Original Article

A Study of Head and Neck Cancer Patients with Special Reference to Tobacco Use and Educational Level

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Abstract

Background: In India, head and neck cancers (HNCs) are common and constitute 20%–30% of all cancers. The most common risk factors are consumption of tobacco and alcohol. Betel nut chewing with or without tobacco is a major risk factor for HNC in India, especially in the Northeast India. **Materials and Methods:** This was a hospital-based retrospective study to measure the descriptive scenario of HNC cases along with their demographic and risk factor profile. The patients diagnosed from June 01, 2014, to December 31, 2014, were included in the study. The data of patients were analyzed for age, gender, subsites, stage at diagnosis, pattern and prevalence of tobacco usage, and different education level of patients. Chi-square test was performed to assess the association of gender and tobacco habits. **Results:** One thousand four hundred and twenty-eight patients were included in the study, M: F was 4:1, hypopharynx in males (36.2%) and mouth in females (39.8%) were leading HNC sites, and majority (83.8%) presented in locally advanced stages. Majority of patients (34.1%) and tobacco users (34.7%) were illiterates, and 82.9% of all HNC patients were tobacco users. Males with cancers of the tongue, hypopharynx, and larynx ($P < 0.05$) were significantly at an increased risk of developing HNC with tobacco consumption. **Conclusion:** Our findings suggest that improvement in the education level may lead to decline in the use of tobacco and thereby reduction in the burden of HNC patients.

Keywords: *Epidemiology, head and neck cancer, Northeast India, risk factor*

Introduction

Globally, more than 600,000 head and neck cancers (HNCs) are diagnosed each year, and the incidence and mortality rates vary according to the economic status of the country.[1] The term HNC covers a broad spectrum of anatomical subsites. Combined HNC was the sixth most common cancer in the world. Most HNCs arise in the epithelial lining of the oral cavity, oropharynx, larynx, and hypopharynx.[2,3] HNCs are predominantly seen in males, but the male-to-female ratio varies worldwide and by anatomical site with a ratio ranging from 2:1 to 4:1.[4,5]

Studies from India suggest a strong association of tobacco chewing with HNC subsites such as, oral, oropharyngeal, and hypopharyngeal cancers.[6] HNCs are common in India and account for about 20%–30% of all cancers, while in the United States, HNC accounts for only 3% of all malignancies.[7,8] Morphologically, squamous cell carcinoma is predominant type in about 90% of all HNC.[9] The subsite predilection of head and neck squamous cell carcinoma reflects the risk profile of a given population, and there are suggestions that these are changing with the course of time.[10] The established risk factors for HNC are tobacco and alcohol consumption and by infection with high-risk human papillomavirus (HPV).[11,12] In South Asian countries, the risk of HNC is further aggravated by smoking of bidis, chewing betel quid, and areca nut.[13] The usage of smokeless tobacco was indicated by the habit of betel quid chewing, mishri, khaini, gutka, snuff, and as an ingredient of pan masala,[14] and smoking forms of tobacco were indicated by the consumption of cigarettes, pipes, and local bidis. In fact, India has one of the highest rates of oral cancer in the world, with over 50% attributable to smokeless tobacco use.[15] Northeast (NE) India is geographically a distinct region of India with distinct food habits and lifestyle behaviors, and the population of NE India is over 30 million, as per the last census of the Government of

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India of 2011. Chewable tobacco consumption (smokeless tobacco use) is a customary habit among the different ethnic and sociocultural groups of this part of the country. The aim of the study was to determine the pattern and prevalence of tobacco use in patients with HNCs and compare that with different level of education.

Materials and Methods

This is a hospital-based retrospective study with histologically confirmed HNC cases to measure descriptive scenario of patients with HNC, and their demographic and risk factor profile diagnosed from June 01, 2014, to December 31, 2014. Prior Institutional Review Board's approval was sought for conducting this study. The hospital where this study was carried out is the Regional Cancer Center in the NE India. To identify cases of HNC in 2014, we recruited categories C00–C14 and C30–C32 of the International Classification of Diseases, 10th Edition, and salivary glands have been included as per the classification of International Agency for Research on Cancer.[16] A total of 5323 patients were diagnosed with cancer at our hospital during the study period, of which 1428 (26.8%) were HNC patients. The data of patients were analyzed for age, gender, subsites, stage at diagnosis, pattern and prevalence of tobacco usage, and educational level of patients. Education of patients was clustered as follows: illiterates, up to 8 years, 10 years, and 12 years of schooling, and college and above. Tobacco habits for the present study were only smoking, only smokeless, and both. The data on tobacco history were collected at the time of patient registration by medical social workers.

Statistical analysis

Descriptive statistics have been used to present the results. Chi-square test was performed to assess the association of gender and tobacco habits. $P < 0.05$ was considered as of statistical significance. The data were analyzed using SPSS version 16 (SPSS Inc., Chicago, IL, USA).

Results

An obvious male predominance was seen with 79% patients were male and 21% were female of the total HNC cases with a ratio of 4:1. The mean age at diagnosis of patients with HNC was 56 years, and the age group distribution of the study cohort is shown in Figure 1. The male-to-female ratio ranges from 1.4 in nose and sinus to 8.2 in hypopharynx [Table 1].

The distributions of HNC by anatomical subsites are shown in Table 1. In males, hypopharynx (36.2%) was the leading site followed by mouth (19.3%), tongue (16.5%), and tonsil (10.3%). Among females, mouth was the leading site (39.8%), followed by tongue (19%) and hypopharynx (17%).

The majority (95.2%) of these HNCs were squamous cell carcinomas. A total of 83.8% HNC patients presented with

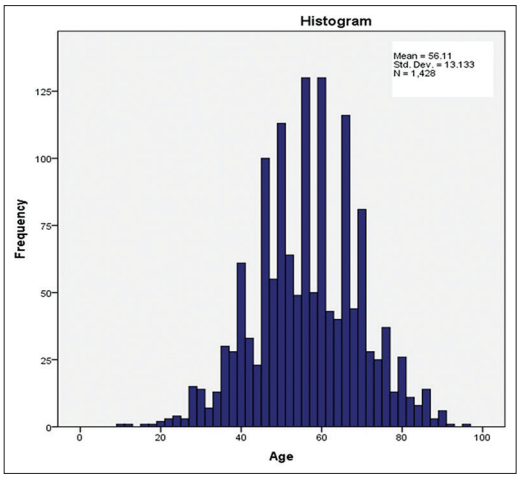

Figure 1: The bar diagram shows the distribution of age of patients with head and neck cancers in the study group

Table 1: Subsite distribution of head and neck cancer patients of the study group

Subsite	Male, *n* (%)	Female, *n* (%)	Total, *n* (%)	Male:female ratio
Lip	19 (1.7)	6 (2)	25 (1.8)	3.2
Tongue	187 (16.5)	56 (19)	243 (17)	3.3
Mouth	219 (19.3)	117 (39.8)	336 (23.5)	1.9
Salivary gland	13 (1.1)	6 (2)	19 (1.3)	2.2
Tonsil	117 (10.3)	21 (7.1)	138 (9.7)	5.6
Oropharynx	44 (3.9)	8 (2.7)	52 (3.6)	5.5
Nasopharynx	26 (2.3)	11 (3.7)	37 (2.6)	2.4
Hypopharynx	410 (36.2)	50 (17)	460 (32.2)	8.2
Nose and sinus	7 (0.6)	5 (1.7)	12 (0.8)	1.4
Larynx	92 (8.1)	14 (4.8)	106 (7.4)	6.6

locally advanced stage (stage III and stage IV combined) at the time of diagnosis. Only 1.6% of patients with HNC patients presented with stage I. About 43.7% males and 50.3% females presented with stage IV at the time of diagnosis [Figure 2]. In 4.8% and 6.5% of males and females, respectively, the information on stages were absent in the dataset (not available) as shown in Figure 2.

The levels of education were as follows: 56.1% females with HNC were illiterates and 28.4% males were illiterates. In males, up to 10 years of schooling (30.2%) and by up to 8 years of schooling (24.2%) constituted the first and third largest groups, respectively. Illiterate males (28.4%) constituted the second largest group. However, among females, up to 8 years of schooling (23.5%) was followed by up to 10 years of schooling (13.3%) as the second and third largest groups [Table 2]. An overall of 82.9% of all HNCs in both genders were found to be associated with tobacco in any form. A total of 87.7% males and 64.6% females were seen to be associated with tobacco habits. The educational levels of tobacco users were similar to educational levels of patients with HNC as shown in Table 2.

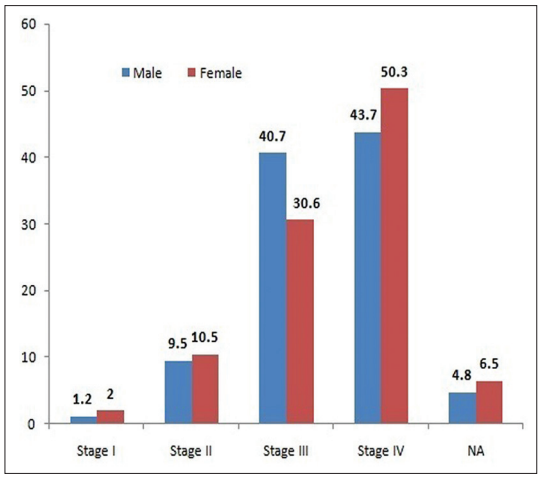

Figure 2: The bar diagram showing the stage distribution of head and neck cancer patients

It was seen that 62.1% of female patients who were illiterate consumed tobacco in any form followed by 29.5% illiterate male patients, whereas 34.7% overall illiterate of both genders had HNC and were tobacco users. The most common habit was combination of both smoking and smokeless tobacco use in males (52.4%) and smokeless tobacco habits in females (84.2%) [Table 2].

The significantly relative risk in male tobacco users was seen for cancer of the larynx, where it was 1.78 (95% confidence interval [CI], 1.05–3.02, $P = 0.000$), in cancer of the tongue, it was 1.52 (95% CI, 1.20–1.92, $P = 0.000$), and in hypopharyngeal cancer, it was 1.44 (95% CI, 1.15–1.79, $P = 0.000$), as shown in Table 3.

Table 2: The characteristics of educational status, tobacco habits, literacy status, and types of tobacco use of the study group

Characteristic	Male (%)	Female (%)	All (%)
Educational status			
Illiterate	322 (28.4)	165 (56.1)	487 (34.1)
Up to 8 years of schooling	274 (24.2)	69 (23.5)	343 (24.0)
Up to 10 years of schooling	343 (30.2)	39 (13.3)	382 (26.8)
Up to 12 years of schooling	111 (9.8)	12 (4.1)	123 (8.6)
College and above	84 (7.4)	9 (3.1)	93 (6.5)
Tobacco habits			
Yes	994 (87.7)	190 (64.6)	1184 (82.9)
No	140 (12.3)	104 (35.4)	244 (17.1)
Literacy status among tobacco users			
Illiterate	293 (29.5)	118 (62.1)	411 (34.7)
Up to 8 years of schooling	243 (24.4)	45 (23.7)	288 (24.3)
Up to 10 years of schooling	299 (30.1)	20 (10.5)	319 (26.9)
Up to 12 years of schooling	91 (9.2)	6 (3.2)	97 (8.2)
College and above	68 (6.8)	1 (0.5)	69 (5.8)
Type of tobacco			
Only smoke	214 (21.5)	13 (6.8)	227 (19.2)
Only smokeless	259 (26.1)	160 (84.2)	419 (35.4)
Both	521 (52.4)	17 (8.9)	538 (45.4)

Discussion

The true burden of HNC in our population may not be reflected by the current literature and what appears is only the tip of the iceberg.[17] The findings from the present study showed that males were almost four times affected with HNC. Among all HNC patients, it is observed that hypopharyngeal cancer (36.2%) was relatively more common in males followed by mouth (19.3%) cancer while cancer of the mouth (39.8%) was more common in female, followed by hypopharynx (17.0%). From the present study, we have seen that cancers of the hypopharynx, larynx, and tonsil were 6–8 times more prevalent in males. Hypopharyngeal cancer in males constitute 5%–10% of all cancer patients and also the age-adjusted incidence of hypopharyngeal cancer in women is high in our population.[18,19] This subsite-wise difference by gender was probably due to the type and nature of tobacco consumption and probable different underlying risk factors such as exposures to HPV infections, hormonal factors, and varied lifestyle behaviors among both the genders of our population. In our study, we have seen that 52.4% of males were consuming a combination of smoking and smokeless tobacco while 84.2% of females were consuming only smokeless tobacco. Relatively, smoking is a stronger risk factor for laryngeal and pharyngeal cancers than for oral cavity cancer.[20] Consumption of chewable tobacco is the major form of tobacco use alone or in combination among upper aerodigestive tract cancer patients of our population.[21] Pooled analysis from a different population has also demonstrated that smokeless tobacco use is a risk factor for HNC, especially oral cancers.[22] In the present study, young patients below 40 years of age were seen to be affected with HNC, which is significant considering the recent downward shift in the age at initiation of tobacco uptake.[23]

In our present study, it was clear that majority of HNC patients belonged to the illiterate group, and the prevalence of tobacco users in this category was also very high. Educational level has been observed to be highly correlated with HNC patients. This may be due to the fact that level of education is directly related to consumption of tobacco-related products, especially chewable tobacco products. Furthermore, an experimental study at the time of patients' discharge has shown that there were no differences in the outcome following educational intervention in patients with HNC.[24] Hence, in our population, low level of education may not be a major hindrance to improve the outcomes of HNC patients at the time of discharge.

Although, in the developed world, tobacco use has declined, but it still continues to be popular in the developing countries.[25] In India, tobacco use is more prevalent among men, rural population, illiterates, poor, and vulnerable section of the society.[26] In our present

Table 3: The risk ratios gender wise with tobacco use

Subsites	Yes (%)	No (%)	Relative risk	Lower limit	Upper limit	*P*
Lip						
Male	16 (84.2)	3 (15.8)	1.26	0.69	2.30	0.56
Female	4 (66.7)	2 (33.8)				
Tongue						
Male	162 (86.6)	25 (13.4)	1.52*	1.20	1.92	0.00
Female	32 (57.1)	24 (42.9)				
Mouth						
Male	187 (85.4)	32 (14.6)	1.10	0.98	1.23	0.10
Female	91 (77.8)	26 (22.2)				
Salivary gland						
Male	12 (92.3)	1 (7.7)	2.77	0.88	8.68	0.02
Female	2 (33.3)	4 (66.7)				
Tonsil						
Male	108 (92.3)	9 (7.7)	1.29	0.98	1.70	0.01
Female	15 (71.4)	6 (28.6)				
Oropharynx						
Male	40 (90.9)	4 (9.1)	1.82	0.90	3.66	0.01
Female	4 (50.0)	4 (50.0)				
Nasopharynx						
Male	16 (61.5)	10 (38.5)	3.39	0.93	12.29	0.03
Female	18 (48.6)	19 (51.4)				
Hypopharynx						
Male	365 (89.0)	45 (11.0)	1.44*	1.15	1.79	0.00
Female	31 (62.0)	19 (38.0)				
Nose, sinus						
Male	6 (85.7)	1 (14.3)	2.41	0.70	6.54	0.22
Female	2 (40.0)	3 (60.0)				
Larynx						
Male	82 (89.1)	10 (10.9)	1.78*	1.05	3.02	0.00
Female	7 (50.0)	7 (50.0)				

*Statistically significant

study, it was seen that majority of tobacco users among both males and females were illiterates (34.7%). Moreover, consumption of both smokeless and smoking forms of tobacco was the predominant tobacco habit of patients with HNC in our population. The proportion of HNC patients with increasing levels of educational qualification showed a downward trend, except in the group of up to 10 years of schooling, where there was a marginal upward trend from the group of up to 8 years of schooling. Of all HNC cases, 56.1% of females and 28.4% of males were illiterate while only 3.1% of females and 7.4% of HNC cases were highly educated or attended college and above. It is also seen that in females, 62.1% of tobacco users in any form were illiterate and those were highly educated; only 0.5% of patients were consuming tobacco products. Similarly, in males, it was seen that only 6.8% use tobacco products when they were highly educated. Hence, higher education will be a major tool to bring down the tobacco consumption rate in our population, which is indirectly related to HNC patients. Study has shown that, in cancers related to smoking, a higher risk was seen among those in the lowest educational attainment category.[27]

In the present study, prevalence ratio analysis showed that males who use tobacco in any form were at increased risk than female tobacco users in any form. The association of tobacco use and gender difference was significant for cancers of the tongue, hypopharynx, and larynx ($P < 0.05$). The high incidence of oral cancer in our population tends to reflect the widespread use of smokeless tobacco, rather than an intrinsically greater rate of malignant transformation of oral lesions.[28] The risk of oral cancer varies between gender, in males, the odds ratio ranges from 1.5 to 10 times, and in females, it ranges from 6.5 to as high 45 times.[29]

The limitation of this study is that the findings may not be generalizable. Another major limitation is the association of tobacco habits with HNC patients in the present study is temporal, due to the categorical nature of data we had at our disposal.

Conclusion

Our findings suggest that improvement in the educational level of our population will lead to a decline in the use of

tobacco and thereby reduction in the burden due to HNC patients in the region or NE India.

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Nil.

Conflicts of interest

There are no conflicts of interest.

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