we observed 3 patients (0.07% of the total number) in the age group categories of 105-124 years in our study (Figure 1).

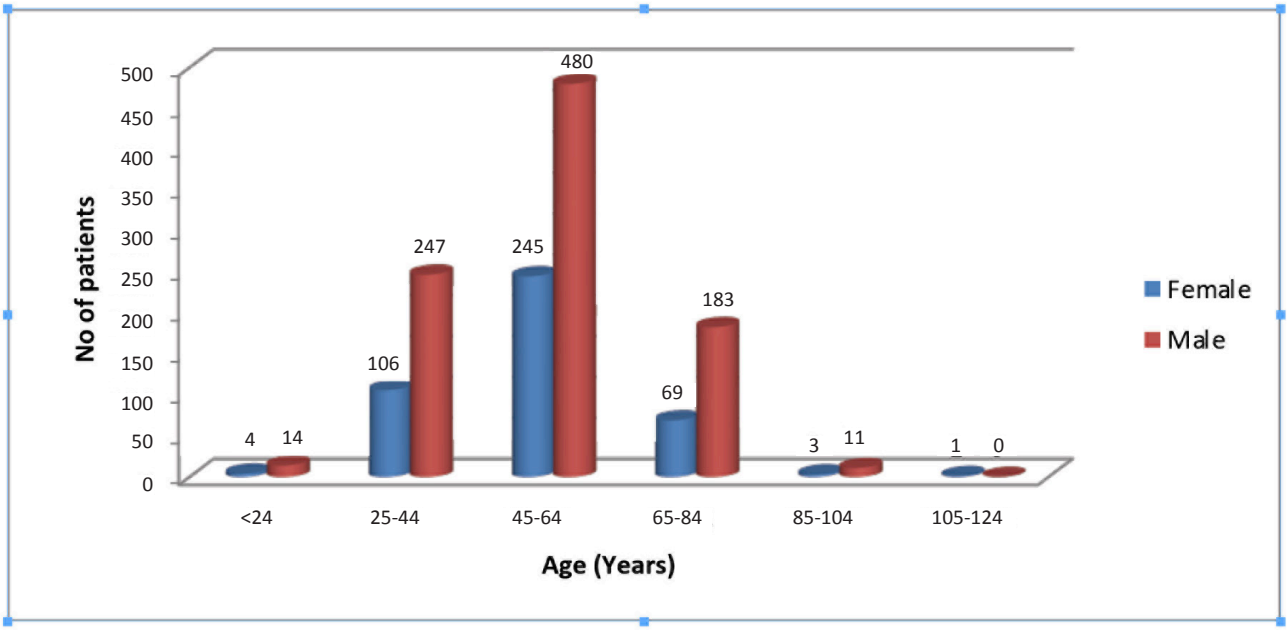

Figure 1. *Distribution of age with gender of oral cancer patient.*

As per the data of cancer distribution in different sites of the oral cavity according to different age groups of cancer cases, the highest of 654 (47.98% of the total number) is found in all age groups associated with the buccal mucosa site out of our total patient. Again, in the same age between 45-64 groups, it is found to have the highest number of cancer patient in the buccal mucosa sites. We also analyzed the data from other sites of cancer like maxilla (alveolar bone), tongue, Mandible (alveolar bone), and other parts like the floor of mouth, lips, palates, etc. (Table 1).

Table 1 Distribution of cancer in different sites of the oral cavity according to different age groups of cancer cases.

Age	Buccal mucosa	maxilla (alveolar bone)	Tongue	Mandible (alveolar bone)	Others (floor of mouth, lips, palates)	Total
<24	6 (0.91)	4 (2.51)	2 (0.68)	1 (0.59)	0 (0.00)	14 (1.02)
25-44	179 (27.37)	38 (23.89)	0 (0.00)	42 (25.14)	15 (16.3)	274 (20.10)
45-64	349 (53.36)	77 (48.42)	86 (29.53)	95 (56.88)	51 (55.43)	658 (48.27)
65-84	114 (17.43)	35 (22.01)	153 (52.57)	28 (16.76)	22 (23.91)	352 (25.82)
85-104	5 (0.76)	5 (3.14)	48 (16.494)	1 (0.59)	4 (4.34)	63 (4.622)
105-124	1 (0.15)	0 (0.00)	2 (0.68)	0 (0.00)	0 (0.00)	3 (0.22)
Total	654	159	291	167	92	1363

Table 2 The study of categorical & continuous variables about gender in patients among oral squamous cell carcinoma.

Parameter	Total	Female	Male	*p* value
	1363	428 (31.5)	935 (68.5)	
Site of Cancer				
Buccal mucosa	654	220 (33.64)	434 (66.36)	<0.001
maxilla	159	50 (31.45)	109 (68.55)	<0.001
Tongue	291	75 (25.78)	216 (74.22)	<0.001
Mandible	167	56 (33.54)	111 (66.46)	<0.001
Other	92	32 (34.79)	60 (65.21)	0.002

In Table 2, we analyzed site of cancer with respect to gender of the patients. we found most of the site were significantly differs when compared with gender of patients having oral squamous cell carcinoma. We found buccal mucosa (p<0.001), maxilla (p<0.001), Tongue (p<0.001), Mandible (p<0.001) and others site of cancer (p=0.002) were significantly differing when compared with gender of the patients. Overall, we obtained there was a significant difference between different sites of cancer when it compared with gender of patients having oral squamous cell carcinoma.in our study we observed alcohol drinking habits was high (28.60%) among the patients followed by smoking (22.10%), gutka (23.40%) and gudakhu (25.80%) (Figure 2)

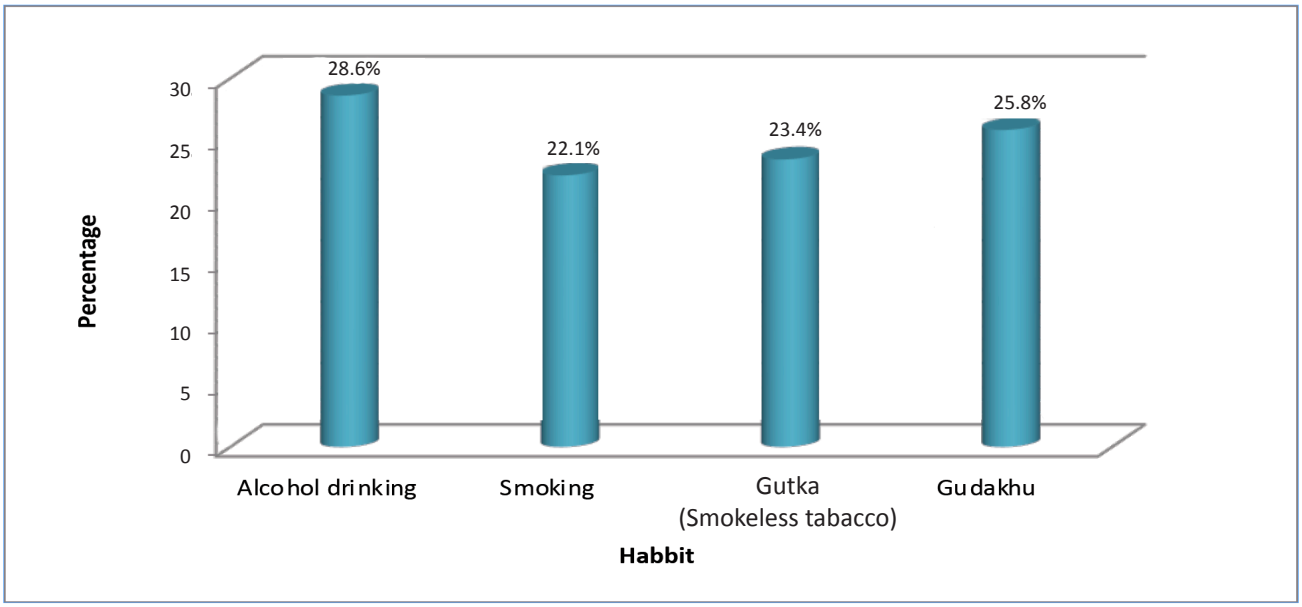

Figure 2. *Distribution of different habits.*

Discussion

Oral cancer is currently the most common type of cancer worldwide, with India accounting for about a third of the entire burden and having the second-highest number of cases. Oral squamous cell carcinoma (OSCC), which is also recognized as a recognizable pre-clinical stage of oral cancer, dominates all cases of oral cancer with potentially malignant abnormalities. OSSC is the third most common mutual cancer of squamous cell carcinoma after cervix and stomach cancer in developing nations in the South-Central and Southeast, such as India, Sri Lanka, Pakistan, and Taiwan.[12] OSSC has a complex etiology that includes chronic smoking, smokeless tobacco usage, and alcohol consumption. Chronic use of betel (pan) and tobacco, as well as alcohol, has been linked to a high risk of OC with poor oral hygiene in Southeast Asia and India.[13,14] Quantity, frequency, and duration of use of alcohol, cigarettes, gutka, and gudakhu, in addition to pan, increase the risk of OSSC. Exposure to smokeless tobacco, which contains many carcinogens, increases the risk of developing oral potentially malignant disorders.[15]

The buccal mucosa, gingiva, and buccal sulcus are much more usually affected in the oral cavity because of the use of tobacco quid such as gutka and betel quid. In a prior study, it was discovered that the micronuclei cells in smokeless tobacco users were significantly higher than in smokers. In earlier research, OSSC patients had a statistically significant increase in nuclear length, nuclear part, cell part, and nuclear-cytoplasmic percentage in oral leukoplakia and oral verrucous carcinoma compared to normal mucosa.[16,17]

In this research, the highest occurrence of OSSC was observed in the age group of 45-64 years, followed by 25-44 years, with a mean age of 63 which was consistent with previous report.[18] The male to female ratio was found to be 2:1 in this study, which was consistent with earlier research that revealed a higher incidence of tobacco use in males than females due to easier access to tobacco products. However, research on the age and gender of oral cancer patients found that the age range 45-64 years had the highest proportion of females (57.24%) and males (51.39%) (Table 1). The precise age is 63.5 years, which is also found in the study of Smith *et al*.[19] It is maybe due to the unhygienic practices of females as well as the use of gudakhu. Vigorous messaging the buccal area damages the epithelial cells, leading to the invasion of the carcinogenic substances to the inner tissue. All these chemicals affect the normal shape of cells, resulting in chromosomal or genetic changes. Although the preparation process of gudakhu is vary area-wise in general, it is glue-like tobacco prepared by using fine leaf dust of tobacco, sheera is known as molasses gerumati (red soil), and lime.

In this study, the buccal mucosa was shown to be the most affected site in both sexes, followed by the tongue & maxilla, with lips being the least common. These findings were consistent with prior research, which found that the most prevalent place was the buccal mucosa. Most of our patients used tobacco gudakhu and gutka, which could be the prevalent place for buccal mucosa. While in western countries, lungs and mouth base are considerably more prevalent because of drinking and smoking.[20]

Conclusion

In conclusion, the age factors for OSSC are a major statistical indicator in our study. Most precisely the age of 63.5 years, often accrued of the OSSC. Women's use of gudakhu along with gutka and other tobacco may be the major cause of the OSSC in eastern India. Majority of patients were male in our study, but it is an observation that females are also affected in a remarkable number which can be correlated with peculiar habit of gudakhu (snuff paste) gum message in our population. However, a study with other states of India can provide more accuracy to this observation.

Conflicts of interest

No conflict of interest exists

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