

Association of Risk Factors with Oral Cancer among Patients in A University Setting

Research Article

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Abstract

Oral cancer is the sixth most common malignancy world wide and 30% of all cancers in India. It has high burden due to exposure of various risk factors. There is a regional difference in specific risk factors. The study aims at evaluating the association of suspected risk factors in our population with oral cancer by age, gender and site. A retrospective study diagnosed with 37 oral cancer patients confirmed histopathologically were reviewed from patient records between June 2019 and March 2020 were included. The details of the patients regarding age, gender, site of occurrence of oral cancer & risk factor were collected and verified. Pearson chi square tests were performed to determine the association between dependent variable (oral cancer) and independent variables. Smokeless tobacco is strongly associated with oral cancer in our study population. Most of the oral cancer patients are middle and older adults (54% and 41% respectively) and 86.4% are males. The most common risk factor was paan chewing of 35.1% followed by sharp cusp 21.6%, smoking 16.2%, gutka 10.8% and combination of risk factors 16.2%. The most common site of occurrence of oral cancer was alveolus of 37.8% that was attributed to increased chewing tobacco. Pearson chi square value= 15.019; df=15; P value= 0.661; non significant association between site of occurrence and risk factors of oral cancer. Chewing tobacco is the most common risk factor of oral cancer. The most common site of occurrence was alveolus. This study emphasized the role of dental clinician to promptly diagnose the early oral mucosal changes and create awareness about its risk factors to the public.

Keywords: Oral Cancer; Paan; Smoking; Smokeless Tobacco; Chewing Tobacco; Gutkha.

Introduction

Head and Neck cancers rank third in the most common malignancies encountered in both genders globally [1]. Oral cancer is said to be a life threatening disease. Management of oral cancer is said to be one challenging entity for [2]. Oral cancer is a malignant neoplasm which arises on the lip or oral cavity. It is defined as a squamous cell carcinoma, because in the dental area, 90% cancers histologically originate in the squamous cells [3]. Oral cancer is a major problem in the Indian subcontinent, when it ranks among the top three types of cancer in the country [4]. The differences in the incidence can be due to overall aging of the population as well as prevalence of specific risk factors [5]. The low income group in India are said to be mostly affected due to wide exposure of risk factors like tobacco chewing and inadequate exposure to newer diagnostic aids resulting in delayed diagnosis of cancer [6, 7]. Oral

cancer is generally present either as mucosal ulcerations, swelling, ulceroproliferative growth, fissures, patchy. There are three well-recognized presentations like white patches (leukoplakia), a red patches (erythroplakia) or as a red and white patches (speckled leukoplakia) on oral mucous membrane and is usually painless in its beginning stages [8].

In India it is seen that tobacco chewing, smoking and alcoholic consumption have become common social habits and also observed that there is a positive correlation with oral submucous fibrosis, oral leukoplakia and oral lichen planus which has potential for malignant transformation [9-11]. Tobacco/betel quid can alone lead to death worldwide especially in developing and under-developed countries. It is estimated that 5 million deaths occurred worldwide in 2005 and by 2020 and it is expected to cause a rise in 10 million deaths annually [9, 10]. The factors that predispose to oral cancer or that are said to be as risk factors are tobacco,

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Received: September 03, 2019

Accepted: September 29, 2019

Published: September 30, 2019

Citation: Preethi Mariona, Sreedevi Dharman. Association of Risk Factors with Oral Cancer among Patients in A University Setting. *Int J Dentistry Oral Sci.* 2019;S6:02:003:11-16. doi: <http://dx.doi.org/10.19070/2377-8075-SI02-06003>

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sharp cusps, paan, gutka, alcohol, diet, nutrition, virus, radiation, ethnicity, genetic factors, oral thrush, immunosuppression, use of mouth washes, syphilis, dental factors, and occupational risk [12]. Chewing tobacco leaves, other forms of smokeless tobacco are used in India and other countries. Gutka is the most abundantly consumed smokeless tobacco form in India. Gutka is banned all over India. Recent evidence suggests that there is an absence of traditional risk factors like chewing tobacco leaves in a significant proportion of younger patients, especially amongst females [13]. Betel quid used in South Asia often contains smokeless tobacco [14]. Considerable research has been found in recent times on the carcinogenic, mutagenic and genotoxic properties of betel quid also known as paan [15]. Previously our team had conducted numerous clinical trials, surveys [16], reviews [17-19], *in-vitro* studies [20] and various other entities [21-29] over the past 5 years. Now we are focussing on epidemiological surveys. The idea for this survey stemmed from the current interest in our community.

The study aims at evaluating the association of risk factors with patients of oral cancer by age, gender and site.

Materials and Methods

Retrospective study was carried out in a university hospital setting by reviewing 37 patients diagnosed with oral cancer that were histopathologically confirmed. Ethical approval was obtained from the Institutional Ethical committee. Population selection was random. Population type was patients with oral cancer. The internal validity of the study was set by clinical appearance and histopathological reports. The inclusion criteria was all patients with oral cancer & exclusion criteria were patients without cancer and the patients with incomplete & censored data. The age of patients were grouped as follows: <35 years - younger adults, 36-55 years - middle aged adults, >55 years - older adults.

Data Collection

The patient records were reviewed and analysed between June 2019 and March 2020. Cross verification was done by referring case sheets and photographs. The details of the patients age, gender, risk factor /oral habits, site of occurrence of oral cancer was obtained. To minimise sampling bias all available data was included.

Statistical Analysis

After Excel tabulation, the data was transferred to SPSS. The analysis was done using SPSS version 19. Descriptive statistics were done to identify the frequency and association between site of occurrence of oral cancer, risk factors, age and gender of patients. The dependent variable was oral cancer. The independent variables were age, gender, risk factors and site of occurrence. The collected data was imported to SPSS and the chi square test was done. The type of analysis performed was association. The level of significance was set at $p < 0.05$.

Results and Discussion

Out of 37 patients it was seen that 86.47%(32) of males are affected with oral cancer & 13.5% (5) of them were females (Figure 1). The graph shows a significant increase in the number of males than females. The results show that people who had reported were of age 32-70, Age groups that are commonly associated are middle aged adults (36-55 years) 54% and older adults (>55 years) 41% and only 5% of the younger adults (<35 years) (Figure 2). The middle age and older adults are frequently encountered with oral cancer. Paan was the most common risk factor of oral cancer. Among the 37 patients the most common risk factor was paan present at an incidence of 35.1% followed by sharp cusp 21.6% smoking 16.2%, gutka 10.8%, when combination of paan and gutka was used cancer occurred in 5.4% of them and the same was for combination of paan and smoking, smoking and gutka (Figure 3). Paan (24.32%) is the most commonly associated risk factor seen in middle aged adults followed by sharp cusp (16.2%) which is most common among older and smoking, paan, gutkha (2.7%) among the younger adults. p value- 0.007 ($p < 0.05$), statistically significant (Figure 4).

It was seen that the only risk factors females had was paan chewing (8.1%) and sharp cusp (5.3%). High association of paan followed by sharp cusp, smoking, gutka were seen in males, p value- 0.620 ($p > 0.05$), not statistically significant (Figure 5). The site of occurrence of 14 patients was alveolus with an incidence of 37.8%, buccal mucosa in 32%, tongue 27% and soft palate 2%. Alveolus (13.5%) followed by Buccal Mucosa (10.8%) were commonly involved when paan was the risk factor. 13.5% had tongue as the site of occurrence in case of involvement of sharp cusp. The most common site of occurrence was alveolus followed by Buc-

Figure 1. Bar graph represents frequency distribution of gender of patients affected with oral cancer. X axis denotes the gender of patients and Y axis is the number of patients with oral cancer. Majority of them were males (red bar) 32 (86.49%), when compared to females (blue bar).

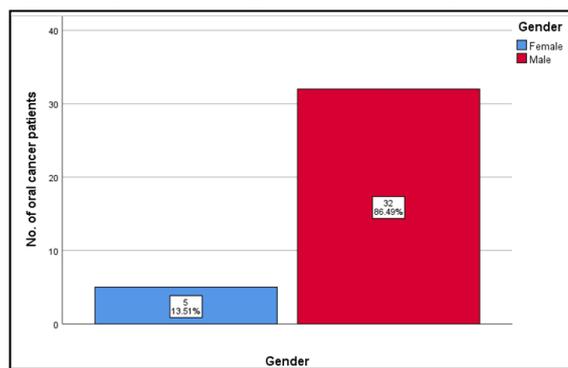


Figure 2. Bar graph represents frequency distribution of age of the patient with oral cancer. The X axis denotes age group and Y axis is the number of patients with oral cancer. Age groups that are most commonly seen are middle aged adults,36-55 years (green bar) 20 (54.05%) followed by older adults, >55 years (red bar) 15 (40.54%) and only then younger adults (blue bar) <35 years, 2 (5.41%).

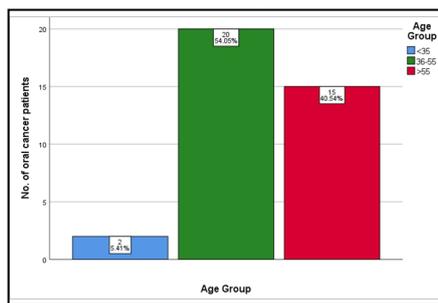


Figure 3. Bar graph represents frequency distribution of various risk factors of oral cancer. The X axis denotes the risk factor and Y axis is the number of patients with oral cancer. Paan (red) was the most common risk factor that was identified among 13(35.1%) followed by sharp cusp (orange) 8 (21.6%), smoking (yellow) 6 (16.2%) than gutkha (blue)10.81%, combination of paan and gutkha (green), smoking and paan (light green) and smoking ,paan and gutkha together (light pink)5.41% respectively.

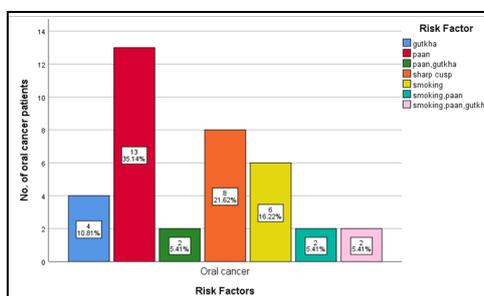


Figure 4. Bar graph represents association between the age of patient and risk factors of oral cancer. X axis denotes the various risk factors and Y axis is the number of patients with oral cancer.<35 years(blue),36-55years(Green),>55 years(red). Majority of oral cancer patients had paan as the risk factor in the age group of 36-55 years. Association was done using Chi square analysis. Pearson chi square value 27.307, P value- 0.007 (p<0.05), statistically significant, hence proving that there is significant association between age of patient and risk factors of oral cancer.

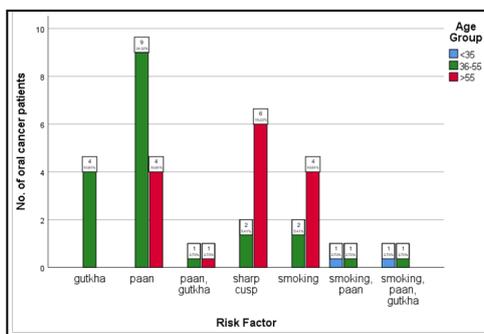


Figure 5. Bar graph represents association between risk factors and gender of oral cancer patients.X axis denotes the risk factor of the patient with oral cancer and Y axis is the number of patients with oral cancer.Males(Red),females(blue). Majority of male patients 27.03% affected by oral cancer had paan as a risk factor when compared to females.Association was done using Chi square analysis. Pearson chi square value 4.420, P value- 0.620 (p>0.05), not statistically significant, hence proving that there is no association between gender of patients with risk factors of oral cancer.

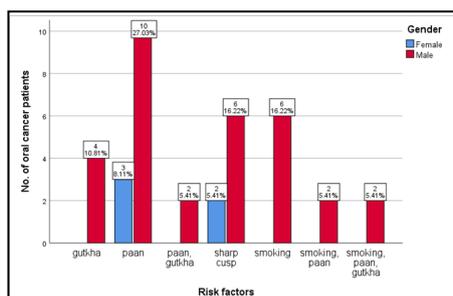
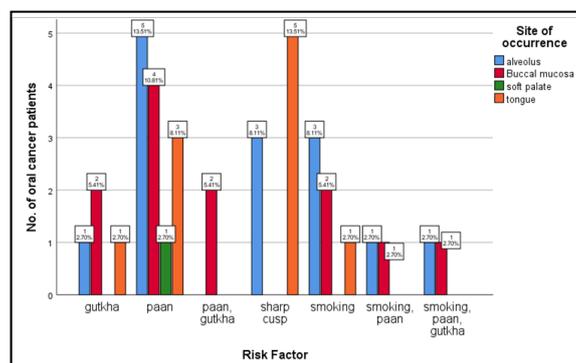


Figure 6. Bar graph represents association between site of occurrence and risk factors of oral cancer. X axis denotes the risk factors and Y axis is the number of patients with oral cancer. Alveolus (blue), tongue (orange), buccal mucosa (red) and soft palate (green). Alveolus was the most common site of occurrence when paan was the risk factor and lateral aspect of tongue when it was sharp cusp, 13.5% respectively. Association was done using Chi square analysis. Pearson chi square value 15.019, P value- 0.661 ($p > 0.05$), not statistically significant, hence proving that there is no association between site of occurrence and risk factors of oral cancer.



cal Mucosa, tongue and soft palate. Figure 6 shows that paan was the most common risk factor occurring on the alveolus (13.5%) and sharp cusp (13.5%) for lesions on the tongue. p value- 0.661 ($p > 0.05$), not statistically significant.

Our study shows that 86.41% of the patients affected with cancer are males and 23.5% are females. In contrast to our study, Kandath et al. and Azar et al. said that women who are smoking are at a higher risk of oral cancer, but still studies emphasise that males are at a higher risk because there is more association with risk factors [30, 8] and also Kruse et al., showed a higher female proportion of squamous cell carcinoma without any risk factor of alcohol and tobacco but which were associated with forms of smokeless tobacco [31]. Mostly oral cancer occurs on the sites of buccal Mucosa, tongue, alveolar mucosa, floor of mouth, soft palate [32, 33]. Similar to our study Llewellyn et al., found that males (79%) were more commonly affected compared to females (63%) [34].

Dental factors that include poor oral hygiene but generally poor dental status such as presence of sharp/fractured teeth due to caries, chronic ulcers or ill fitting dentures may serve as risk factors [35]. Oral lesions generally tend to occur in the areas where the risk factors mostly come in contact with. In smokers the lesions occur on the floor of the mouth because of the method of use [32]. When there is a fractured cusp or a sharp cusp the lesions generally tend to be on the tongue or Buccal Mucosa. The extent to which cancer is dependent upon the risk factor is equal as the gender & age of the patient. In our study it is observed that males had a risk factor of 31.2% paan, 18.7% smoking, 12.5% gutka, 18.7% sharp cusp seen and also a combination of paan and gutka, smoking and paan, and smoking, paan and gutka showed an incidence of 6.2% each. It was seen that males are more exposed and prone to risk factors such as forms of smoking and smokeless form of tobacco. In contrast to our study, the 1:1 gender ratio is said to decline rapidly in western countries as women are being exposed more to risk factors [36]. This is because of the increased exposure of women to various risk factors like alcohol, smoking in the western countries. The ratio seems to change even in the Asian countries. In studies conducted by Kadashetti et al. it was seen that 32% chewed tobacco/betel quid for 5–10 years and 10–20 years, respectively, followed by 22% cases for ≥ 20 years [9].

In our study the age groups that are commonly associated with oral cancer was middle aged adults (36-55 years) 54% are the most affected followed by older adults (>55 years) 41% and only 5% of the younger adults (<35 years). Sanderson et al., and Kandath et al. state that the predominant age group where cancer occurs in India is 61-70 followed by 30-40 years [30-36]. Similar to our study Loyhab et al., stated that cancer occurring in patients less than 40 years is very less [37]. Kandath et al., highlights that the most common ages affected by cancer are those between 30-40 and 61-60 30. Potentially malignant disorders (PMD) have a high risk of malignant transformation in oral cavity. Habits such as tobacco and alcohol usually predispose to Potentially Malignant Disorders and subsequently to an oral carcinoma. Oral squamous cell carcinoma (OSCC) can occur even without the usage of tobacco [29].

Our study shows that among the 37 patients the most common risk factor was paan present at an incidence of 35.1% followed by sharp cusp 21.6%, smoking 16.2%, gutka 10.8%, when combination of paan and gutka was used cancer occurred in 5.4% of them and the same was for combination of paan and smoking, smoking and gutka. Loyha et al., said that betel quid chewing is quite strongly associated with oral cancer, especially in chewers of long duration which is similar to our study and also there were significant associations between oral cancer and tobacco smoking, alcohol [38]. Radoš et al., concluded that alcohol and tobacco consumption was 74% in men and 45.4% in women. It also said that alcohol drinking alone was not associated with the risk of oral cavity cancer, while exclusive tobacco smoking and joint consumption of alcohol and tobacco increased the risk [39] Combination of risk factors can have synergistic effects and thereby lead to early oral cancer progression.

In our study out of the 37 patients, the most common site was alveolus with an incidence of 37.8%, buccal mucosa in 32% patients, 27% patients on the tongue and 2% on the soft palate. In contrast, the most common site of occurrence studied by Azhar et al., was on the Buccal mucosa with an incidence of 71% [8]. Also Kandath et al., notes that the most common site of occurrences is buccal mucosa [30]. Similar to our study Parul et al found that in India, the alveolus followed by gingivo buccal sulcus, Buccal mucosa was the most common site of occurrence of oral cancer [33]. In our study when paan chewers were examined 13.5% of

the site of occurrence was alveolus. Schepman et al noted that in the smokers most common site of occurrence was the floor of the mouth [32]. The risk factor that comes in contact with the part of the oral cavity in a chronic period of time tends to develop a lesion further leading to persistence of irritant that causes oral cancer. Mohileen et al., recorded that tongue lesions, usually on the lateral part of the tongue were more commonly seen in non smokers [40] which is similar to our study. Varsha et al., studied the quality of life of oral cancer patients as well and concluded that it was poor as the day to day function of mastication, speech, swallowing becomes a challenge and is found to be very difficult to cope with the negative impact of the disease [41].

The limitations of the study is the small sample size and that the people belonged to a different ethnic group of population. The future scope of the study lies in outline the possible risk factors of oral cancer. Moreover it is essential that the patient needs to be educated on the use of these risk factors and what effect will these cause in the long term.

Conclusion

Within the limitations of the study, chewing tobacco like paan was the most common risk factor in the development of oral cancer. The most common site of occurrence was alveolus followed by sharp cusp. 84.6% of males reported with oral cancer and a maximum of them belong to the middle age adults. An oral cancer awareness programme should be conducted among the general population and should involve educating the patient on risk factors of oral cancer and counselling of such patients is warranted to reduce mortality rate.

Acknowledgement

The study was supported by Saveetha Dental College and Hospitals who provided insights and expertise that greatly assisted the study. We would also like to thank the reviewers of the articles for these insights.

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