

Epidemiological Profile of Head and Neck Cancer Patients in Western Uttar Pradesh and Analysis of Distributions of Risk Factors in Relation To Site of Tumor.

Mohammad Shadab Alam¹, Roshan Perween², Shahid A Siddiqui³

ABSTRACT

Introduction: Head and neck cancers (HNC) are major form of cancers in India. The spectrum varies from place to place within the country because of significant diversified risk factors. Aims and Objective of the study were to study, epidemiology and risk factors of HNC patients from western UP and to find out correlation between risk factors and different anatomical regions involved.

Materials and method: All patients with histologically confirmed diagnoses of HNC between JAN 2011 to DEC 2013 were selected from hospital records. Data regarding age, gender, addiction habits, site of tumor and other details were obtained from their clinical records and statistical analysis was done.

Result: HNC, accounts for 21.2% of total body malignancy and 47 % of all malignancies in males and 2.5% in females. Squamous cell carcinoma was the most common histological type (97%). Maximum incidence of HNC (>60%) was in 40-60 year of age. Male: female ratio was (16:1). Oral cancers were most common HNC in patients below 40 year age group while carcinoma oropharynx and larynx were more common in patients above 40 year age group.

Conclusion: Tobacco smoking was most prevalent risk factor for carcinoma oropharynx, larynx and hypopharynx. Alcohol drinking alone was observed in <1% patients as a risk factor. In oral tongue cancer smoking and tobacco chewing were equally prevalent. Habit of tobacco chewing and alcohol were significantly higher in carcinoma buccal mucosa than other HNC suggesting synergistic effect specific to this site.

Keywords: Head and Neck cancer, Epidemiology, Risk factor, Tobacco use, Prevalence, Synergistic effect, Uttar Pradesh.

It is necessary to identify the differences if any in the sites, patterns, and incidences of the disease amongst various communities living in a geographic areas having varying pattern of climate and physical environments to identifying dietary habits, social customs, and such other factors. This study has been done in an attempt to define the demographic and risk profile of HNC patients in western Uttar Pradesh.

MATERIALS AND METHOD

This cross sectional study has been designed and approved by institute's ethical committee.

Patient population- Catchment area of this study was major population of western Uttar Pradesh. Study population consist of 850 patients registered and finally diagnosed with head and neck malignancy in our institute between Jan 2011 to Dec 2013. Data pertaining to these patients was entered in standardized questionnaire. These were in context to age, sex, site involved, smoking, alcohol and chewing habits and other clinical details. Patients on basis of histopathology were categorized into squamous cell carcinoma and other malignancy. Various malignancies of the head-neck region were classified according to International Classification of disease coding system devised by WHO (10th revision) using ICD codes from C00 to C80.

STATISTICAL ANALYSIS

Statistical analysis was done on the data collected and result was formulated. Significance (*P*) values and Correlation values were determined by Pearson Chi-square test by correlat-

INTRODUCTION

Head and neck cancers (HNC) are major form of cancers in India, accounting for 23% of all cancers in males and 6% in females.¹ In India, the disproportionately higher incidence of HNC compared to other common malignancies may be due to excessive consumption of tobacco in various forms with and without alcohol, low socioeconomic status leading to poor oral and dental hygiene, poor diet and infections of viral origin.² The spectrum of HNC varies from place to place within the country because of significant variation in regional risk factors.^{3,4,5}

¹Assistant Professor, Department of Radiotherapy, ²Assistant Professor, Department of Obstetrics and Gynecology, ³Professor and Chairman, Department of Radiotherapy, J.N. Medical College and Hospital, Aligarh Muslim University, Aligarh, U.P., India

Corresponding author: Dr. Mohammad Shadab Alam, Assistant Professor, Department of Radiotherapy, J.N. Medical College and Hospital, Aligarh Muslim University, Aligarh, U.P., India.

How to cite this article: Mohammad Shadab Alam, Roshan Perween, Shahid A Siddiqui. Epidemiological profile of head and neck cancer patients in western Uttar Pradesh and analysis of distributions of risk factors in relation to site of tumor. International Journal of Contemporary Medical Research 2016;3 (1):260-264.

ing two variables at a time from age, gender, risk factor, site of tumor. P Value <0.05 was considered significant and value >0.05 was considered statistically insignificant.

RESULTS

Study population consists of 794 males and 56 female patients of head and neck cancer. Male, female ratio was 16:1. More than 97% cases were squamous cell carcinoma. Difference in incidence in males and females was significant in each age group (P value<.05).Maximum incidence of HNC was found in 51-60year age group (34%) but in male incidence was almost equal in 51-60 and 41-50 age group (n=246 and 241 respectively). More than 60 percent of the patients were 41-60 year of age (Table 1).

Distribution of cases according to age, gender and site of the tumor

Most common site of HNC was oral cavity (n=279) followed by oropharynx (n=271) and larynx (n=179). Malignancy arising from hypopharynx (n=36), nose and paranasal sinuses (n=19) and nasopharynx (n=8) were uncommon. Second-

ary neck with unknown primary constituted 5% of all HNC. Tumors arising from salivary glands (n=8), thyroid (n=4), external auditory canal (n=1), ear pinna (n=1) and eye lid (n=2) all together account for <2% of HNC. Most common sub site of HNC was base of tongue (16%) followed by buccal mucosa (14.2%). Oral tongue (13.5%) and supraglottic larynx (13.5%) had equal incidence (Table-2).

Oral cancer was most common HNC in less than 40 year age groups and ranked second and third respectively in 41-50 and above 50 age groups. Oropharynx was most common HNC in more than 40 year age groups. Carcinoma larynx has shown consistent increase in incidence with increase in age, and ranked second common HNC in more than 50 year age groups. Secondary neck with unknown primary presents 5-8% of HNC in all age groups. Cancer arising from salivary glands, nose and paranasal sinuses (PNS) were more common in <50 year age group (Table-3).

Distribution of risk factor according gender and age

In this study tobacco smoking was found to be most prevalent risk factor in total (35.8%) as well as in male patients (37.3%). Tobacco chewing only was uncommon (8.7%) in

Age group (Years)	Total		Gender				P Value
	N	%	Females		Males		
			N	(%)	N	(%)	
<30	45	5.3	1	(1.78)	44	(5.54)	<.0001
31-40	133	15.6	7	(12.5)	126	(15.86)	
41-50	241	28.3	15	(26.8)	226	(28.46)	
51-60	246	28.9	19	(33.92)	227	(28.58)	
60-70	137	16.1	11	(19.64)	126	(15.86)	
71-80	42	4.9	2	(3.57)	40	(5.03)	
>80	6	0.7	1	(1.78)	5	(0.63)	
Total	850		56		794		

Table-1: Distribution of Case Based on Age Group and Gender (Total=850)

S. No	Site	N	(%)	N	(%)
1	Oral cavity			279	(32.82)
	Oral tongue	115	(13.5)		
	Buccal mucosa	121	(14.2)		
2	Oropharynx			271	(31.88)
	Base of tongue	135	(15.88)		
	Tonsillar fosse	77	(9.05)		
3	Larynx			179	(21.05)
	Supraglottic	115	(13.5)		
4	Hypopharynx			36	(4.23)
5	Nose and Para nasal sinuses			19	(2.23)
6	Nasopharynx			6	(0.70)
7	Unknown primary			44	(5.17)
8	Others			16	(1.88)
	Salivary gland	8	(0.94)		
	thyroid	4	(.47)		
	Carcinoma ear pinna and external auditory canal	2	(.23)		
	Sebaceous gland carcinoma of eye lid	1	(.12)		
	Basal cell carcinoma lower eye lid	1	(.12)		

Table-2: Distribution of Case Based on Site of Disease (Total=850)

males but in combination with smoking it accounts second common risk factor (19%). In female patients, most prevalent risk factor was tobacco chewing (34%) followed by smoking (16%) and smoking with tobacco chewing (14.2%). Alcohol addiction was rare (<5%) in females while in males, it was found either with smoking (10%) or with smoking and chewing tobacco (9.3%). Only 30% female and 14% male were free of all these risk factors. In <30 year age group tobacco chewing (26.7%) was most common risk factor, smoking (13.3%), smoking with tobacco chewing (15.5) and smoking with chewing and alcohol consumption (13.3%) had equal prevalence. Above this age group, smoking alone was most prevalent risk factor and found in 34-50 % of each age group. Smoking with tobacco chewing and alcohol was much common in below 50 year age groups. Smoking with alcohol habit was present in 10% of patients in each age group. Thirty three percent of more than 80 year age patients were free of all these risk factors compared to less than 20% patients in other age groups.

Distribution of risk factor according to site of tumor

In patients of carcinoma oropharynx, larynx and hypopharynx and secondary neck with unknown primary, smoking alone was present in 47%, 43%, 52% and 52% population respectively and smoking with other habits was found in 60% population as the most common risk factor. Tobacco chewing alone was rare (<5%) in this group. In patients of oral

cancer, tobacco chewing, smoking, tobacco chewing with smoking and tobacco chewing with smoking and alcohol was present in 25%, 20% 19% and 12.5% population respectively. Smoking with alcohol was present in 17% cases of carcinoma nasopharynx and larynx. In cancer arising from nose and para nasal sinuses (PNS), thyroid and salivary gland, about 50% patients and in carcinoma nasopharynx 35% patients had none of these risk factors. In remaining sites only 16% of patients were free of all these risk factors.

In patients of carcinoma oral tongue and buccal mucosa, tobacco chewing was present in 22% and 24% population respectively. Smoking alone was more prevalent in oral tongue (28% vs 8%) and tobacco chewing with smoking (14% vs 21%) or with smoking and alcohol (16% vs 33%) was more prevalent in buccal mucosa. In patients of carcinoma base of tongue (BOT) and tonsillar fossa smoking, tobacco chewing, tobacco chewing with smoking was present in 48%, 3.5% and 16% population respectively. Combined habit of smoking, alcohol and tobacco chewing was found to be more common in carcinoma BOT (16% vs 5%). Only 14 % cases of carcinoma BOT and 4% cases of carcinoma tonsil were free of all these risk factors (Table-4).

DISCUSSION

Present study is retrospective and hospital based, which includes histologically confirmed cases of head and neck

Age Group (year)	Oral cavity N	Oropharynx N	Larynx N	Unknown Primary N	Hypopharynx N	Nose and-PNS N	Nasopharynx N	Other N	P Value
<30	35	0	0	1	1	3	0	5	<.001
31-40	79	32	16	2	1	0	1	2	
41-50	74	82	50	12	7	8	5	3	
51-60	51	95	59	20	16	5	0	1	
60-70	31	45	39	7	8	3	0	3	
71-80	9	15	13	2	3	0	0	2	
>80	1	2	2	0	0	0	0	0	
Total	279	271	179	44	36	19	6	16	

Table-3: Distribution of case according to age group and site of Tumor (Total=850)

Habit	Buccal Mucosa (N=121)		Oral Tongue (N=115)		Base Of Tongue (N=135)		Tonsillar Fosse (N=77)		Larynx (N=179)		P Value
	N	%	N	%	N	%	N	%	N	%	
Smoking	10	8.2	32	27.8	65	48	38	49.3	77	43	<.0001
Chewing	29	24	25	21.7	4	3	3	3.9	3	1.7	
Smoking+ Chewing	25	20.7	16	13.9	21	15.5	14	18	36	20	
Smoking+ Alcohol	1	0.8	4	3.5	18	13.3	7	9	30	16.7	
Smoking+ Chewing+ Alcohol	40	33	18	15.6	7	5	12	15.6	9	5	
Chewing+ Alcohol	4	3	3	2.6	1	0.7	0	0	1	0.5	
Na	12	10	17	14.8	19	14	3	3.9	23	12.8	
Total	121		115		135		77		179		

Table-4: Distribution of Common Risk Factor in Common Sites of Head And Neck Cancer

cancers(HNC). Study population is mixture of rural, urban and suburban population. Half of the study population is non vegetarian. As per various studies published squamous cell carcinoma varying from 88-96%.⁴⁻⁷ is the most common histological sub type. In our study squamous cell carcinoma was observed in more than 97% Cases.

Prevalence of HNC with respect to total body malignancies (TBM) varies from 9.8% to 42.7%.^{8, 9,10,11} and it accounts for 30% of all cancer in males and 11-16 % in females. Male, female ratio is commonly 1:1 to 3.1:1.^{4,6,12} In the current study 4015 cases of confirmed malignancy (1698 male and 2317 female) were registered between Jan 2011 to Dec 2013. Out of that 850 (794 males and 56 females) were of head and neck cancers (HNC) which represents 21.2% of all cases and 47 % of males and 2.5% in female cancer. Male, female ratio was 16:1. According to one of the study in eastern UP, HNC burden was reported to be 35.65% in male and 7.44% in female.¹³ From this study we can conclude that state of Uttar Pradesh has very high burden of HNC only second to the highest (54.48%) reported in northeast⁴ in males and very low burden in females in this region.

Geographical variations in incidence of HNC in different part of world and within the country is indicative of differences in the prevalence of regional risk factors. This variation in different regions of India is supported by various studies.^{4-9,12} According to recent studies in different region of India on HNC patients, larynx was most common site of HNC in South India,¹⁴ (38.37%) and Bihar,⁷ oral cavity in U.P.⁵ and Ahamadnagar(41.28%)⁶ and oropharynx in Northeast⁴ and Meghalaya(24%).¹⁵ In this study oral cancer (32.8%) were found to be most common HNC and base of tongue was most common sub site followed by buccal mucosa. Carcinoma hypopharynx (<5%) was uncommon in this population.¹⁵

In India, tobacco consumption is responsible for half of all the cancers in men and a quarter of all cancers in women.¹⁶ Variations in the incidence of HNC by site is mostly related to the relative distribution of major risk factors such as tobacco or betel quid chewing, cigarette or bidi smoking, alcohol consumption and viral infections.

India has one of the highest rates of oral cancer in the world, partly attributed to high prevalence of tobacco chewing.^{2,17,18,19} The prevalence of both smoking and chewing tobacco in various forms varies significantly among different states in India. Some regional patterns have been observed for chewing tobacco. Chewing of tobacco is relatively more common in the Central, Eastern, Western (except Goa) and Northeastern states (except Meghalaya) compared to Northern and Southern states. However, in the Northern states, where chewing is relatively less common, smoking of tobacco is relatively higher (except in Punjab where tobacco prevalence is one of the lowest as majority of its population (58%) practice Sikh religion, which prohibits tobacco consumption). Tobacco consumption is highest in the least educated, poorest, and scheduled castes and scheduled tribe.²⁰ Prevalence of tobacco consumption increases up to the age

of 50 year and then there is decline in Indian population.²⁰ In this study maximum number of head and neck cancers are present in 50-60 year of age and > 60% of HNC were found in 40-60 year of age. Prevalence was equal in 41-50 year and 51-60 year age group in males.

Smoking is relatively more pronounced factor for cancer of pharynx (RR=8.5) and larynx (RR=7.5) than cancer of oral cavity (RR=4.9).²¹ In this study smoking was present in >80% cases of cancer of oropharynx, larynx and hypopharynx and only 50% cases of oral cancer. There is six fold higher risk of oral cancer among the people having habit of betel nut and tobacco (gutkha).²² In this study Tobacco chewing including betel nut was present in >60% cases of oral cancer and only 30% of pharynx and larynx cancer. This habit was found to be more common in younger age group and female patients that may be the reason for oral cancer as most common cancer in this group.

In this study out of 850, only one case of HNC with alcohol only as a risk factor was found. Although relative risk of modest amount of alcohol consumption on different site of HNC in non smoker is controversial. This study supports the result that there is little or no risk of HNC with moderate alcohol intake in ex-smokers or who never smoked.^{21,23}

High alcohol consumption has RR>5 mainly for oral cavity, oropharynx and esophagus. When tobacco smoking and alcohol consumption are combined, they may increase the risk by more than 15-fold.²⁴ This effect is possibly because; alcohol may act as a solvent and enhance the penetration of carcinogens into target tissues. Acetaldehyde, which is the alcohol metabolite, has been identified recently as a tumor promoter.²⁵⁻²⁷ In this study combined habit of tobacco chewing and alcohol consumption was most prevalent predisposing factor for oral cancer.

Comparing risk factors of cases of carcinoma oral tongue and buccal mucosa, there was significant difference (p value < .001). Tobacco chewing was equally prevalent in both (22% vs. 24%). Smoking was more prevalent in oral tongue (28% vs. 8%) but tobacco chewing and smoking or Tobacco chewing along with smoking and alcohol is more prevalent in buccal mucosa which suggests synergistic effect of tobacco and alcohol on buccal mucosa but no similar effect on oral tongue (Odd Ratio=2).

In this study, secondary neck with unknown primary constituted 5% of all HNC. Habit of smoking or smoking with alcohol was present in 60% cases. Primary can be detected in more than 50% of these patients after pan endoscopy guided biopsy and PET scan. Primary commonly lies in nasopharynx, oropharynx or, pyriform fosse. These sites have strong association with smoking which could explain habit of smoking in more than half of these patients. In carcinoma nasopharynx, habit of smoking and smoking with alcohol was present in around 70% cases shows strong association between them.

In study population HNC prevalence was very low in females and male female ratio was exceptionally high. Detailed study

on this population can find associated factor responsible for this difference which could be used for prevention of head and neck cancer in other population.

CONCLUSION

Head and neck cancers are one of the most common malignancies prevalent in India with wide variations in risk factors, sites of involvement, geographical and demographic characteristics. Heterogeneity in risk factors and differences in prevalence of HNC at different sites of head and neck region may be because of differences in surface area, micro-anatomy, tissue microenvironment and duration of exposure to carcinogens which need to be explored.

REFERENCES

1. National Cancer Registry Programme-Biennial Report (1988-89) of the National Cancer Registry Programme. New Delhi: Indian Council of Medical Research, Surya Printers, 1992;3-42.
2. Franceschi S, Bidoli P, Herrero R, Munoz N. Comparison of cancers of the oral cavity and pharynx worldwide: etiological clues. *Oral Oncol* 2000;36:106-15.
3. Elango JK, Gangadharan P, Sumithra A, Kuriakose MA. Trends of Head and Neck Cancers in Urban and Rural India. *Asian Pacific Journal Cancer* 2006;7:108-12.
4. Bhattacharjee A, Chakraborty A, Purkaystha P. Prevalence of head and neck cancers in the North East - An institutional study: *Indian Journal of Otolaryngology and Head and Neck Surgery* 2006;58.
5. Mehrotra R, Singh M, Gupta RK, Singh M, Kapoor AK. Trends of prevalence and pathological spectrum of head and neck cancers in North India: *Indian Journal of Cancer* 2005;42:2:89-93
6. Shinde KJ, Hashmi SIH. Retrospective study of Malignant Lesions of Head and Neck in Rural Area of Ahmadnagar District: *IOSR Journal of Dental and Medical Sciences (IOSR-JDMS)* 2013;4:12-9.
7. Siddiqui MS, Chandra R, Aziz A, Suman S. Epidemiology and histopathological spectrum of head and neck cancer in Bihar- A state of eastern India: *Asian Pacific Journal of Cancer prevention* 2012;13:3949-53
8. Bhatia PL, Jha BK. Pattern of head and neck cancers in Manipur: *Indian J. Cancer* 1982;19:241-8.
9. PadmbhanTK, Vasudevan DM. A statistical analysis of cancer registered at the Regional Cancer Centre, Trivandrum: *Indian Journal of Cancer* 1982;19:189-96
10. Jussawalla DJ, Sathe PV, Yeole BB, Natekar MV. Cancer incidence in Aurangabad city 1978-80: *Indian J Cancer* 1984;21:55-62.
11. Thakur S, Chaturvedi V, Singh AK, Puttewar MP, Raizada RM. Pattern of ear, Nose, pharynx, larynx and esophagus (ENPLO)cancers in rural based hospital: *Indian Journal of Otolaryngology Head Neck Surgery* 2001;53:93-9.
12. Sharma P, Saxena S, Aggarwal P. Trends in the epidemiology of oral Squamous cell carcinoma in western UP: an institutional study: *Indian J Dent Res* 2012;3: 21.
13. Nandi M, Mandal A, Asthana AK. Audit of Cancer Patients from Eastern Uttar Pradesh (UP), India: A University Hospital Based Two Year Retrospective Analysis. *Asian Pac J Cancer Prev*, 14,4993-98.
14. Reddy R, Reddy MVV, Reddy PP. Epidemiological Studies of Head and Neck Cancer in South Indian Population. *Research in Cancer and Tumor* 2013;2:38-44.
15. Shunyu NB, Syiemleeh J. Prevalence of head and neck cancer in state of Meghalaya; a hospital based study: *International journal of head and neck surgery* 2013;4,1-5.
16. WHO. Tobacco or health: a global status report. Geneva: World Health Organization, 1997.
17. Vora AR, Yeoman CM, Hayter JP. Alcohol, tobacco and paan use and understanding of oral cancer risk among Asian men in Leicester. *Br Dental J* 1997;188:441-51.
18. Moore SR, Johnson NW, Pierce AM, et al. The epidemiology of tongue cancer: a review of global incidence: *Oral Diseases* 2000;6:75-84.
19. Dikshit R, Kanhere S. Tobacco habits and risk of lung, Oropharyngeal and oral cavity cancer: a population-based case-control study in Bhopal, India: *Int J Epidemiology* 2000;29:609-14.
20. Rani M, Bonu S, Jha P, Nguyen SN, Jamjoum L. Tobacco use in India: prevalence and predictors of smoking and chewing in a national cross sectional household survey: *TobaccoControl* 2003;12:1-8.
21. Lewin F, Norell SE, Johansson H, Gustavsson P et al. Smoking Tobacco, Oral snuff and alcohol in etiology of Squamous cell carcinoma of head and neck. *Cancer* 1998;82:1367-74.
22. Jayant K, Balakrishna V, Sanghvi LD, et al. Quantification of the role of smoking and chewing tobacco in oral, pharyngeal and esophageal cancer. *Br J Cancer* 94;30:385.
23. Mia H, Paul B, Simone B, Xavier C, Chu C. Alcohol Drinking in Never Users of Tobacco, Cigarette Smoking in Never Drinkers, and the Risk of Head and Neck Cancer: Pooled Analysis in the International Head and Neck Cancer Epidemiology Consortium. *J Natl Cancer Inst* 2007;99:777-89.
24. Tuyns AJ, Esteve J, Raymond L, Berrino F, Benhamou E, Blanchet F, et al. Cancer of the larynx/hypopharynx, tobacco and alcohol: IARC international case-control study in Turin and Varese (Italy), Zaragoza and Navarra (Spain), Geneva (Switzerland) and Calvados (France). *Int J. Cancer* 1988;41:483-91.
25. International Agency for Research on Cancer (IARC). Alcohol drinking. IARC Monograph on the evaluation of carcinogenic risks of chemicals to humans. IARC: Lyon, France; 1989;1:416.
26. Blot WJ. Alcohol and cancer: *Cancer Res* 1992;52:2119s-23s.
27. Harty LC, Caporaso NE, Hayes RB, Winn DM, Bravo-Otero E, Blot WJ, et al. Alcohol dehydrogenase 3 genotype and risk of oral cavity and pharyngeal cancers: *J Natl Cancer Inst* 1997;89:1698-705.

Source of Support: Nil; **Conflict of Interest:** None

Submitted: 03-12-2015; **Published online:** 24-12-2015