



Association of Head and Neck Cancer With Smoking

Swapna.k

Department of Human genetics ,Andhra university,Visakhapatnam.

ABSTRACT

Introduction: Head and neck cancer includes malignant tumors arising from a variety of sites in the upper aero-digestive tract, including oral cavity, pharynx and larynx. Head and neck cancer is strongly associated with certain environmental and life style risk factors, including tobacco smoking, smoke less tobacco consumption. **Materials and methods:** The study population consisted of 103 patients out of which 65 are male and 38 are females. The patients had histologically confirmed diagnosis of head and neck cancer, who reported during the period from 2011-2013 in Mahatma Gandhi cancer hospital, Visakhapatnam, Andhra Pradesh, India. The statistical analysis was carried out by risk estimation and measure of association was calculated in terms of Odds ratio (OR). 95% confidence interval (CI) and subsequent p-value of significance (<0.01) were included as well. **Results:** This retrospective study indicates that risk factors like smoking and smoke less tobacco are the cause of head and neck malignancies. However male to female ratio are different among different risk factors. **Conclusions :** Our study concludes that tobacco related products are major risk factors. Our gender wise analysis shows male patients are mostly affected by HNC malignancies. In this study smoking contributed to head and neck cancer in both males and female with any form of tobacco exposure and smokeless tobacco consumer data shows insignificant values.

KEYWORDS : odds ratio, Head and neck cancer, oral cavity, larynx, pharynx

INTRODUCTION:

Head and neck cancer includes malignant tumors arising from a variety of sites in the upper aero-digestive tract including oral cavity, larynx and pharynx. Head and neck cancers (HNC) are 10 most common cancers among all the cancer. In all countries men are affected almost twice as often as women, because of their higher indulgence in risk factors. In India, it accounts for one fourth of male cancers and one tenth of female cancers (1,2). Men and women are affected differently by tobacco use and smoking rates alone differ between men and women. The difference in disease likeness may be a reflection of the prevailing risk habits of the population (3,4). Globally, the major cause for HNC is the use of tobacco products in the forms of cigarettes, bidis, cigars and loose tobacco in pipes is common (5,6). Bidi smoking is more hazardous than cigarette smoking. Reverse smoking with the lighted end inside the mouth which is practised in India is linked with hard palate cancers (7). Tobacco smoke, smokeless tobacco, deficient diet, Human Papilloma virus infection have been suggested as risk factors for head and neck cancers (8,9,10). The practice of different habits in different populations might account for the difference in site of infection preference and the difference in the incidence observed. The primary cause of the very high incidence of oral cancer is the widespread habit of chewing betel quid or paan and related areca nut use.

Chewing of areca nut is common in India, Sri Lanka, Pakistan, Bangladesh, Myanmar, Thailand, Cambodia, Malaysia, Indonesia, Singapore, Philippines, New Guinea, Taiwan and China and in people emigrating from these countries. (11). In India, tobacco is mostly combined with other ingredients like betel leaf, areca nut, slaked lime, etc.

Common forms of oral smokeless tobacco are Pan/paan/betel quid ingredients are Areca nut, betel leaf, slaked lime, and catechu, condiments, with or without tobacco used in Indian subcontinent. Khainiis made from Tobacco and lime used in Bihar, Mishri (Burned tobacco) in Maharashtra Zarda (Boiled tobacco) Gadakhu (Tobacco and molasses) Mawa (Tobacco, lime and areca) are majorly used in central India (12). There is a strong association between the site of cancer and the site where the Pan/paan/betel etc is placed regularly. Group of carcinogens in saliva give rise to cancers in the floor of the mouth and ventral and lateral tongue. Smoking is more strongly associated with soft palate and larynx cancers (13).

Materials and methods:

The study population consisted of 103 patients out of which 65 are male and 38 are females. The patients had histologically confirmed diagnosis of head and neck cancer, who reported during the period from 2011-2013 in Mahatma Gandhi cancer hospital, Visakhapatnam, Andhra Pradesh, India. All patients who visited the clinic age 21 years up to 80 years were eligible for enrollment in current study. Data

collected from hospital laboratories were entered in a manner that ensured strict quality control checks and avoided repetition of cases. Participants were first asked to describe their personal habits like tobacco use and betel quid use.

The statistical analysis was carried out by risk estimation and measure of association was calculated in terms of Odds ratio (OR). 95% confidence interval (CI) and subsequent p-value of significance (<0.01) were included as well. The present data was calculated by medical software.

RESULTS:

Table 1: Gender wise distribution and odds ratio estimation of smoking habit amongst head and neck cancer patients

Smoking Habit	Males (%) (n=65)	Female (%) (n=38)	Total (%)	Odds Ratio	95% Confidence Interval	P value
Bidi/ Cigarette smokers	31 (47.69)	3 (7.89)	34 (33.01)	10.637	2.9705 to 38.0911	0.0003*
Reverse smokers	11 (16.92)	9 (23.68)	20 (19.42)	0.656	0.2439 to 1.7661	0.0021*
Tobacco chewers	7 (10.77)	3 (7.89)	10 (9.71)	1.432	0.3475 to 5.9068	0.0188*
Non-smokers	16 (24.62)	23 (60.53)	39 (37.86)	0.213	0.09 to 0.5038	0.0014*

*p< 0.01- Significant; **p< 0.02 -moderately Significant; ***p< 0.005-Highly Significant; NS-not significant

Gender wise risk factors analysis reveals odds ratio of bidi/cigarette smoking is 10.637 and 95% confidence intervals are 2.970-38.091. In reverse smokers OR=0.656 (95%CI=0.243-1.766), tobacco chewers OR=1.43 (95%CI=0.347-5.906) and non smokers OR=0.21 (95%CI=0.09-0.503). Table 1 shows signifying results as the p values are less than the P value (0.01).

Table 2 :Tobacco exposure duration of the cancer patients in relation to prevalence of head and neck cancer.

Factor	N	Frequency	Mean	P value
Non tobacco exposure	43	41.75	2.1669	< 0.001*
below 10 year exposure	5	4.85	2.1667	
11- 20 years exposure	15	14.56	2.0600	
21 -30 years exposure	20	19.42	2.1500	
31- 40 years exposure	20	19.42	2.1500	
41 and above years exposure	0	0.00	0	

*p< 0.01- Significant; **p< 0.02 -moderately Significant; ***p< 0.005-Highly Significant; NS-not significant

Mostly 21-40 years tobacco exposure having high frequency 19.42 , Using their frequencies and mean values, the p value has been calculated and made significant results.

Table 3: Distribution of smoking habits in head and neck patients.

Habit	Mean	Std. Error	95% Confidence Interval	P value
Smoking habits				
Bidi/Cigarettes (n=34)	1.2185	0.06903	1.1324 to 1.5232	0.001*
Reverse Smoking (n=20)	1.0700	0.08468	0.8707 to 1.2293	
tobacco chewing (n=10)	1.4567	0.1851	1.0242 to 1.6425	
Non smokers (n=39)	1.2273	0.06810	1.1172 to 1.6745	

*p< 0.01- Significant; **p< 0.02 -moderately Significant; ***p< 0.005-Highly Significant; NS-not significant

In the above table 3, smokers are habit data has been taken and calculated .Mean and standard error in smoking data has been tabulated. Reverse smokers are 20 patients and mean=1.070, tobacco chewers are 10 patients and mean=1.456and Bidi/Cigarettes is 34 patients and mean=1.218, non smokers are 39 patients and smokers are mean=1.227. From the data smoking association is statistically significant as the p value is within the range.

Table 4:Gender wise distribution and odds ratio estimation of smoke less tobacco habit amongst head and neck cancer patients

Habit	Males (n=65)	Females (n=38)	Total	Odds Ratio	95% Confidence Interval	P value
Gutka	2	0	2	2.9389	0.1375 to 62.8306	0.4902 ^{NS}
Chyni	19	7	26	1.5868	0.6109 to 4.1218	0.3431 ^{NS}
Gutka+Chyni	0	1	1	0.1959	0.0078 to 4.9299	0.3219 ^{NS}
No Chyni	44	30	74	0.8574	0.4646 to 1.5825	0.6228 ^{NS}

*p< 0.01- Significant; **p< 0.02 -moderately Significant; ***p< 0.005-Highly Significant; NS-not significant.

For this study, OR=2.93(95%CI=0.1375 to 62.830)consuming gutka and OR=1.58(95%CI=0.610 to 4.121)takingchyni remaining are users ofGutka+ChyniOR=0.195(95%CI=0.007 to 4.929) and no chyni users are OR=0.85(95%CI=0.464to 1.582)table 4 shows insignificant values.

DISCUSSION:

In this retrospective study, the smoking patterns of HNC patients are high Bidi or Cigarette smokers with 47.69%. Out of 65 males, 31 (47.69%) are bidi/cigarette smokers, 11 (16.92%) are reverse smokers. 7 (10.77%) are of tobacco chewers 16 (24.62%) are non smokers or non tobacco chewers. Whereas in females, the ratio different with highest number are from non-smoker category 23(60.53%) and followed by 9 (23.68%) reverse smokers and remains 3 cases bidi/ cigarette smoker and tobacco chewer with 7.89% each respectively. Overall, least number is recorded in bidi/ cigarette smokers and tobacco chewers. There is a signifying variation in between smoking and HNC prevalence. Compared to never tobacco smoking, current smoking was associated with cancer risk.

According to Previous studies among never smokers, ever exposure to involuntary smoking was associated with an increased risk of HNC cancer in a dose dependent fashion and declining with the duration of smoking cessation (14). It was established in the study that smoking contributed to head and neck cancer in both males and female with any form of tobacco exposure (table 1) where p value <0.01. Tobacco exposure duration may infer the causation for the Head and neck cancer. In the present study, out of 103 patients, below 30 years are 40 patients. Whereas above 30 years are of 20. The exposure duration to tobacco and related products also increases the cancer incidences proportionally (table 2) where p value is <0.001. In present study, the frequency of reverse smoking in females is less than males.

Most studies reveals that smoking, tobacco chewing, reverse smoking were contributing risk factors for cancer in males and females(15,16). This might be explained that smoking is the most important risk factor and a high proportion of tobacco chewers in this study area. This is also signifying in the cases of the smoking .Some people never use tobacco, but instead they use non tobacco products; these include Gutka, Chyni etc. These may have effect on oral cavity with relevance to cancer. For this study, out of 65 males, 2 are consuming gutka and 19 are taking chyni remaining are non users of these. Whereas in females, out of 38, 7 are chyni users, non users are 30 patients. Gutka and chyni is using only one patient. The incidence of head and neck cancer with non tobacco use such as gutka, chyni showed insignificant results in this study. As per previous literature and extremely rare among people in southern India, while paan-tobacco chewing is commonly seen in women in coastal areas of Andhra Pradesh (17,18,19).

Conclusions :

Our study concludes that tobacco related products are major risk factors. Our gender wise analysis shows male patients are mostly affected by HNC malignancies . In this study smoking contributed to head and neck cancer in both males and female with any form of tobacco exposure and smokeless tobacco products consumer data shows insignificant values. It is recommended to collect the large data on smoking habits which in relation to prevalence of HNC cases.

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