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Association of Deleterious Habits with the Occurrence of Oral Malignant Lesions

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ABSTRACT

Background: Differences in incidence and pattern of oral cancer can be due to the overall effects of the prevalence of specific risk factors in a sample population. The low-income groups are at a wide exposure to risk factors such as tobacco chewing, gutka consumption, smoking, etc.

Objective: The aim of this epidemiological study is to determine the association of deleterious habits already deemed as risk factors in patients with oral cancer at our centre.

Methods: A retrospective analysis of patients undergoing treatment for oral cancer in our institution was done to identify patients with a positive association to habits - pan chewing, smoking, and gutka consumption. Statistical analysis was performed using the Chi-square test after data collection using SPSS software version 20.

Results: Out of 48, 40 patients were included for the study based on the inclusion criteria. Females had no habits (20%), while males reported an incidence of pan chewing habit (15%), and gutka consumption (10%). Overall patients undergoing treatment for oral cancer with exposure to risk factors were 35% while 65% of patients had no association with deleterious habits and risk factors associated with oral cancer. A significant association was found between the prevalence of no habits and middle age group individuals.

Conclusion: The study observed a trend towards a higher incidence of oral cancer in patients without exposure to deleterious habits. This strengthens the association of incidence of oral cancer with the genetic constitution of the individual and / or other risk factors not studied here. Many cancer registries should be scanned for confirmation of this trend shift elsewhere in the nation.

Clinical Significance: Genetic and molecular analysis of specimens can help shed light on the etiological factors responsible for oral cancer in patients.

Key Words: Oral cancer, Habits, Smoking, Pan chewing, Gutka, Tobacco

INTRODUCTION

The oral cavity is one of the most common sites of a cancer diagnosis as observed by Indian oral cancer registries.¹ There are numerous types of non-communicable diseases that are leading to an increased burden on the health care system, cancer being one of them. Oral cancer is known to have an association with numerous risk factors such as tobacco consumption - smoked or smokeless, areca nut chewing, betel quid chewing with or without consumption of alcohol.²⁻⁹ Other risk factors including high-risk HPV, EBV, diet, oral hygiene, socio-economic status, ill-fitting dentures, syphilis,

malnutrition, chronic irritation from rough or broken teeth are reported frequently in oral cancer patients.^{8,10-17}

The disproportionately higher prevalence of oral cancer in India as one of leading cancer in either sex is attributed to the widespread use of tobacco in the form of smoked or smokeless type.^{18,19} In countries where such habits were prevalent and had cultural importance in traditional and religious ceremonies, oral cancer was reported as one of the most common cancers.^{20,21} The presence of certain habits in patients diagnosed with oral cancer provides an insight into the magnitude of association of risk factors with oral cancer characteristics

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in the present study. Despite the limitations of institutional records as a source of data, an effort was made to study the epidemiology of risk factors - pan chewing, smoking, gutka consumption habits - among oral cancer patients undergoing surgical treatment at our institution.

As much as evidence is available on the prevalence of oral cancer in patients with deleterious habits, there are studies that describe patients with oral cancer without association to habits such as tobacco consumption, areca nut chewing, alcohol consumption.²² These studies describe cancer of the tongue in patients who had ill-fitting dentures, sharp tooth and were not exposed to habits of tobacco consumption, alcohol consumption, areca nut, or betel quid chewing. Most of the literature suggests the association of habits with oral cancer, however, there is increasing evidence that oral cancer differs from site to site.^{23,24} Therefore, site-specific prevalence of oral cancer and associated habits is another field of research that is relatively unexplored in the South Indian population.

The study of geographic variations of cancer risk in India with a sample population of diverse cultures, habits, and dietary practices ought to be particularly fruitful in developing etiological hypotheses that can open investigations into public health care measures that prevent oral cancer. Geographical area-wise descriptive data on oral cancer is important to understand the extent of the problem, determination of high-risk groups amongst the population which can help in allocation of resources for research, prevention, treatment, and support services. The aim of this epidemiological study is to determine the association of deleterious habits already deemed as risk factors in patients with oral cancer at our centre.

MATERIALS AND METHODS

A retrospective study on habits and association with the prevalence of oral cancer was done in our institution for a period of ten months from June 2019 to March 2020 for all oral cancer patients who underwent surgical treatment. Institutional ethical clearance was obtained for data retrieval and usage as required for the study (SDC/SIHEC/2020/DI-ASDATA/0619-0320).

The primary variables of interest were deleterious habits like smoking, pan chewing and gutka consumption in patients above 18 years of age with biopsy-confirmed diagnosis of primary malignant neoplasm of the oral cavity who underwent surgical ablative therapy in our institution. Case sheets of all relevant patients were identified and reviewed for inclusion in the study.

From a total of 48 case sheets, a total of 40 patients were identified and recruited for the study. Inclusion criteria were

patients who underwent primary surgical management for histopathologically proven squamous cell carcinoma of the oral cavity at our institution. All patients above 18 years irrespective of their medical conditions and treated for oral squamous cell carcinoma were included. Exclusion criteria included all patients with premalignant lesions, salivary gland malignancies, and soft palate / uvula - as they differ in etiology, histology, and natural history from those arising in the epithelium of the upper aero-digestive tract. Use of dentures, food habits, frequency of risk habits were not included due to incomplete and absence of data. Data collection was performed to include: demographic details, habits - tobacco consumption in the form of smoking, pan chewing, and alternative chewing mixtures - gutka consumption, along with surgical treatment modalities used for management of lesions. Parameters evaluated were age, gender, presence or absence of habits, type of habits, and site of pathology as dependent variables and oral squamous cell cancer with the independent variable.

Statistical Analysis

Data were analyzed using SPSS version 20 statistical software. Chi-square test was used to determine the statistical level of significance.

RESULTS

After analysis of 48 case sheets, a total of 40 patients were identified and recruited for the study. It was observed that 80% of patients undergoing surgical treatment for oral cancer were males while only 20% were females (Graph 1). All females, 20% (n=8) and 45% (n=18) males diagnosed with oral cancer had no associated habits. 15% (n=6) males had a pan chewing habit, which was the most prevalent followed by 10% (n=4) males with a habit of gutka consumption (Graph 2).

Oral cancer was traditionally thought of as a disease mainly affecting the older age group. The distribution of oral cancer across the age groups encountered in our study was identified and is almost similar to global trends. Below 40 years old individuals only 5% (n=2) individuals were treated for oral cancer. In the present study, the majority of patients diagnosed with oral cancer were in the 41-50 age group accounting for 35% (n=14) cases. Cases of oral cancer were observed at extremes of age as well where in the 51-60 age group comprised 32.50% (n=13) patients and above 60 years age group with 27.50% (n=11) patients (Graph 3).

In our study, we also studied the relationship of the prevalence of habits according to age groups that were diagnosed and treated for oral cancer. Except for the 30-40 age group which showed a strong association with the presence of deleterious habits in two cases of oral cancer diagnosed in this

group, all others show the higher frequencies of no association with habits yet the presence of oral cancer. In the 41-50 age group, patients presented with 20% (n=8) no habits, 5% (n=2) gutka consumption and 2.5% (n=1) smoking habits. In the 51-60 age group, patients presented with 25% (n=10) no habits, 5% (n=2) gutka consumption and 2.5% (n=1) with pan chewing habits. In the above 61 years age group, 20% (n=8) patients had no association with deleterious habits, while 5% (n=2) patients presented with a pan chewing habit and 2.5% patients with both pan and gutka consumption habits (Graph 4).

The distribution of habits amongst individuals undergoing treatment for oral cancer is illustrated in Graph 5. Most individuals 65% (n= 26) did not have any of the habits being studied as risk factors associated with the presence of oral cancer. I

DISCUSSION

After analysis, it was observed that males were diagnosed with oral cancer four folds as compared to females in our center. Oral cancer was traditionally thought of as a disease mainly affecting the older age group. The distribution of oral cancer across the age groups encountered in our study was identified and is almost like global trends. Below 40 years old individuals only 5% of individuals were treated for oral cancer. In the present study, most patients diagnosed with oral cancer were in the 41-50 age group accounting for 35% cases. Cases of oral cancer were observed at extremes of age as well where in the 51-60 age group comprised 32.50% patients and above 60 years age group with 27.50% patients. There is a trend towards individuals in their old age being diagnosed and treated for oral cancer globally which is thought to be a result of the sum total of all the harmful effects of habits as the patient ages.^{6,22} The indiscriminate usage of substances mainly tobacco and tobacco-related products leads to genetic damage over a prolonged period of time which might explain prevalence in the middle age group. The immune surveillance reduces at 20 years of age or above. This reduced immunity conjugating with indiscriminate usage of toxic substances justifies oral cancer prevalence in these age groups. Proper counseling on tobacco cessation by medical professionals is shown to be associated with reduced incidence of cancer amongst those who stopped or reduced tobacco usage in the rural population.^{25,26}

In our study, we also studied the relationship of the prevalence of habits according to age groups that were diagnosed and treated for oral cancer. Except for the 30-40 age group which showed a strong association with the presence of deleterious habits in two cases of oral cancer diagnosed in this group, all others show the higher frequencies of no association with habits yet the presence of oral cancer.

Smokeless tobacco contains over two thousand chemicals, several of those are directly related to causing oral cancer.^{27,28} Wrapped inside a betel leaf, tobacco has been a part of the cultural heritage of India and is known as pan (betel quid). However, in the last few decades, tobacco companies have started selling tobacco in ready packages small quids known as Gutka - which is kept in the oral cavity and gradually gets absorbed by salivary dilution.^{29,30} Smoking beedi produces more carbon dioxide, tar, nicotine, and alkaloids as compared to regular cigarettes, the filterless beedi along with low combustibility may contribute to higher toxin yields as compared to cigarettes.³¹ But ultimately our study reflected a very strong association between the absence of smoking, pan chewing, and gutka consumption, yet the presence of oral cancer.

The distribution of habits amongst individuals undergoing treatment for oral cancer revealed most individuals 65% not having any of the habits being studied as risk factors associated with the presence of oral cancer. There are studies in the literature that agree with our results where non-drinking, non-smoking patients develop oral cancer usually of the tongue.^{32,33} (Table 1). Risk factors responsible for the development of oral cancer like HPV, EBV, diet, oral hygiene, socio-economic status, ill-fitting dentures, syphilis, malnutrition, chronic irritation from rough or broken teeth are reported frequently in oral cancer patients which were associated with oral cancer cases in our study also.^{8,10-16} This trend towards increasing cases amongst individuals without exposure to certain risk factors like deleterious habits provides increased avenues for research into causal factors for disease in such individuals like genetics.³⁴ Since only 35% of patients reporting with oral cancer had exposure to risk factors like smoking, tobacco consumption, it is safe to assume that increasing public awareness about health hazards associated with them has led to patients discontinuing habits, seeking early treatment, and success of public health measures like statutory warnings about alcohol consumption and smoking by the government of India. However, due to the limitations of this study, the role of other habits and risk factors should be taken into consideration before jumping to absolute conclusions. The study also implicates the seriousness of the need to implement and sustain appropriate oral cancer preventive measures including public health education emphasizing early symptoms, self-examination instructions, and regular visits to oral surgeons or dental specialists for cancer screening.

CONCLUSION

The study concludes that there is definitely a paradigm shift in the incidences of cancer and associated risk factors. A higher percentage of patients with no habits and occurrence of oral cancer, especially tongue cancer is a very interesting

finding. This finding warrants further molecular level analysis of samples to determine the etiological factors responsible for the development of cancer in cases with unidentified risk factors. What other factors promote susceptibility of mankind, leading to this life-threatening disease, is still an enigma. Further epidemiological studies with a larger sample population and micromolecular level analysis, may probably help unveil factors still unknown in the development of oral cancer.

CLINICAL SIGNIFICANCE

Oral cancer is a disease of complex etiology and micromolecular level analysis may probably help unveil factors still unknown in the development of oral cancer.

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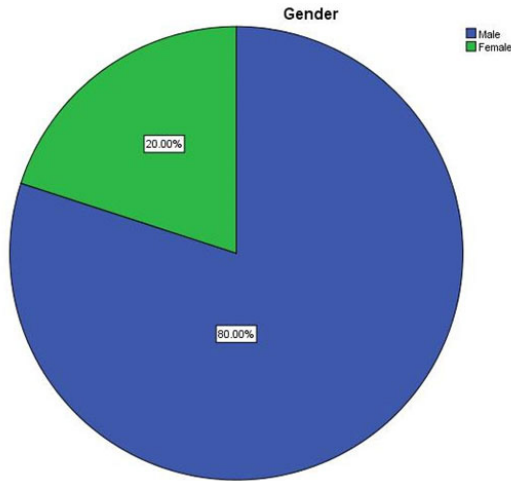
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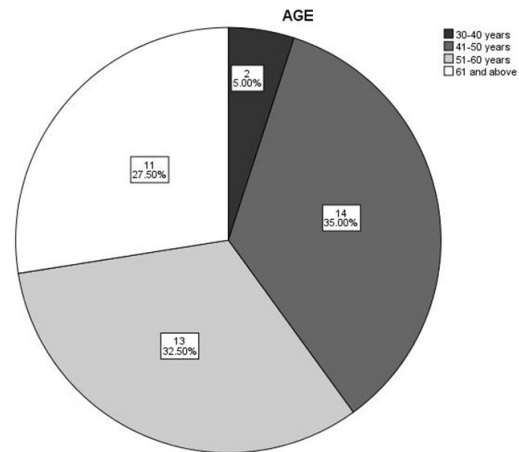
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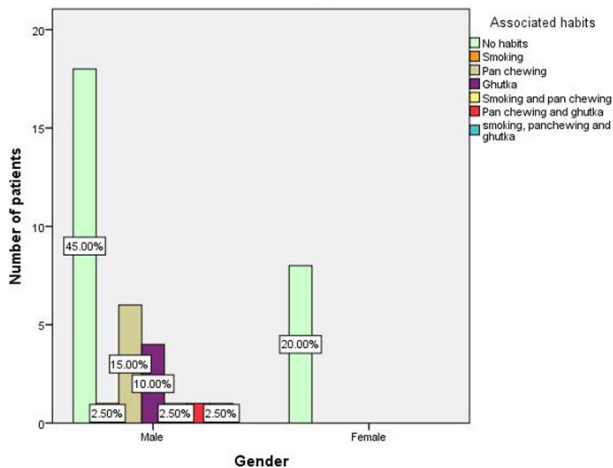
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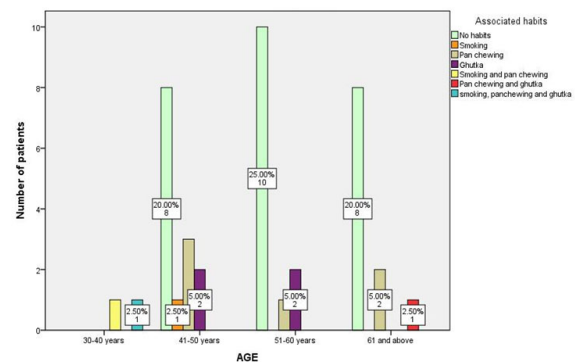
Graph 1: Pie chart showing the prevalence of oral cancer amongst males (80%, blue) and females (20%, green). Males are affected by oral cancer four folds as compared to females



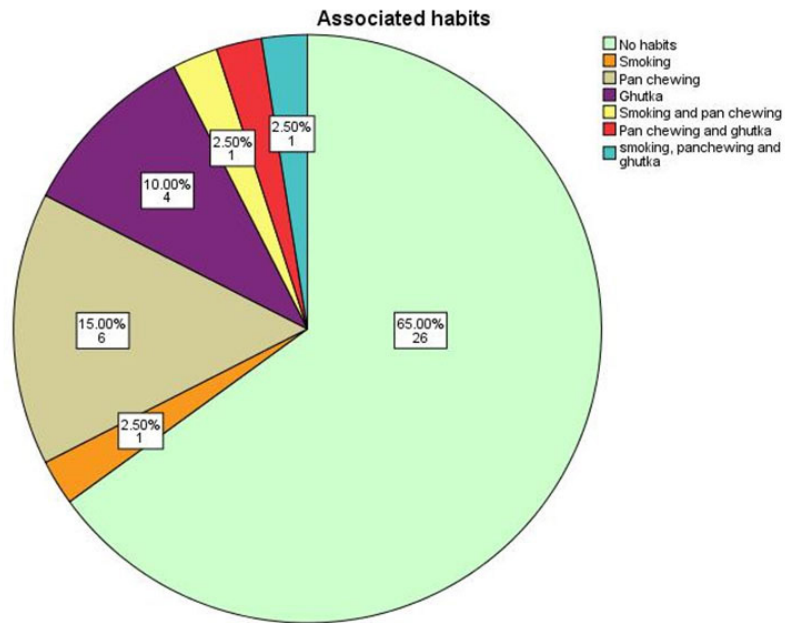
Graph 3: Pie chart illustrating the distribution of oral cancer amongst the various age groups. 41-50 years old individuals (35%, grey) are most commonly affected, closely followed by 51-60 years old (32.50%, light grey) while the least affected age group being 30-40 years old (5%, black).



Graph 2: Bar graph illustrating the spectrum of distribution of habits amongst the genders, where X-axis represents gender, Y-axis represents the total number of patients. All females and 45% of males diagnosed with oral cancer had no associated habits (teal). 15% of males had a pan chewing habit (beige) which was the most prevalent followed by 10% of males with a habit of gutka consumption (purple). The association of habits to gender in the occurrence of oral cancer was not statistically significant with $p\text{-value} = 0.496 > 0.05$ using the Chi-square test.



Graph 4: Bar graph illustrating the relationship of prevalence of habits according to age groups diagnosed with oral cancer where X-axis represents age groups, Y-axis represents the number of patients diagnosed with oral cancer. Except for the 30-40 age group, all others show the highest frequency of no association with habits yet the presence of oral cancer. Pan chewing (beige) and gutka consumption (purple) remain the most commonly associated risk factors for the development of oral cancer. There was statistically significant association between habits and age of diagnosis of oral cancer with $p\text{-value} = 0.000 < 0.05$ using the Chi-square test.



Graph 5: Pie chart showing the distribution of habits amongst individuals undergoing treatment for oral cancer. The majority of individuals 65% (teal) did not have any habits as risk factors associated with the presence of oral cancer. Study shows the highest incidence of pan chewing habit in 15% of patients (beige), followed by gutka consumption in 10% (purple) patients diagnosed with oral cancer.

Table 1: Table shows the site of malignancy and associated risk factors in the study population

	Tongue	Buccal Mucosa	Gingivobuccal sulcus	Floor of Mouth	Lip	Palate
Smoking	-	1	-	-	-	-
Pan	-	3	3	-	-	-
Gutka	-	1	3	-	-	-
Smoking + Pan	-	-	1	-	-	-
Gutka + Pan	-	-	1	-	-	-
Smoking + Pan + Gutka	-	-	1	-	-	-
No Habits	14	5	7	-	-	-