

Head and Neck Squamous Cell Carcinoma in Young Adults: A Hospital-Based Study

Abstract

Background: Head and neck cancers (HNCs) account for 30% of all cancers in India. In north eastern India, tobacco-related cancers are very common because of the widespread use of tobacco. The paucity of any study from this region in young head and neck patients has prompted us to take up this study. **Methodology:** A retrospective study was conducted at Dr. B Borooah Cancer Institute, Guwahati during January 2015–December 2015. Data regarding tumor site, age, sex, education, habit of tobacco (smokeless and smoke), and betel nut consumption were analyzed using IBM SPSS version 19. $P < 0.05$ was considered as statistically significant. **Results:** About 75.1% patients were males. Among patients ≤ 39 years, 83.7% were tobacco chewers, 50.5% were smokers, and 83.7% betel nut chewers, and among >39 years, these proportions were 83.7%, 56.2%, and 78.7%, respectively. The most common site among ≤ 39 years and >39 were mouth (40.8%) and hypopharynx (36.8%). Among tobacco and betel nut chewers and smokers, the most common sites were mouth (40.3%, 42.5%) and hypopharynx (41.5%). The site of head and neck squamous cell carcinoma was highly associated with chewing and smoking habit ($P < 0.05$). Among illiterate patients, proportions of tobacco and betel nut chewers and smokers were 65.3%, 61.6%, and 67.9%, respectively. **Conclusion:** A positive association between tobacco use, male gender, and low education levels were found. The younger generation should be made aware about the adverse health consequences of tobacco use to reduce the preventable risk factors of HNC.

Keywords: Head and neck, squamous cell, tobacco, young

Introduction

Head and neck cancer (HNC) is one of the most common cancers worldwide with annual incidence more than 550,000 cases, of which around 300,000 deaths occur every year.^[1] Head and neck squamous cell carcinoma (HNSCC) accounts about 90% of all HNC which is the sixth leading cancer by incidence worldwide. HNSCC typically develops in sixth to seven decades of life. However, some studies reveal that it has developed in younger age group in different parts of world including India, China, USA, and Europe.^[2-6] HNSCC incidence rate in patients below 40 years has reached 0.4%–3.6%.^[7] The most common locations where HNSCC arises are the oral cavity, oropharynx, larynx, and hypopharynx.^[7,8] The main risk factors associated with HNSCC are environmental and lifestyle factors such as chewing tobacco, alcohol consumption, and smoking. Recently, epidemiological

studies has emerged a strong association with human papillomavirus (HPV) in a subset of HNSCC and in nonsmoking cases.^[9,10] In north eastern parts of India in the states such as Assam, Meghalaya, Mizoram, Tripura, Nagaland, and Manipur, the risk of HNSCC is further associated with the practice of betel quid and areca nut chewing,^[11] chewing of smokeless tobacco products,^[12] and smoking of bidis and cigarettes.^[13] However, there is an increase in the number of young HNSCC patients, without history of any typical risk factors. Other risk factors associated with the prevalence of HNSCC are poor dental hygiene, poor diet, immunosuppressant, submucous fibrosis, gastrointestinal reflux, different inherited syndrome, and chronic iron deficiency anemia.^[6,14-18]

Since remarkable differences exist in consumption of alcohol, tobacco, diet, literacy, and social status in the north eastern region of India compared to other parts of the country, we proposed to define in this article the environmental and lifestyle risk

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factors, age group, tumor location, and literacy among the group of HNSCC patients reported in hospital-based cancer registry at Dr. B Borooah Cancer Institute, Guwahati, Assam, India, during January 2015–December 2015.

Methodology

The present study is a retrospective study conducted at Dr. B Borooah Cancer Institute, Guwahati, on patients who were diagnosed with HNSCC during January 2015–December 2015. A total of 362 patients ranging from age group 20–40 years who had histologically confirmed cases of squamous cell carcinoma (SCC) of oral cavity, tonsil, oropharynx, nasopharynx, hypopharynx, and larynx were included. Patients with imprecise and incomplete information on clinical and histological data, previously treated cases, and SCC of the other parts of the head and neck were excluded. The present study has been approved by the institutional review board.

Data regarding tumor site, age, sex, education, habit of tobacco (smokeless and smoke) consumption, and betel nut chewing habit were abstracted from hospital records and analyzed using IBM SPSS version 19 (SPSS Inc., Chicago, IL, USA). The variables were analyzed using Chi-square or Fisher's exact test. $P < 0.05$ was considered as statistically significant.

Results

We reviewed the medical records of 362 HNSCC patients of whom 272 were males and 90 were females (the male to female ratio was 3:1). The mean and median ages were 38 and 39 (range: 20–40) years, respectively. The patients were divided into two groups, below 39 years or younger ($n = 184$ patients) and 39 years above or older ($n = 178$ patients) based on median age. The mean and median ages in younger patients were 34 and 35 years, and in older patients, they were 41 and 42 years. The male to female ratio in younger and older groups were 2.2:1 and 4.4:1, respectively. The patients' ages differ significantly with their sex [Table 1]. Among the patients in younger age group, 154 (83.7%) were tobacco chewers, 93 (50.5%) were smoker, and 154 (83.7%) were betel nut chewer. However, in older age group, 149 (83.7%) were tobacco chewer, 100 (56.2%) were smoker, and 140 (78.7%) were betel nut chewer. Patients' chewing and smoking habit did not differ significantly with their age.

The most prevalent site of HNSCC in younger patients was mouth ($75/184 = 40.8\%$) while in older patients, the most common site was hypopharynx ($65/178 = 36.5\%$). The site of HNSCC was significantly different with patients' age ($P = 0.012$). In male, the highest frequencies were observed in two sites, mouth and hypopharynx ($85/272 = 31.3\%$) while in female, the highest cases were found in mouth ($40/90 = 44.4\%$). There was no significant difference between patients' HNSCC site and sex. Among tobacco chewers, the most common observable

Table 1: Characteristics of patients and patients' age

Patients' characteristics	Patients' age (years)		P
	≤39	>39	
Gender			
Male	127 (69.0)	145 (81.5)	0.006
Female	57 (31.0)	33 (18.5)	
Tobacco smokeless			
Chewers	154 (83.7)	149 (83.7)	0.997
Nonchewers	30 (16.3)	29 (16.3)	
Tobacco smoke			
Smokers	93 (50.5)	100 (56.2)	0.283
Nonsmokers	91 (49.5)	78 (43.8)	
Betel nut			
Chewers	154 (87.7)	140 (78.7)	0.219
Nonchewers	30 (16.3)	38 (21.3)	

location of HNSCC was mouth ($122/303 = 40.3\%$) while among smokers, the most common location observed in hypopharynx ($80/193 = 41.5\%$). However, mouth was the most frequently observed site of HNSCC among the patients who ever chewed betel nut ($125/294 = 42.5\%$). The site of HNSCC was highly associated with chewing and smoking habit ($P < 0.05$) [Table 2].

Next, we investigated the relation between chewing and smoking habit and education status of the patients. We observed that out of 303 tobacco chewers, 198 (65.3%) were illiterate. Further, 181 (61.6%) patients were illiterate among betel nut chewers. Education status was statistically significant with chewing habit ($P < 0.05$). Moreover, 131 (67.9%) patients were identified as illiterate smokers. Smoking habit did not differ significantly with education status [Table 3].

Further, we have performed univariate analysis between education (odds ratio [OR] 3.381, 95% confidence interval [CI] 1.547–7.389, $P = 0.002$) and habit of tobacco consumption. The risk of developing HNSCC was statistically higher among illiterate tobacco chewers which was about three times more than nonchewers. Furthermore, multivariate analysis showed significant effect of education (OR 3.618, 95% CI 1.643–7.970, $P = 0.001$) and gender (OR 1.916, 95% CI 1.032–3.554, $P = 0.039$) on tobacco-chewing habit. The risk of prevalence HNSCC among males was about two times higher in tobacco chewers than nonchewers. Among the illiterate tobacco chewers, there is four times higher risk of prevalence HNSCC than nonchewers [Tables 1-3].

Discussion

HNSCC is the most commonly diagnosed cancer worldwide. Over 200,000 cases of HNC occur each year in India. Nearly 80,000 oral cancers are diagnosed every year in our country.^[19] The true global incidence of HNSCC in young patients is unclear because most epidemiological studies do not report its incidence by age stratification.

Table 2: Characteristics of patients and tumor site

Patients' characteristics	Tumor site								P
	Lip	Tongue	Mouth	Tonsil	Oropharynx	Nasopharynx	Hypopharynx	Larynx	
Age (years)									
≤39	3 (1.6)	27 (14.7)	75 (40.8)	13 (7.1)	9 (4.9)	13 (7.1)	36 (19.6)	8 (4.3)	0.012
>39	2 (1.1)	27 (15.2)	50 (28.1)	10 (5.6)	8 (4.5)	5 (2.8)	65 (36.5)	11 (6.2)	
Gender									
Male	5 (1.8)	37 (13.6)	85 (31.3)	18 (6.6)	12 (4.4)	14 (5.1)	85 (31.3)	16 (5.9)	0.102
Female	0	17 (18.9)	40 (44.4)	5 (5.6)	5 (5.6)	4 (4.4)	16 (17.8)	3 (3.3)	
Tobacco smokeless									
Chewers	5 (1.7)	43 (14.2)	122 (40.3)	18 (5.9)	15 (5.0)	14 (4.6)	71 (23.4)	15 (5.0)	<0.05
Nonchewers	0	11 (18.6)	3 (5.1)	5 (8.4)	2 (3.4)	4 (6.8)	30 (50.8)	4 (6.8)	
Tobacco smoke									
Smokers	1 (0.5)	24 (12.4)	51 (26.4)	10 (5.2)	12 (6.2)	14 (7.3)	80 (41.5)	1 (0.5)	<0.05
Nonsmokers	4 (2.4)	30 (17.8)	74 (43.8)	13 (7.7)	5 (3.0)	4 (2.4)	21 (12.4)	18 (10.7)	
Betel nut									
Chewers	5 (1.7)	54 (18.4)	125 (42.5)	20 (6.8)	11 (3.7)	7 (2.4)	56 (19.4)	16 (5.4)	<0.05
Nonchewers	0	0	0	3 (4.4)	6 (8.8)	11 (16.2)	45 (66.2)	3 (4.4)	

Table 3: Characteristics of patients and patients' education status

Patients' characteristics	Education status		P
	Literate	Illiterate	
Tobacco smokeless			
Chewers	105 (34.7)	198 (65.3)	0.001
Nonchewers	8 (13.6)	51 (86.4)	
Tobacco smoke			
Smokers	62 (32.1)	131 (67.9)	0.690
Nonsmokers	51 (30.2)	118 (69.8)	
Betel nut			
Chewers	113 (38.4)	181 (61.6)	<0.05
Nonchewers	0	68 (100)	

In India, HNC accounts for 30% of all cancers.^[19] The population of north east India is associated with distinct demographic profile, lifestyle, food habits, and customary practices, which implicates toward higher susceptibility to develop HNSCC. HNSCC usually occurs in the sixth to seventh decades of life, but Llewellyn *et al.* have shown increased incidence of HNSCC among young.^[3] Various epidemiological studies had reported a strong association with HPV in a subset of young HNSCC and nonchewers and smokers.^[9] The percentage of HNSCC in younger individuals varies depending on the cutoff age chosen. In our study, we have taken the cutoff age as 39 years. According to Llewellyn *et al.*, the incidence of HNSCC in younger individuals ranges from 0.4% to 3.6%^[3] when the cutoff age was taken as <40 years. However, our study showed 50.8% cases in younger age group when young were defined 39 years or below. The mean age was 41 years in older age group. This significant bias may be due to habit of consuming tobacco (smokeless and smoke) and chewing betel nut at early ages in the region of north east India. This is observed in our study as well. Considering the gender in the present study, males were

more commonly affected than females which implicate the increased use of tobacco and betel nuts in males. This finding was similar to the study conducted by Toner and O'Regan.^[6] Smoking, tobacco, and alcohol consumption are main risk factors for HNC.^[20]

The most common site of cancer in the present study population was oral cavity. This finding is different from the previous other studies by Gawecki *et al.*^[21] SCC of larynx and hypopharynx in young patients are rare and account for approximately 10% and 1% of all HNSCCs in patients aged <40 years.^[22] In patients younger than 39 years, oral cavity was the most common site; however, hypopharynx was more common in patients older than 39 years and equal to 40 years which was different from the other studies.^[23] On contrary to the findings in other studies, oral cavity and hypopharynx were the two most commonly affected sites in males, whereas in females, it was the oral cavity which was found to be more frequent in our study.^[24]

Tobacco both in smokeless and smoked form is known as one of the major risk factors for HNSCC. Various Indian studies had shown that tobacco smoking in the form of cigarettes, bidis, cigar/chutta/cheroot, dhunti (Goa), the water pipes/hookah (north India), reverse chutta smoking (in coastal Andhra Pradesh and Orissa), Hookli (Gujarat), and chillum (Northeast part of India) has attributed to the development of HNSCC. In India, around 57% of all men and 11% of women between 15 and 49 years of age use some form of tobacco. Uses of smokeless tobacco as well as betel quid (pan) with lime and zarda are widespread in many parts of India.^[25] Tobacco consumption in India is growing at a rate of 2%–3% per annum.^[26] A high incidence of smoking was reported among youth from Bangladesh, India, and Indonesia.^[27] The high prevalence of tobacco usage has led to increase in disease burden and

high health-care costs in developing countries. In our study, 40.3% of the tobacco chewers had oral cancers which is similar to that observed by O'Regan *et al.*^[28] Mafi *et al.* has found 81.7% of SCC in larynx with the habit of smoking; however, in our study, it was observed that 41.5% of patients had SCC of hypopharynx.^[23] Among the betel nut chewers, oral cavity was the most common affected site in our study group. This finding is similar to the other studies.^[29]

Illiteracy was significantly associated with tobacco use in our study. This is consistent with many other studies.^[30] Illiteracy and lack of awareness among the general population about the side effects of tobacco have emerged as major public health problem in north east India.

The limitations of our study include that the study was a retrospective one resulting in missing of data and small number of patients. Hence, further prospective studies will be of greater value in this respect. However, the strength of our study is that this is the first study from north east India on young HNC patients.

Conclusion

Tobacco and betel nut consumption are the major risk factors for HNSCC. There was a positive association between tobacco use, male gender, and low education levels, and incidence of HNSCC in north eastern states is higher than the other states. Since HNSCC cancers are highly preventable cancers, we should inform the general public, especially the younger illiterate population about the adverse health consequences of tobacco and betel nut use.

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Conflicts of interest

There are no conflicts of interest.

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