Prevalence of head and neck cancers in three north coastal districts of Andhra Pradesh: A retrospective study

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Abstract

Aim: An audit of head and neck cancer cases is a need based study to find its prevalence in three north eastern districts in Andhra Pradesh.

Materials and Method: This is an institutional retrospective study analysis which was done Mahatma Gandhi Cancer Institute, Visakhapatnam, Andhra Pradesh, India from 1st January 2012 to 30th July 2018. Total cases operated at the centre were 8446 out of which 2586 cases are head and neck cancer.

Results: Prevalence of head and cancer in our 7 years study contributes around 30.61%. Highest prevalence is seen in Visakhapatnam district [39%] followed by Vizianagaram [34.1%]. Males are more affected for head and neck cancers than females contributing for around 63.15% followed by females, which is around 36.85%. Oral cavity malignancies contribute to about 60.8% out of all head and neck cancers cases followed by pharynx which is around 16.2%. The least affected is the RMT which is around 0.1%. Tongue cancers are more commonly affected which is around 25.3% followed by palate which is 17.9%. People with age >50 years are more affected for head and neck cancers contributing for around 53.5% and least is seen in people with age <20 years which is around 0.9%.

Conclusion: The retrospective study hopes to quantify and analyse the spectrum of head and neck cancers in Visakhapatnam, Vizianagaram and Srikakulam districts of Andhra Pradesh. A tremendous effort is needed to identify its prevalence and incidence, generate awareness and establish screening, prevention and intervention modalities to meet this challenging statistical analysis.

Keywords: Head and Neck cancers, oral cavity malignancies, tongue, RMT, palate.

1. Introduction

Head and neck cancers are emerging as major public health problems, which are lifestyle related, have a lengthy latent period and need dedicated infrastructure and human resource treatment. In India, 6.5% of the total population is represented by older persons above 60 years [1]. Overall 57.5% of global head and neck cancers occur in Asia, out of which around 30-35% occur in India [2]. Oral cancers contribute for around 9.4%.[3]. Need based epidemiological studies are important for understanding such threats to the nation from non communicable diseases like cancer and find its ways to defy such threats which will assume increasing importance. HNC in India has a variant demographic profile, etiological factors, food habits, personal and family history. Epidemiological studies are often necessary to find out all these parameters to implement cancer control activities [4]. The burden of cancer in India is on rise due to increase in longevity of the growing population.

Head and Neck cancers can cause varying degrees of structural deformities, and functional handicaps, depending on the site, size and patterns of spread, there by compromising well being and self esteem. The quantity of life can be further worsened by treatment of head and neck tumours which can induce additional mutilation. [5]

In South Asian countries, the risk of HN squamous cell carcinoma is aggravated by smoking of bidis [6], reverse smoking and chewing tobacco, betel quid and areca nut [7]. The prevalence of cancer is often strikingly dissimilar in different groups of population varies greatly from one community to another, and differs in different communities in the same geographic location, depending on the practices and lifestyles of the people in the location. Moreover, differences have been observed in the etiological, clinicpathological and molecular pathological profile in the tobacco smoking, chewing, and alcohol associated oral cancers, particularly in the Indian subcontinent. [8]

Over 200,000 cases of head and neck cancers occur each year in India. Nearly, 80,000 oral cancers are diagnosed every year in our country [9]. Oral cancers contribute for about 9.4% [10]. Maximum number of mouth cancers among males was seen after the age of 55 years except in Mumbai where it is common in the age group of 45 to 49 years, whereas there is much variation seen in females.[11]

Regional differences in the prevalence of risk factors are the reason behind the variability in incidence and pattern of head and neck cancer. Most of the oral lesions are detected in their advanced stages although oral cavity is accessible for visual examination. In fact, 60% to 80% of patients present with advanced disease in India, as compared to 40% in developed countries, consistent with which, the overall survival is reduced. Many independent researches had reported the wide ranged prevalence of oral cancer and its risk factors in various parts of the country, but there is scant literature concerning the demographic profile of the head and neck cancers in Andhra Pradesh. Since considerable differences exist in the consumption of tobacco, alcohol, diet, literacy, social status and availability of the services in the state of Andhra Pradesh compared to other states, [12] we attempt to define the geographic profile of the head and neck cancers cases in one hospital based cancer registry in Andhra Pradesh during the period of 2012-2018 July.

1.1 Aims and Objectives:

This research is aimed to study the distribution of various Head and Neck cancers in areas in and around the district of Visakhapatnam.

The main objective of this study is to obtain the distributions of various types of HNC's, their existing densities and most common type of HNC's seen in the area for cancer prevention. On order to enforce the cancer control programme, the statistical data should be collected. Then, cancer maps need to be created to obtain a realistic analysis about the spatial distribution of cancers. These maps help to determine the geographical distribution of people at risk environment risks pertaining to cancer and to address health issues.

2. Methods

2.1 Background

Disease centres collect information about notable diseases and maintain disease registries in database. Follow up data on 2586 HNC's cases are collected from the regional cancer care centre using a recording system with law governing privacy and confidentiality. This data includes the residential address of the cancer patients. In this way, with analytical studies the trends of HNC's can spatially be determined.

By supporting an epidemiological study, registries play an important role in determining the cancer incidence, prevalence and mortality over time in different areas and social classes. These are helpful for enforcing the cancer preventive programs. For the successful implementation of these preventive programs the data regarding the cancer prevalence, incidence and mortality is crucial.

2.2 Study area

The study area includes the three north eastern coastal districts of Andhra Pradesh in the districts of Visakhapatnam, Vizianagaram and Srikakulam. The total study area expands over 23,537sq. km with a population around 9,332,058.

Figure 1: The study area

2.3. Data collection and organisation

Health data limitation is a problem in India. The health data collection is grossly uneven with certain important parts of the country not registered by the registry data. Hence, the current cancer burden is not reflected by the data. However, the pathetic situation of health care system in major parts of the country as also emphasized by the World Bank is not suitable to provide anywhere near accurate data on cancer burden. Hence, a pilot study is useful to collect the data and converting it into analog format.

The data is collected in an excel sheet and should include the patient's age, Gender, location, diagnosis, the type of cancer and mobile number (optional).

2.4 Statistical analysis

Prevalence is defined as the number of cases of a disease at a specific time within a community or population. A cancer prevalence rate is the number of persons who manifest the cancer at the given time in a defined population. The prevalence rate for each administrative unit is calculated with the following formula:

Prevalence rate

= (total cancer cases/total population)x1000

According to WHO the number of cancer cases is estimated to be between a minimum of 150 and a maximum of 300 for 1,00,000 population. Hence if the rate is around 300 then it indicates a very high cancer density level.

In India, every year 15 million new cancer cases are diagnosed. When the cancer incidences is calculated, it is about 113.6 for 1,00,000 population and estimated to increase to 190-270 by 2025 if appropriate measures are not taken.

3. Result

A total of 2,586 cases of Head and Neck cancers were reported during the study period. The number cases recorded in males are more when compared to female subjects. Among male and females the highest incidence of HNC's was seen within the age group of greater than 50, followed by the age group 21-50. Carcinoma of tongue is the commonest cancer reported (25.3%). Followed by pharyngeal cancer (17.9%), closely followed by pharyngeal cancer (16.2%).

Incidence of head and neck cancer cases in our 7 years study to around 30.61% out of total body malignances, such high prevalence is indicative of low economic status, tobacco chewing and smoking mostly reverse smoking.

In Table 1 show that a total of 2,586 cases out of 8446 are HNC's. It is shows that high numbers of HNC's cases are registered in Visakhapatnam (1008 cases out of 2,586 cases). Followed by Vizianagaram (881 cases out of 2,586 cases).

Table 1: The study area cases

Type of Cancer	Districts						Total	
	Srikakulam		Visakhapatnam		Vizianagaram			
	Count	%	Count	%	Count	%	Count	%
palate	0	0.0%	0	0.0%	4	0.4%	4	0.2%
palate	90	13%	195	19.3%	179	20.3%	464	17.9%
pharyngeal	110	15.8%	164	16.3%	144	16.3%	418	16.2%
oesopharyngeal	85	12.2%	134	13.3%	88	10%	307	11.9%
nasal	4	0.6%	10	1%	5	0.6%	19	0.7%
eye	0	0.0%	1	0.1%	3	0.3%	4	0.2%
epiglottis	16	2.3%	28	2.8%	24	2.7%	68	2.6%
neck	5	0.7%	12	1.2%	12	1.3%	29	1.1%
tongue	202	29%	236	23.4%	217	24.6%	655	25.3%
Buccal mucosa	82	11.8%	84	8.3%	87	9.9%	253	9.8%
Vocal cord	19	2.7%	28	2.8%	21	2.4%	68	2.6%
Parotid gland	10	1.4%	17	1.7%	17	2%	44	1.7%
ear	3	0.4%	5	0.5%	6	0.7%	14	0.5%
larynx	25	3.6%	32	3.1%	23	2.6%	80	3.1%
tonsil	11	1.6%	30	3%	17	2%	58	2.2%
maxilla	5	0.7%	6	0.6%	8	1%	19	0.7%
mandible	20	2.9%	13	1.3%	18	2%	51	2%
Retromolar trigone	1	0.1%	2	0.2%	1	0.1%	4	0.2%
SCC	8	1.1%	7	0.7%	6	0.7%	21	0.8%
Submandibular region	1	0.1%	4	0.4%	1	0.1%	6	0.2%
Total	697	100.0%	1008	100.0%	881	100.0%	2586	100.0%

The results have shown that the occurrence of HNC's is more in age group of >50 category (53.5%). The least is seen in the age group <20 category (0.9%). (Table 2)

Table 2: Shows that cancer occurrence is different among different age groups.

Type of Cancer	Age						Total	
	< 20		21 - 50		> 50			
	Count	%	Count	%	Count	%	Count	%
palate	0	0.0%	3	0.3%	1	0.1%	4	0.2%
Palate	0	0.0%	135	11.4%	329	23.8%	464	17.9%
pharyngeal	15	65.2%	149	12.6%	254	18.4%	418	16.2%
oesopharyngeal	2	8.7%	156	13.2%	149	10.8%	307	11.9%
nasal	0	0.0%	8	0.7%	11	0.8%	19	0.7%
eye	0	0.0%	3	0.3%	1	0.1%	4	0.2%
epiglottis	1	4.3%	20	1.7%	47	3.4%	68	2.6%
neck	0	0.0%	6	0.5%	23	1.7%	29	1.1%
tongue	2	8.7%	404	34.2%	249	18.0%	655	25.3%
Buccal mucosa	0	0.0%	176	14.9%	77	5.6%	253	9.8%
Vocal cord	0	0.0%	16	1.4%	52	3.8%	68	2.6%
Parotid gland	1	4.3%	21	1.8%	22	1.6%	44	1.7%
ear	1	4.3%	4	0.3%	9	0.7%	14	0.5%
larynx	1	4.3%	18	1.5%	61	4.4%	80	3.1%
tonsil	0	0.0%	15	1.3%	43	3.1%	58	2.2%
maxilla	0	0.0%	13	1.1%	6	0.4%	19	0.7%
mandible	0	0.0%	22	1.9%	29	2.1%	51	2.0%
Retromolar trigone	0	0.0%	1	0.1%	3	0.2%	4	0.2%
SCC	0	0.0%	9	0.8%	12	0.9%	21	0.8%
Submandibular region	0	0.0%	1	0.1%	5	0.4%	6	0.2%
Total	23	100.0%	1180	100.0%	1383	100.0%	2586	100.0%

It shows that the occurrence of head and neck cancer is different in males and females. The occurrence of cancer in more in males (63.15%) than females (36.85%). This difference is due to change in life style and habits.

Table 3: Shows that cancer occurrence depends on gender

Type of Cancer	Gender				Total	
	Female		Male			
	Count	%	Count	%	Count	%
palate	2	0.2%	2	0.1%	4	0.2%
palate	329	34.5%	135	8.3%	464	17.9%
pharyngeal	120	12.6%	298	18.2%	418	16.2%
oesopharyngeal	161	16.9%	146	8.9%	307	11.9%
nasal	5	0.5%	14	0.9%	19	0.7%
eye	2	0.2%	2	0.1%	4	0.2%
epiglottis	23	2.4%	45	2.8%	68	2.6%
neck	10	1.0%	19	1.2%	29	1.1%
tongue	145	15.2%	510	31.2%	655	25.3%
Buccal mucosa	56	5.9%	197	12.1%	253	9.8%
Vocal cord	9	0.9%	59	3.6%	68	2.6%
Parotid gland	20	2.1%	24	1.5%	44	1.7%
ear	11	1.2%	3	0.2%	14	0.5%
larynx	8	0.8%	72	4.4%	80	3.1%
tonsil	11	1.2%	47	2.9%	58	2.2%
maxilla	9	0.9%	10	0.6%	19	0.7%
mandible	17	1.8%	34	2.1%	51	2.0%
Retromolar trigone	3	0.3%	1	0.1%	4	0.2%
SCC	8	0.8%	13	0.8%	21	0.8%
Submandibular region	4	0.4%	2	0.1%	6	0.2%
Total	953	100.0%	1633	100.0%	2586	100.0%

Incidence of five years and six months contributed to around 30.6% out of all total body malignances. Such high prevalence is indicative of low socio-economic status and Gutka, betel leaves chewers, smoking and drinking habits in northeastern districts of Andhra pradesh. (Table 4)

Table 4: shows the total number of cases reported in each year from 2012 to 2018 June

Year	Total number of cases
2012	375
2013	411
2014	423
2015	367
2016	399
2017	366
2018 till June	245
Total	2586

Even though the results about HNC's point that male are more prone to Head and neck cancer, this scenario is contralateral in case of total body malignancies. Table 5 shows that the occurrence of total body malignancies is more in case of female (68.59%) almost twice, whereas in case of males it is almost (31.41%).

Table 5: Occurrence of total body malignancies

Gender	Frequency	Percent
Female	5793	68.59
Male	2653	31.41
Total	8446	100.00

Table 6 shows that Even though HNC's mostly occur in age group >50, this scenario is also changed in case of total body malignancies. The prevalence is more prone in age group between 21 to 50(52.26%).

Table 6: Frequency of HNC's

Age	Frequency	Percent
< 20	119	1.41
21 - 50	4416	52.29
> 50	3911	46.31
Total	8446	100.00

4. Discussion

Most of Head and neck cases and death are due to both individual predispositions linked to certain genetic characteristics, and exposure to carcinogens caused by lifestyle bahaviour. Smoking is generally considered as one of the carcinogenic lifestyle bahaviour. Studies show around 57% of all men and 11% of women in India between 15 to 50 years use some form of tobacco [13]. Results from world health survey and global health youth tobacco survey also reveals that 10 to 20% of students in 8th and 10th grades currently use tobacco in some form[14].

The strong association of pharyngeal and oral cancer with smoking is well organized and the prevalence of reverse smoking in and around the areas of Visakhapatnam explains the high prevalence of head and neck cancer.

Our statistical analysis concludes that the occurrence of head and neck cancer is more in Visakhapatnam district, followed by Vizianagaram. Our epidemiological studies show that the oral cavity is affected with 60.8% cases of all HNC'S cases followed by pharynx with 16.2% cases. Studies also reveal the incidence of developing cancer is 5 to 9 times more in smokers than non smokers [15]. Carcinogenic tobacco is the major factor in HNC's. Most of females are exposed to them in India. Regular alcohol consumption is associated with 2 to 3 fold higher risk in drinkers than among non drinkers [16]. Overall 7 to 19 % oral cancers are attributed to regular alcohol drinking.

Combination of alcohol and smoking increases the risk of cancer by 11 fold [17]. This can also be combined with bidi or cigarette smoking. Human papilloma virus {HPV} is other viral cause for causing various cancers of body like HNC's, genital cancers and skin cancers [18-20]. In the district of Srikakulam the habit of reverse smoking is widespread. In the survey conducted in 1970 43.8% are reverse smoker, the female and male ratio 1.7:1. Ten previously undiagnosed cases of oral cancers,9 located on palate, were found[21].

Our statistical analysis conclude that the dominant area which was involved in HNC's was the oral cavity which was 60.8%.out of all those oral cavity cancers, tongue is mostly affected with an incidence of 25.3% followed by palate 17.9%

The increasing number of HNC's is the major cause for their mortality and morbidity and change in the quality of life of the patient [22-25].over and above all the predisposing factors, lack of awareness about HNC's and ineffectively running preventive programmes have made the scenario worse, though the mortality of the HNC's is less it is still a major problem in India.

5. Conclusion

This retrospective study hopes to quantify and analyse the spectrum of head and neck cancers in Visakhapatnam, Vizianagaram and Srikakulam districts of Andhra Pradesh. a tremendous effort is needed to identify its prevalence and incidence throughout the country, generate awareness and establish screening, prevention and intervention modalities to meet this challenging statistical analysis.

Conflict of interests

There is no conflict of interests between authors

References

[1]. Shah B, Kumar N, Menon GR, *et al*. Assessment of burden of non-communicable disease: A project supported by WHO. Indian Council Of Medical Research, Delhi, 2006.

[2]. Kulkarini, Manik Rao. Head and Neck cancer burden in India. *Int J Head and Neck Surg* 2013; 4(1): 29-35.

[3]. Mishra, Anupam, and Rohit Meherotra. Head and Neck Cancer: Global Burden and Regional Trends in India. *Asian Pacific Journal of Cancer Prevention* 2014; 15(2): 537-550.

[4]. Moore, Malcolm A., *et al*. "Cancer epidemiology in South Asia-past,present and future." *Asian Pac J Cancer Prev* 2010; 11 suppl 2: 46-66.

[5]. Chaukar DA, Das AK, Deshpande MS, Pai PS , *et al*. Quality of life of head and neck cancer patient: Validation of the European organization for research and treatment of cancer QLQ-Hand N35 in Indian patients. *Indian J Cancer* 2005 Oct-Dec; 42(4):178-84.

[6]. Sapkota A, Gajalakshmi V, Jetly DH, Roychowdhary S, Dikshit RP, Brennan P *et al*. Smokeless tobacco and increased risk of hypopharyngeal and laryngeal cancers: A multicentric case-control study from India. *Int J Cancer* 2007; 121: 1793-1798.

[7]. IARC working group on the evaluation of carcinogenic risks to humans. Betel quid and areca-nut chewing and some areca-nut derived nitrosamines. *IARC Monogr Eval Carcino G Risks Hum* 2004; 85: 1-334.

[8]. L.Addala, C Kalvana Pentapati, PK Reddy Thavanti, V Anianevula, MD Sadhnani, Risk factor profiles of head and neck cancer patients of Andhra pradesh, India. *Indian Journal of Cancer* 2012; 49(2) :215-219.

[9]. Akheel Mohammad, Anuj Bhargava, Ashmi Wadhwania: Incidence of head and neck cancers in western India: A cancer centre based retrospective analysis. IOSR J of *Dental and Medical Sciences* 2018; 17 (2): 30-34.

[10]. Mishra, Anupam and Rohit Meherotra. Head and Neck Cancer: Global burden and regional trends in India". *Asian Pacific Journal of Cancer Prevention* 2014; 15(2): 537-550.

[11]. National Cancer Registry Programme (ICMR) (2009). Consolidated report of HBCR: 2004-2006. Banglore, India.

[12]. Addala L. Pentapati Kalvana C, PK Reddy Thavanthi. V Anianevulu. MD Sahnani, Risk factor profiles of head and neck cancer patients of Andhra Pradesh, India. *Indian Journal of Cancer* 2012; 49 (2): 215-219.

[13]. Goldenberg, David, *et al*. Spectrum of head and neck cancer in children. *Journal of Indian Association of Pediatric Surgeons* 2009; 14(4): 200.

[14]. Sengupta Subhabrata, *et al*. Spectrum of head and neck cancer in children. *Journal of Indian Association of Prevalence*. *Cancer* 2007; 110(7): 1429-1435.

[15]. Sturgis, Erich M., and Paul M. Cinciripini. Trends in head and neck cancer incidences in relation to smoking prevalence. *Cancer* 2007; 110(7):1429-1435.

[16]. Browman, George P., *et al*. Influence of cigarette smoking on the efficacy of radiation therapy in head and neck cancer. *New England Journal of Medicine* 1993; 328(3): 159-163.

[17]. Kissin, Benjamin, *et al*. Head and Neck cancer in Alcholics The relationship to Drinking, Smoking, and Dietary patterns. *JAMA* 1973; 224(8): 1174-1175.

[18]. Dufour X., *et al*. HPV and head and neck cancer. *European annals of otorhinolaryngology, head and neck disease* 2012; 0129(1): 26-31.

[19]. Marur, Shanthi, *et al*."HPV and head and neck Cancer: a virus related cancer epidemic." *The Lancet oncology* 2010; 11980: 781-789.

[20]. Syrjanen, Stina. Human papillomavirus (HPV) in head and neck cancer. *Journal of clinical virology* 2000; 32: 59-66.

[21]. Pindborg J. J., Mehta F. S, Gupta P.C, Daftary D.K and Smith C.J: Reverse smoking in Andhra Pradesh India: A study of palatal lesions among 10,169 villagers. *British Journal of Cancer* 25; (1) 10-20.

[22]. Weymuller, Ernest A., *et al*."Quality of life in head and neck cancer. *The laryngoscope* 2000; 110(S94): 4-7.

[23]. Hassan, Sammy J., and Ernest A. Weymuller. "Assessment of quality of life in head and neck cancer patients. *Head and Neck* 1993; 15(6): 485-496.

[24]. Hammerlid, Eva, *et al*. Malnutrition and food intake in relation to quality of life in head and neck cancer patients. *Head and neck Neck* 20(60, 1998, 540-548.

[25]. Hammerlid, Eva, *et al*. Health related quality of life three years after diagnosis of head and neck cancer-A longitudinal study. *Head and Neck* 23(2); 2001, 113-125.