

## RESEARCH ARTICLE

# Stage-Wise Presentation of Non-Metastatic Head and Neck Cancer: an Analysis of Patients from the Kumaon Hills of India

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### Abstract

**Background:** Head and neck cancer without distant metastases is amenable to various modalities of treatment. However, the stage at presentation is a very important determinant for treatment success. The present study was conducted to determine the stage-wise presentation of non-metastatic head and neck cancer patients from the hilly regions in Kumaon division of Uttarakhand, India. **Materials and Methods:** The hospital records for non-metastatic head and neck cancer patients from the only functional cancer centre of the region for the period of two-years (January 2012- December 2013) were included. Nasopharyngeal carcinoma was excluded due to its staging system being different. Non-squamous histopathologies were also excluded. Patients hailing from nearby regions of Uttar Pradesh and Nepal were excluded, as were patients from non-hilly regions of Kumaon. **Results:** Of the 271 patients of head and neck cancer, 27 with distant metastases at diagnosis were excluded from the analysis. Of the 244 eligible patient records, 90.1% (n=222) were male, and 9.9% (n=22) were female. The proportions of patients with carcinoma of the larynx, oropharynx, oral cavity, hypopharynx and maxillary antrum were 31.9% (n=78), 27.9% (n=68), 20.5% (n=50), 12.7% (n=31) and 1.2% (n=3). A further 5.7% (n=14) were diagnosed as having secondary involvement of neck nodes with unknown primaries. The proportion of patients presenting in stages I, II, III, IVA and IVB were 0.8% (n=2), 2.5% (n=6), 9.4% (n=23), 51.6% (n=126) and 35.7% (n=87) respectively. **Conclusions:** An abysmally low proportion (3.3%) of non-metastatic head and neck cancer patients presented in the early stages (I and II). A vast majority of the patients (88.1%) presented with stages IVA and IVB. Not only does this reflect a poor therapeutic outlook, but also exposes the dire need for programmes focusing on cancer awareness and early detection in the region.

**Keywords:** Head and neck cancer - Kumaon - cancer in the Himalayas - Uttarakhand

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### Introduction

Squamous cell carcinomas of the head and neck (SCCHN) can arise from the mucosa of various sites, with a vast majority of the cases being related to alcohol and tobacco use. The less frequent etiologies include carcinogenesis due to human papilloma virus, or owing to chronic irritation as for example with a sharp tooth upon the buccal mucosa. While a large proportion of SCCHN is amenable for prevention in the theoretical sense, it practically requires a great deal of efforts in terms of curbing tobacco and alcohol use in the society. Given the remote likelihood in the possibility of completely eliminating tobacco and alcohol use in the society, the importance of early detection (secondary prevention) for SCCHN remains undiminished.

The prospects of benefit from treatment for SCCHN is highly dependent upon the stage of the disease at presentation. Increasing stage at diagnosis protends a

lesser likelihood of cure, and very advanced stages are amenable only for palliative treatments. Despite published literature portraying a fairly good overall success rate for head and neck cancer, the general prospects for survival in the developing world is rather low. Not only can this be attributed to limitations in therapeutic infrastructure, but also due to other factors- such as advanced stage at diagnosis, poor nutritional status, high prevalence of infectious co-morbidities and the such.

The Kumaon region is one of the two administrative divisions within the Himalayan state of Uttarakhand in India. The region is unique in that the people are adapted to life in the hills, which are markedly different in terms of climate, heritage and means of livelihood. The region is home to approximately 4.2 million people (of whom 2.58 million live in the hills) as per the 2011 census of India (Census India, 2011). The lack of a well established public health referral system, along with the lack of a cancer registry in the region makes the actual cancer incidence

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figures unknown.

The Swami Rama Cancer Hospital & Research Institute is the only cancer centre which caters to the patients of the region. Despite being adequately equipped with modern therapeutic equipment, a general dissatisfaction has been prevailing since a majority of patients have been presenting with advanced stages, which often diminishes the prospects of successful treatment.

Head and neck cancer happens to be the commonest malignancy presenting in the centre. We thus sought to perform an analysis with regards to the stage-wise presentation of head and neck cancer in region, with an intention to use the data for shaping future public health efforts towards early detection.

### Materials and Methods

The study was conducted at the Swami Rama Cancer Hospital and Research Institute, which happens to be the only cancer hospital in the Kumaon region. Since this study was designed to include only the patients from Kumaon hills, patients from the non-hilly areas of Kumaon (such as the district of Udham Singh Nagar), as well as patients from adjoining regions such as the Gharwal region, Uttar Pradesh and Nepal were excluded.

The hospital records were searched for patients with non-metastatic head and neck cancer registered in the centre for a period of two-years (from January 2012 to December 2013). Patient records with histopathologically proven squamous cell carcinoma of the head and neck region were included for analysis. Non-squamous histologies such as adenocarcinoma, adenoid-cystic carcinoma and melanoma were excluded. Nasopharyngeal carcinoma was excluded due to its staging system being different from the rest of SCCHN as per the AJCC-TNM staging system (Edge et al., 2010).

Data entry and analysis were performed with LibreOffice 4.0 and Gnumeric 1.1, respectively.

### Results

Of the total of 271 patient records registered with head and neck cancer for the span of January 2012 to December 2013, twenty-three were excluded due to presence of distant metastases at presentation. The eligible 244 patient records with non-metastatic SCCHN included 222 male and 22 female patients. The median age of presentation was 57 years, with the range being from 21 years to 92 years.

Carcinoma of the larynx was the commonest, whereas carcinoma of the maxillary antrum was the least frequent diagnosis. The percentages of patients with carcinoma of the larynx, oropharynx, oral cavity, hypopharynx and maxillary antrum were 31.9% (n=78), 27.9% (n=68), 20.5% (n=50), 12.7% (n=31) and 1.2% (n=3). A further 5.7% (n=14) were with the diagnosis of 'secondary in neck node with unknown primary tumour' (table-1).

With regards to the stage of presentation (as per the AJCC-TNM 2010 staging system), the overall percentage of non-metastatic head & neck cancer patients presenting with stages I, II, III, IVA & IVB were 0.8% (n=2), 2.5%

**Table 1. Site wise Distribution of Non-Metastatic Head and Neck Cancers in the Kumaon Hills**

SITE	Number (Percentage)	
Ca Oropharynx	68	(27.9%)
Ca Larynx	78	(31.9%)
Ca Oral Cavity	50	(20.5%)
Ca Hypopharynx	31	(12.7%)
Ca Maxillary Antrum	3	(1.2%)
Secondary neck with unknown primary	14	(5.7%)

**Table 2. Site-Specific Stage-Wise Distribution Non-Metastatic Head and Neck Cancers in the Kumaon Hills**

	I	II	III	IVA	IVB
Larynx(n=78)	2.60%	2.60%	15.40%	56.40%	23.10%
Oropharynx (n=68)	0%	1.50%	11.80%	39.70%	47.10%
Oral Cavity (n=50)	0%	6%	6%	44%	44%
Hypopharynx (n=31)	0%	0%	0%	74.20%	25.80%
Maxillary Antrum (n=3)	0%	0%	0%	66.70%	33.30%
2neck upt (n=14)	-	-	0%	57.10%	42.90%
TOTAL (n=244)	0%	0%	0%	51.60%	35.70%

(n=6), 9.4% (n=23), 51.6% (n=126) and 35.7% (n=87), respectively. The site-specific stage-wise presentation has been enumerated in table-2.

The percentage of non-metastatic head and neck cancer patients presenting with early stages (I & II) was merely 3.3% (n=8). The two patients with stage-I were both patients with carcinoma of the glottis. Of the six patients with stage-II, three patients were with carcinoma of the oral cavity, two patients with carcinoma of the larynx, and one patient with carcinoma of the oropharynx.

An astoundingly high proportion of patients (96.7%, n=236) presented with stages III-IVA/B. It was further observed that a very large number of patients presented with extremely advanced local tumor or nodal stages. Among the 87 patients with stage-IVB disease, 37 patients had primary tumour status of T4b and 56 patients were with N3 nodal status. Six patients were with both T4b and N3 status.

The study population also included 14 patients who had been assigned the diagnosis of 'secondary in neck node with unknown primary tumor' (SNUPT). These patients were staged as per protocol, with the assignment of stages III, IVA and IVB for N1, N2 and N3 nodal status. Of the 14 patients with SNUPT, eight patients had been staged IVA (N2) and six patients had been staged IVB (N3).

### Discussion

The mountainous state of Uttarakhand in India comprises of two regions, namely Kumaon and Gharwal. The Kumaon region includes six districts, namely Pithoragarh, Bageshwar, Almora, Champawat, Nainital and Udham Singh Nagar. With the exception of Udham Singh Nagar, the remaining districts are hilly by terrain. While the districts of Nainital and Champawat mainly comprise of low elevation sub-Himalayan range (Sivalik hills), the districts further to the north, namely Almora, Bageswar and Pithoragarh are featured by the presence

of the lesser Himalayas (the Mahabharat range) as well as the Great Himalayan range (Negi, 1991).

As per the 2011 census of India, the population of the Kumaon region was 4,228,998. This however includes the population of the non-hilly district of Kumaon, namely the district of Udham Singh Nagar (1,648,902). Thus, if the district of Udham Singh Nagar is excluded, we arrive at the population of the Kumaon Hills to be 2,580,096. The population density of the Kumaon hills is rather sparse, ranging from 68 persons per square kilometer at Pithoragarh, to 225 persons per square kilometer at Nainital. This is much lesser in comparison to the national average of India, at 364 persons per square kilometer. The literacy rates are also comparable to the rest of India, with literacy rates for the districts of Nainital, Almora, Pithoragarh, Bageswar and Champawat were 83.9%, 80.5%, 82.3%, 75.8% and 79.8%, respectively (Census India, 2011).

The people of the Kumaon region are adapted to life in the hills. Majority of the people are descendants of warrior clans, or traditional scholars. Though subsistence farming and forestry still is the main way of life, there has been a recent emergence of small industries. There is a small but growing presence of tourism as an industry in the region (Negi, 1995; Saklani, 1998).

To cater to the requirements of cancer patients of the Kumaon region, the Swami Rama Cancer Hospital & Research Institute was established as a government run institution, and the centre initiated treatment of patients from January 2010. We included patients treated in the centre from January 2012 onwards since the patient records from 2012 onwards have been digitized and made easily accessible for analysis by the use of open-source spread-sheet software.

Head and neck cancer is the most common malignancy registered in the institute, with 45.1% of all cancer patients registered in the centre being SCCHN. Due to the lack of a cancer registry, the exact incidence in the region cannot be estimated, and it is likely that the presenting patient population could likely be representing only the tip of the iceberg (Gress, 2002; Chaudhry et al, 2008; Lasrado et al, 2012). The region is infamous for its high alcohol and tobacco consumption. In fact, about a third of the male population of the region are addicted to alcohol (Bag et al., 2012). While smoking is ubiquitous, so is the habit of 'ghutka' chewing. Ghutka is a form of orally chewed tobacco which may contain additional flavouring and additives.

The presentation of SCCHN at late stages is a direct effect of neglect of symptoms occurring at the early stages. Many patients disregard a neck node until the day it grows big enough to cause pain. Most patients do not regard hoarseness of voice, or a non-healing sore in the mouth as symptoms serious enough to warrant clinical attention. The rugged mental character of the hill people could also be another factor, given that them being accustomed to the routine difficulties of life in the hills could be disregarding the symptoms of diseases. There have been instances of patients with extremely advanced cancers who do not seek clinical attention despite facial disfigurement, and only present for treatment when the onset of pain makes

their condition intolerable.

The people of the region often fall prey to quacks and non-licensed practitioners. There are a large number of faith healers, and patients often prefer them over licensed modern clinicians. Despite the provision of free primary health care facilities, it is due to an unshakable belief and faith in traditional medicine that patients often fail to present in the crucial early stages. After progression to advanced incurable stages, the patients are as a rule abandoned by the 'traditional healers'.

There has been a clear failure not just in terms of cancer prevention, but also in terms of early detection. Given that the prospects of cure dramatically decreases with increasing stage among patients with head and neck cancer, detection in the early stages is to be provided high importance. There is need for a multi-pronged approach to improve the same.

Improved outcomes from treatment as described in the literature from western countries not only are because of improved therapeutic infrastructure, but also due to the fact that patients in the developed countries present at earlier, easily treatable stages. As per the American literature, the published proportions of SCCHN patients with localized and regional disease were 31% and 47%, respectively (Siegel et al., 2014). In the developed countries, the changing patterns over time with the use of tobacco and alcohol, along with altering lifestyles and urbanization have been causing changes in the patterns of SCCHN such as with the age of onset, subsite predilection and the such (Elango et al., 2006).

While 40% of patients in developed countries present in advanced stages, 60-80% of patients present with advanced disease in India (Kulkarni, 2013; Mishra and Meherotra, 2014).

Though regional variations exist within the developing world, the overall trend is dismal, with a high proportion of patients presenting in advanced stages (Siddiqui et al, 2012; Goyal et al, 2014). A surprisingly small number of studies have measured the stage-wise presentation of SCCHN in the developing world. In a study from the state of Andhra Pradesh in India, it was noted that the stage wise presentation of head and neck cancer was 23.7%, 27.1%, 33.3 and 15.9% for stages I, II, III & IV respectively (Addala et al., 2012)

In a study from the All India Institute of Medical Sciences, the apex health care institute of India, it was observed that only 8.9% of patients were diagnosed in stages I & II. While 20.6% of patients were in stage-III, 60.3% of patients were diagnosed in stage-IV. A further 10.2% of patients were un-staged (Mohanti et al., 2007). In a study from Karachi, Pakistan from the period of 1995-2002, it was observed that about two-thirds of SCCHN patients were diagnosed with stages III or IV (Bhurgri et al., 2006).

While in general, a high proportion of SCCHN patients present with advanced stages in the developing world, the results from the Kumaon region paints a far greater dismal picture. Despite the region being equipped with two modern linear accelerators, brachytherapy, chemotherapeutic and surgical facilities, the overall outcome of treatment remains compromised, mainly

attributable to the presentation of patients in predominantly advanced stages.

While preventive measures will focus upon eliminating the risk factors for carcinogenesis, the likelihood of complete success of such measures in inducing behavioural changes within the target population will be unlikely. There will remain a significant proportion of people who will remain uninfluenced by the preventive campaigns. Thus, the focus should not only be upon prevention, but also equally importantly upon early detection efforts. If successful, efforts at early detection will lead to the presentation of patients in early stages, which will enhance the probability of successful treatment.

There is a need for sensitizing the population of these hills to the importance of seeking care under modern medicine, which is based upon the principles of evidence based practise. There is a need for community level and mass media campaigns to warn the patients of the dangers with unlicensed medical practitioners and traditional faith healers. Additionally, strict judicial action must be guaranteed upon non-licensed practitioners. Despite the government running a fairly well established network of primary health centres, community health centres and district hospitals, the proportion of patients presenting to us after being referred by these facilities is very low. Among the 244 patients in this study, while 47.9% (n=117) of the patients had presented to this hospital on their own, 29.9% (n=73) of patients were referred by private licensed practitioners. Only 22.2% (n=54) of these patients had presented after being diagnosed and referred from government run health-care network of primary health centres, community health centres and district hospitals. This not only depicts a general unpopularity of legitimate health care centres in the society, but also the population's preference for unscientific practitioners.

There is also a need for sensitization of the existing health-care personnel towards the importance of early detection of malignancies. Since a majority of existing facilities are overwhelmed with common diseases in the region such as tuberculosis, there is a likelihood that there may be an unintentional shift of due emphasis away from cancer detection and referral. Thus, frequent cancer detection camps must be made a part of the calendar in the region. Also, continuing medical education programmes are planned to be held so as to keep the regional doctors refreshed with the latest knowledge on cancer detection and epidemiology.

Lastly, the regional peculiarities with regards to climate and geography are worthy of mention. The communities in the hills are known to be rather small and isolated from each other, with vast areas of forested interspaces. Though majority of the villages are connected by roads, a considerable number of communities have to walk significant distances in order to reach the nearest road. The hills are subject to intense rains during the monsoons, which very commonly induces hardships with road travel due to landslides and road blockades. During the winters, the extreme cold makes normal life difficult, and many areas are cut off from the rest of the world due to heavy snow-fall. It is of no surprise that many patients of the region do state these reasons for being unable to

present with cancer in the early stages. Thus, regional transport related infrastructure development is important not only for the overall development of the region, but also in relation to the health of the people.

In the light of the observations made in this study, this institute which has to date been dedicated mainly towards cancer treatment, has also decided to be actively involved in cancer prevention and early detection activities. Cancer related educational programmes for doctors of the region are proposed to be initiated. Primary health care personnel are to be trained with cancer detection techniques, such as with fine needle aspiration cytology, endoscopy and biopsy. It is hoped that community education programmes for cancer prevention, and cancer detection camps for early detection will be made an integral part of the academic calendar.

In conclusion, the stage-wise presentation of head and neck cancer patients from the Kumaon hills paints a dismal picture where in the presentation of patients is predominantly in very advanced stages. The described situation is a clear example that the war on cancer can not be won merely by the setting up of hospitals with modern equipment. Public health measures such as the promotion of cancer awareness and early detection is of vital importance, lest the presentation of malignancies occur in advanced, often incurable stages..

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