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An Institutional Study of Nasopharyngeal Carcinoma and its Clinico-Pathological Presentations among the Populations of Hills and Valleys.

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ABSTRACT

Background: Nasopharyngeal Carcinoma (NPC) is the most frequently encountered malignancy amongst the neoplasms of nasopharynx. In India, NPC is uncommon in most regions, but high prevalence is observed in North-eastern part of the country. The National Cancer Registry has reported the prevalence of NPC to be 1.82% among all cancers in this region, constituting the eighth most common cancer in the North-eastern states. **Methods:** Newly diagnosed cases of NPC were studied for a period of 3 years in an institute in Manipur. The origin of the patient (hill or valley) were identified, dietary addiction, clinical presentations, histopathological types and stage at presentation were studied and analysed in the two regions. **Results:** The study consisted 121 cases of diagnosed NPC, consisting of higher numbers of males then females, making a ratio of 1.95:1. Mean age of the patients was 46±12.34. 74.4% originated from hills and 25.6% from valleys. Consumption of smoked meat comprised 77.7% and was seen more in hilly areas with strong statistical significance. Addiction to smoking, alcohol and smokeless tobacco was seen more among valley patients. Swelling neck was the commonest clinical presentation (93.4%), followed by nasal symptoms (63.6%), auricular features (34.7%), cranio-facial pain (34.7%) and neurological symptoms (12.4%), with greater percentage among hilly populations. Undifferentiated carcinoma was the commonest histological type (73.6%), followed by Non-keratinizing carcinoma (20.7%) and keratinizing squamous cell carcinoma (5.8%). Commonest stage at presentation was stage 4 (38.8%). **Conclusion:** There is a marked significant difference in the incidence of NPC among the different populations of hills and the valleys. A detailed study of genetic and immuno-histochemical analysis of NPC between the two groups of origin in this part of the country is a necessity.

Keywords: Clinico-pathological presentation, Incidence, Nasopharyngeal carcinoma.

INTRODUCTION

Nasopharyngeal Carcinoma (NPC) is the most frequently encountered malignancy amongst the neoplasms of nasopharynx. Though a rare cancer throughout the world but a leading form of cancer in Southeast Asia including the Southern China and Hong Kong, the Arctic, North Africa and the Middle East.[1] In India, NPC is uncommon in most regions, but high prevalence is observed in North-eastern part of the country. The population here is thought to comprise of migrating people from East and Southeast Asia, who are presumed to have brought with them the risk for NPC to this region.

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The National Cancer Registry has reported the prevalence of NPC to be 1.82% among all cancers in this region, constituting the eighth most common cancer in the North-eastern states.[2] According to ICMR Bulletin September 2003, based on studies on NPC cases registered in most of the cancer diagnosis and treatment centres in Northeast region of India during 1988-89, the Mongoloid populations, particularly the Nagas are having intermediate risk for nasopharyngeal carcinoma as the incidence is about 4.3/100,000 people/year.

However, no specific bimodal age peaks were observed in a study from Northeast region of India.[3] It is more common in males with the age-standardised male-female ratio of 2-3:1. NPC is a unique model of human malignancy with a multi-step carcinogenic process involving a virus (Epstein Barr virus), environmental carcinogens, and an NPC susceptibility gene.[1] Various environmental agents/ factors implicated in the etiology of NPC include cigarette smoking, Chinese herbal medicines, salted

fish, preserved vegetables, fermented food stuffs, nitrosamines and nitro-precursors, household smoke and fumes, industrial fumes and chemicals, nutritional deficiencies, weaning habits and metals. The nasopharynx is a clinical blind spot in the middle of the skull base. Being situated in a relatively big and inert space where only air and mucus are in transit, NPC can remain silent for a long time causing few primary symptoms.[4] Majority of the patients of NPC present at the advanced stage with metastasis to cervical lymph node. The most common histological subtype is WHO type III, undifferentiated carcinoma.

MATERIALS AND METHODS

After obtaining the permission of the Institute ethics committee, Regional Institute of Medical Sciences, the study was conducted among histologically confirmed newly diagnosed cases of NPC during the period of September 2011 to August 2014 in the department of Otorhinolaryngology in collaboration with the department of Radiotherapy, Regional Institute of Medical Sciences, Imphal, Manipur. The residing area (Hills or Valley) and religion (Hindu, Christian or Muslims) of the patients were identified. Dietary addiction of the patients mainly Smoking, alcohol consumption, excessive intake of smoked or salted meat, addiction to tobacco and betel nuts were noted. Clinical presentations – cervical secondary nodes, nasal symptoms (nasal blockade, epistaxis, nasal discharge, anosmia), audiological symptoms (hearing impairment, tinnitus, earache), cranio-facial pain, neurological symptoms (double vision, dim vision, facial weakness), throat problems (discomfort in swallowing), generalised symptoms (fever, loss of appetite, weakness) and cases with metastasis were recorded. Histopathological Examinations (HPE) from primary tumour obtained and classified into WHO 1991 types i.e. Keratinising Squamous Cell Carcinoma (WHO type I), Non-Keratinising Carcinoma (WHO type II) and Undifferentiated Carcinoma (WHO type III). Co-relation of residing areas and religion with dietary addiction, clinical and histological presentations, and stage of disease at presentation were analysed. Fisher's Z-distribution was used for statistical analysis.

RESULTS

The study consisted of 121 cases of diagnosed nasopharyngeal carcinoma. It consisted of higher number of males comprising 66.1% (80/121) than females, which comprises 33.9% (41/121). Thus, the tumour occurred 1.95 times i.e. almost 2 times more frequently in males than in females. Most common age fell in the range of 31-40 years with 27.3% (33/121) followed closely by 51-60 years range with 26.4% (32/121), thus showing bimodal age distribution. The mean age of the patients was 46±12.34 years. The youngest in the series was 20 years and the oldest 75 years. It is observed from [Figure 1] that percentage of females was more in the youngest age range i.e. 20-30 years. Incidentally, the youngest and the oldest were females originated from hilly region.

[Figure 2 and 3] deal with the frequency distribution with percentage of patients and the comparison between males and females over the socio-demographic parameters. Depending on origin, 74.4% (90/121) originated from hilly areas, while 25.6% (31/121) originated from valley region, thus making strong statistical significance (p-value – 0.008). Depending on religion, 81.8% (99/121) were Christians, 13.2% (16/121) were Hindus, and 5.0% (6/121) were Muslims. It is also observed from [Table 1] that, all the patients residing in hilly areas were Christians, i.e. out of the 99 (81.8%) Christian patients, 90 (74.4%) patients were residing in hills, while the remaining 9 patients (7.4%) were residing in valley. Thus, all the Hindus and Muslims in the study group were residing in valleys. Therefore, a total of 31 cases (25.6%) were of valley origin.

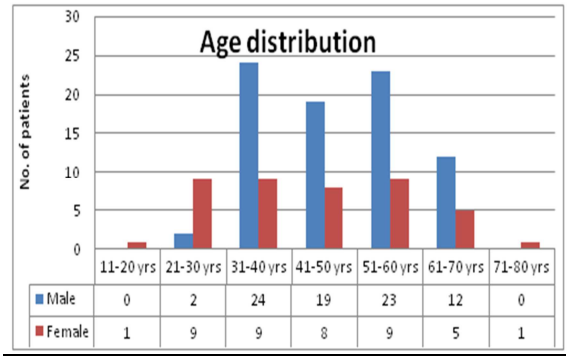

Figure 1: Age distribution among the study sample.

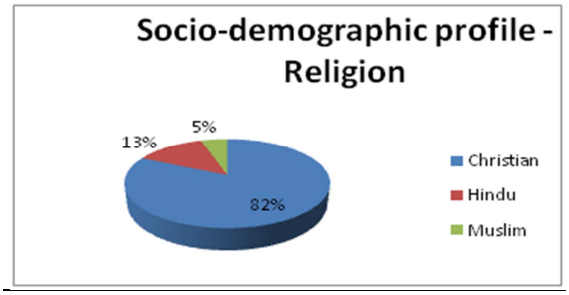

Figure 2: Socio-demographic profile base on religion.

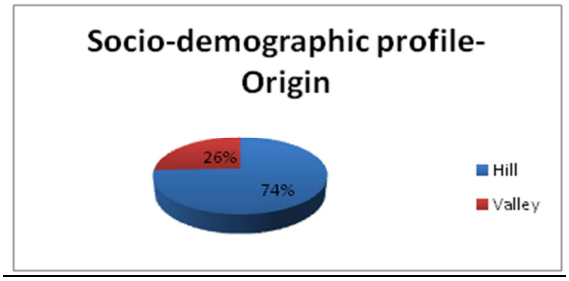

Figure 3 : Socio-demographic profile base on patient's place of origin.

Table 1: Distribution of the group depending on origin with relation to religion

Origin	Sex	Christian (%)	Hindu (%)	Muslim (%)	Total (%)
Hill	Male	61 (50.4)	0	0	61 (50.4)
	Female	29 (24)	0	0	29 (24.0)
	Male+Female	90 (74.4)	0	0	90 (74.4)
Valley	Male	6 (5.0)	10 (8.3)	3 (2.5)	19 (15.7)
	Female	3 (2.5)	6 (5.0)	3 (2.5)	12 (9.9)
	Male+Female	9 (7.4)	16 (13.2)	6 (5.0)	31 (25.6)

Table 2: Distribution of dietary addiction.

Addiction	Sex	Hill (%) [N=90]	Valley (%) [N=31]	Total (%) [N=121]	p-value
Smoking	Male	26 (28.9)	13 (41.9)	39 (32.2)	0.2468
	Female	4 (4.4)	2 (6.5)	6 (5.0)	
	Male+Female	30 (33.3)	15 (48.4)	45 (37.2)	
Alcohol	Male	12 (13.3)	9 (29.0)	21 (17.4)	0.2803
	Female	1 (1.1)	0 (0.0)	1 (0.8)	
	Male+Female	13 (14.4)	9 (29.0)	22 (18.2)	
Smokeless Tobacco	Male	22 (24.4)	10 (32.3)	32 (26.4)	0.1826
	Female	4 (4.4)	5 (16.1)	9 (7.4)	
	Male+Female	26 (28.9)	15 (48.4)	41 (33.9)	
Betel nuts	Male	12 (13.3)	4 (12.9)	16 (13.2)	0.3988
	Female	6 (6.7)	2 (6.5)	8 (6.6)	
	Male+Female	18 (20.0)	6 (19.4)	24 (19.8)	
Smoked/salted meat	Male	51 (56.7)	8 (25.8)	59 (48.8)	0.0001
	Female	33 (36.7)	2 (6.5)	35 (28.9)	
	Male+Female	84 (93.3)	10 (32.3)	94 (77.7)	
No addiction	Male	2 (2.2)	5 (16.1)	7 (5.8)	0.2059
	Female	3 (3.3)	5 (16.1)	8 (6.6)	
	Male+Female	5 (5.6)	10 (32.3)	15 (12.4)	

It is observed from the study that, origin of the patient plays a significant role. The reason may be the genetic factor or environmental factor supplemented with dietary addiction/habits of the patient. Thus, for the present study, the cases are divided into those originated from hilly areas and those from valley areas, and the findings in terms of dietary addiction, clinical presentation, histological types and stage of the disease at presentation are analysed.

Five dietary addiction/habits are considered in connection with the topic under study. They are smoking, use of smokeless tobacco and betel nuts, alcoholism and excessive intake of smoked/salted meat. Here in the sample, one may have more than one addiction/habits (multiple addiction/habits), so therefore, total number of study subjects become more than the actual total.

In the study sample, 12.4% (15/121) never used any of the mentioned dietary habits. Thus the rest, i.e. 87.6% (106/121) were addicted to at least one of the habits. The dietary habit, which the patients under study were addicted in maximum, was consumption of smoked/salted meat, which comprises 77.7% (94/121). Most patients from hilly region were seen to consume smoked meat with 93.3% (84/90) compared to those among valley patients which is about 32.3% (10/31). It is observed from the [Table 2] that patients from valley areas were indulged more in smoking, alcoholism and use of smokeless tobacco. Percentages of patients in valley areas addicted to smoking, alcohol and smokeless tobacco are 48.4% (15/31), 29.0% (9/31) and 48.4% (15/31) respectively, as against 33.3% (30/90), 14.4% (13/90) and 28.9% (26/90) respectively in patients of hilly areas. Percentage of use of betel nuts is almost equal among the patients of the two groups with 19.4% (6/31) for valley patients and 20.0% (18/90) for hilly patients. On comparison of the two groups, patients living in valleys were more indulged to addiction of smoking, alcohol and smokeless tobacco, whereas patients living in hills were seen more to consume smoked meat. 5.5% (5/90) of hilly patients had no dietary addiction as compared to 32.3% (10/31) of valley patients.

[Table 3] shows the clinical presentations of the patients, which include the nodal, extra-nodal features and metastasis. Swelling neck i.e. secondary neck node was the commonest clinical presentation observed with overall percentage of 93.4% (113/121).

Table 3: Clinical presentation

Features		Sex	Hill (%) [N=90]	Valley (%) [N=31]	Total (%) [N=121]	p-value
Neck node		Male	55 (61.1)	19 (61.3)	74 (61.2)	0.0909
		Female	27 (30.0)	12 (38.7)	39 (32.2)	
		Male+Female	82 (91.1)	31 (100.0)	113 (93.4)	
Nasal symptoms	Nose block	Male	22 (24.4)	5 (16.1)	27 (22.3)	0.3790
		Female	8 (8.9)	3 (9.7)	11 (9.1)	
		Male+Female	30 (33.3)	8 (25.8)	38 (31.4)	
	Epistaxis	Male	21 (23.3)	4 (12.9)	25 (20.7)	0.3101
		Female	6 (6.7)	0 (0.0)	6 (5.0)	
		Male+Female	27 (30.0)	4 (12.9)	31 (25.6)	
	Nasal discharge	Male	4 (4.4)	3 (9.7)	7 (5.8)	0.3854
		Female	1 (1.1)	0 (0.0)	1 (0.8)	
		Male+Female	5 (5.6)	3 (9.7)	8 (6.6)	
	Total nasal symptoms	Male	47 (52.2)	12 (38.7)	59 (48.8)	0.1315
		Female	15 (16.7)	3 (9.7)	18 (14.9)	
		Male+Female	62 (68.9)	15 (48.4)	77 (63.6)	
Auricular features	Decreased hearing	Male	17 (18.9)	1 (3.2)	18 (14.9)	0.3448
		Female	8 (8.9)	4 (12.9)	12 (9.9)	
		Male+Female	25 (27.8)	5 (16.1)	30 (24.8)	
	Tinnitus	Male	6 (6.7)	0 (0.0)	6 (5.0)	0.0031
		Female	3 (3.3)	0 (0.0)	3 (2.5)	
		Male+Female	9 (10.0)	0 (0.0)	9 (7.4)	
	Earache	Male	2 (2.2)	0 (0.0)	2 (1.7)	0.3791
		Female	1 (1.1)	0 (0.0)	1 (0.8)	
		Male+Female	3 (3.3)	0 (0.0)	3 (2.5)	
	Total auricular features	Male	25 (27.8)	1 (3.2)	26 (21.5)	0.0478
		Female	12 (13.3)	4 (12.9)	16 (13.2)	
		Male+Female	37 (41.1)	5 (16.1)	42 (34.7)	
Cranio-facial pain		Male	23 (25.6)	3 (9.7)	26 (21.5)	0.2227
		Female	14 (15.6)	2 (6.5)	16 (13.2)	
		Male+Female	37 (41.1)	5 (16.1)	42 (34.7)	
Neurological symptoms		Male	9 (10.0)	1 (3.2)	10 (8.3)	0.3814
		Female	4 (4.4)	1 (3.2)	5 (4.1)	
		Male+Female	13 (14.4)	2 (6.5)	15 (12.4)	
Generalised symptoms		Male	3 (3.3)	3 (9.7)	6 (5.0)	0.3986
		Female	5 (5.6)	0 (0.0)	5 (4.1)	
		Male+Female	8 (8.9)	3 (9.7)	11 (9.1)	
Discomfort in swallowing		Male	11 (12.2)	3 (9.7)	14 (11.6)	0.3939
		Female	1 (1.1)	0 (0.0)	1 (0.8)	
		Male+Female	12 (13.3)	3 (9.7)	15 (12.4)	
Metastasis		Male	0 (0.0)	0 (0.0)	0 (0.0)	0.3970
		Female	1 (1.1)	1 (3.2)	2 (1.7)	
		Male+Female	1 (1.1)	1 (3.2)	2 (1.7)	

Table 4: Nodal presentation

Nodes	Sex	Hill (%) [N=90]	Valley (%) [N=31]	Total (%) N=121]	p-value
Unilateral	Male	38 (42.2)	15 (48.4)	53 (43.8)	0.3984
	Female	15 (16.7)	3 (9.7)	18 (14.9)	
	Male+Female	53 (58.9)	18 (58.1)	71 (58.7)	
Bilateral	Male	17 (18.9)	4 (12.9)	21 (17.4)	0.3312
	Female	12 (13.3)	9 (29.0)	21 (17.4)	
	Male+Female	29 (32.2)	13 (41.9)	42 (34.7)	
No Nodes	Male	6 (6.7)	0 (0.0	6 (5.0)	0.2789
	Female	2 (2.2)	0 (0.0)	2 (1.7)	
	Male+Female	8 (8.9)	0 (0.0)	8 (6.6)	

Table 5: Distribution of histological type

Type	Sex	Hill (%)[N=90]	Valley (%)[N=31]	Total (%)[N=121]	p-value
Type I	Male	1 (1.1)	2 (6.5)	3 (2.5)	0.3986
	Female	4 (4.4)	0 (0.0)	4 (3.3)	
	Male+Female	5 (5.6)	2 (6.5)	7 (5.8)	
Type II	Male	14 (15.6)	2 (6.5)	16 (13.2)	0.3825
	Female	3 (3.3)	6 (19.4)	9 (7.4)	
	Male+Female	17 (18.9)	8 (25.8)	25 (20.7)	
Type III	Male	45 (50.0)	15 (48.4)	60 (49.6)	0.3079
	Female	23 (25.6)	6 (19.4)	29 (24.0)	
	Male+Female	68 (75.6)	21 (67.7)	89 (73.6)	

All the patients of valley origin presented with metastasis at cervical nodes (secondary neck node) i.e. 100% (31/31), while 91.1% (82/90) presented with neck node amongst hilly patients, making significant p-value of 0.0909. [Table 4] shows that 58.1% (18/31) presented with unilateral neck node while 41.9% (13/31) presented with bilateral neck node in valleys. Amongst patients originated from hills, out of 91.1% (82/90) presented with neck node, 58.9% (53/90) were unilateral and 32.2% (29/90) were bilateral. Thus, the rest 8.9% (8/90) presented with no nodes.

Nasal symptoms presented as the commonest extra-nodal symptoms with 63.6% (77/121), out of which 31.4% (38/121) were nose block, 25.6% (31/121) were epistaxis and 6.6% (8/121) were nasal discharge. These symptoms were seen relatively higher in patients of hilly origin (68.9%) as compared to that of valley origin (48.4%). Auricular features and cranio-facial pain were second most common presentations with 34.7% (42/121) each. Of the auricular features, hearing loss comprised of 24.8% (30/121), tinnitus 7.4% (9/121) and earache 2.5% (3/121). Here also, the percentage amongst hilly patients was more compared to that of valley patients, which are 27.8% (25/90), 10.0% (9/90) and 3.3% (3/90) respectively for hilly patients, as against 16.1% (5/31) of hearing loss and 0% each for tinnitus and earache in valleys. Tinnitus made a significant difference between hill and valley patients with p-value of 0.0031. Auricular features, in total, too made significant difference between the two groups (p-value – 0.0478). Neurological symptoms, generalised symptoms, throat (swallowing) discomfort and features of distant metastasis constituted 12.4% (15/121), 9.1% (11/121), 12.4% (15/121) and 1.7% (2/121) respectively.

According to WHO classification of NPC, 1991, the tumour is divided into Type I (Keratinising Squamous Cell Carcinoma), Type II (Non-Keratinising Carcinoma) and Type III (Undifferentiated Carcinoma). Due to marked difference in incidence in hilly and valley areas in this part of the country, an attempt is made to analyse the difference in histological types in this two regions.

From [Table 5] it is observed that, Type III was the commonest histological type of NPC found, with overall percentage of 73.6% (89/121). Of the patients in hilly areas, the percentage is 75.6% (68/90) as compared to that of valley region, which is 67.7% (21/31). This is followed by Type II with 20.7% (25/121), out of which 18.9% (17/90) were from hills and 25.8% (8/31) were from valleys. The least common type thus is Type I which comprises of 5.8% (7/121), where 5.6% (5/90) were from hills and 6.5% (2/31) were from valleys. It is observed that in Type I and III, percentage of patients of hilly origin are more as compared to that of valley origin. Whereas in Type II, percentage of patients in valleys are higher compared to that in hills. This is because percentage of patients in valleys was higher amongst females in Type II i.e. 19.4% (6/31) in valleys as compared to 3.3% (3/90) in hills.

Table 6: Distribution of Stage at presentation

Stage	Sex	Hill (%) [N=90]	Valley (%) N=31]	Total (%) [N=121]	p-value
Stage 1	Male	1 (1.1)	0 (0.0)	1 (0.8)	0.3970
	Female	0 (0.0)	0 (0.0)	0 (0.0)	
	Male+Female	1 (1.1)	0 (0.0)	1 (0.8)	
Stage 2	Male	22 (24.4)	8 (25.8)	30 (24.8)	0.3989
	Female	10 (11.1)	3 (9.7)	13 (10.7)	
	Male+Female	32 (35.6)	11 (35.5)	43 (35.5)	
Stage 3	Male	17 (18.9)	0 (0.0)	17 (14.0)	0.3034
	Female	11 (12.2)	2 (6.5)	13 (10.7)	
	Male+Female	28 (31.1)	2 (6.5)	30 (24.8)	
Stage 4	Male	21 (23.3)	11 (35.5)	32 (26.4)	0.2803
	Female	11 (12.2)	4 (12.9)	15 (12.4)	
	Male+Female	32 (35.6)	15 (48.4)	47 (38.8)	

[Table 6] shows the stage of the disease at presentation. The commonest stage of presentation observed from the study was stage 4, with a percentage of 38.8% (47/121). Amongst hilly patients, 35.6% (32/90) presented with stage 4 NPC, whereas higher percentage i.e. 48.4% (15/31) was seen amongst valley patients. The second most common stage of presentation observed was stage 2, with 35.5% (43/121) overall. Patients presented with stage 2 amongst hilly and valley areas were almost equal with 35.6% (32/90) and 35.5% (11/31) respectively. Patients with stage 3 constituted 24.8% (30/121), which is about 31.1% (28/90) amongst hilly patients and 6.5% (2/31) amongst valley patients. Of the total sample size, only 1 patient i.e. 0.8% presented at stage 1, which was of hilly origin.

DISCUSSION

Overall, the study sample consisted of 66.1% males and 33.9% females, making a ratio of 1.95 : 1. Similarly male : female ratio of 2 : 1 was found in a study conducted by Fatusi O et al, 2006[5] in Nigeria and Sharma TD et al, 2011[6] in Northeast India.

Most of the patients belonged to Christian religion (81.8%), with few Hindus and Muslims (13.2% and 5.0% respectively). The incidence of NPC was seen more in hilly population showing statistical significance. 74.4% were from hills and 25.6% were from valleys (p-value of 0.008). The majority in Christian religion may be due to the fact that, most of the hill population belong to Christian.

The most frequent age group found in the study was 31-40 years and 51-60 years with 27.3% and 26.4% respectively, thus showing a bimodal age distribution with peaks in the 4th and 6th decades. The pattern of bimodal age distribution with peaks in age group of 15-24 years and 65-74 years has been reported in low risk population.[7]In our study, the 5th decade also shows relatively high percentage with 22.3%. This almost tallies with views of other workers like Chan AT et al (1998), where median age was found to 40-50 years.[8] The number of patients begins to increase after the age of 30 years and decline after 60 years which is similar to the studies in high incidence areas.[6,9,10]

Non-keratinizing NPC has a strong association with Epstein Barr virus (EBV) as compared to the keratinizing squamous cell carcinoma (KSCC). Infrequent association of KSCC with EBV may also indicate a different carcinogenesis involved in the subtype of tumour.[11] The association of Keratinizing tumours with EBV has long been controversial[12], but a relationship with tobacco smoking has been found in several studies.[12-14] Sporadic NPC is usually of the well-differentiated type, whereas familial disease is poorly differentiated. To date, EBV seems to be exclusively associated with undifferentiated carcinoma in the nasopharynx.[15]

Association of occupational exposure to smoke with NPC has been reported by Armstrong et al in 1983. Majority of the population living in hills in this part of the country have houses, which are poorly ventilated, overcrowded and smoke-filled. It was observed in a study that 88% of NPC patients consumed smoked meat and 90% of them lived in poorly ventilated overcrowded house, while 51% were smokers and 47% of them used tobacco.[6] In the present study, 77.7% of the total patients used smoked meat, 93.3% were amongst hilly patients and 32.3% were amongst valley patients making strong significant difference (p-value – 0.0001), while smoking and use of tobacco comprised of 37.2% and 33.9% respectively.

The study reflects nodal metastasis as the commonest clinical presentation (93.4%), with 58.7% presenting as unilateral neck node, 34.4% bilateral neck node and 6.6% without any nodal metastasis. The second most common presentation was nasal symptoms with 63.6%, out of which nose block constituted 31.4% and epistaxis 25.6%. Auricular features and cranio-facial pain constituted 34.7% each. In the auricular features, hearing loss comprised of 24.8%. Neurological symptoms comprised of 12.4%. In a similar study by Khademi B et al (2006), neck mass constituted 86%, epistaxis 27%, nasal obstruction 26% and hearing loss 16.7%.[17] In another study by Sharma TD et al, 2011, neck swelling featured the commonest presentation with 78% followed by nasal obstruction with 35.5%, epistaxis 27.5%, hearing loss 24.5% and neuro-ophthalmic symptoms 10%.[6] In a study in Nigeria, 60% of patients presented with neuro-ophthalmic presentation.[18]

In the present study, 100% of the valley patients presented with swelling neck while 91.1% presented with neck node amongst hilly patients, making significant difference with p-value of 0.0909. Another significant difference noted in the clinical presentation between hilly and valley population is tinnitus; 10% in hilly patients and 0% in valley patients (p-value – 0.0031). Auricular features as a whole made significant difference between the two populations (p-value – 0.0478).

The commonest histological type in the study was found to be Undifferentiated carcinoma (WHO Type III), comprising 73.6% of sample size. Type II and Type I constituted 20.7% and 5.8% respectively. This result is similar to a study by Wei et al, 2010 in the high incidence region of China where 84.6% of all histological types was Non-keratinising, and keratinising was 5.8% of all NPCs.[19] Some authors consider Type II to be a variant of Type III. From this point of view, Type II plus Type III in the study constituted 94.3%. In another study by Khademi B et al (2006), the finding of WHO histological Type II and III was 80.4%.[17] Yet in another study in the North-eastern area of India, Type III comprised of 75%, Type II comprised 15% and Type I comprised of 10%.[6] The commonest stage at presentation in our study is Stage 4 (38.8%), followed by Stage 2 (35.5%).

CONCLUSION

There is a marked difference in incidence of nasopharyngeal carcinoma between the hilly and valley population. Genetic, environmental diversity and dietary factors may be the reason for this marked difference between the two populations in this part of the country. Though not marked significance in difference is seen in clinical presentation, histological type and stage at presentation between the two populations, a detailed study of genetic and immuno-histochemical analysis of NPC in this part of the country is a necessity.

REFERENCES

1. Fribrog J, Wohlfahrt J, Koch A, Storm H, R. Olsen O, Melbye M. Cancer susceptibility in nasopharyngeal carcinoma families. Clin Cancer Res. 2005; 65(18): 8567-72.

2. Kataki AC, Simons MJ, Das AK, Sharma K, Mehra NK. Nasopharyngeal carcinoma in the Northeastern states of India. Chin J Cancer. 2011; 30(2): 106-13.
3. Kumar S. Epidemiological and etiological factors associated with nasopharyngeal carcinoma [J]. ICMR Bulletin. 2003; 33(9): 1-9.
4. Chuan-Teih C. Nasopharynx (the post nasal space). 6th ed. Butterworth Heinemann, Oxford: John H; 1997.
5. Fatusi O, Akinpelu O, Amusa Y. Challenges of managing nasopharyngeal carcinoma in a developing country. J Natl Med Assoc. 2006; 98(5): 758-64.
6. Sharma TD, Singh TT, Laishram RS, Sharma LDC, Sunita AK, Imchen LT. Nasopharyngeal carcinoma – a clinico-pathological study in a Regional Cancer Centre of Northeastern India. Asian Pacific J of Cancer Prev. 2011; 12: 1583-7.
7. Bray F, Haugen M, Moger TA. Age incidence curves of nasopharyngeal carcinoma worldwide: Biomodality in low-risk populations and etiologic implications. Cancer Epidemiol Biomarkers Prev. 2008; 17: 2356-65.
8. Chan AT, Teo PM, Leung TW, Johnson PJ. The role of chemotherapy in the management of nasopharyngeal carcinoma. Cancer. 1998; 82(6): 1003-12.
9. Parkin DM, Bray F, Ferlay J, Pisani P. Global cancer statistics, 2002. CA Cancer J Clin. 2005 Mar; 55: 74-108.
10. Zong YS, Zhang RF, He SY. Histopathologic types and incidence of malignant nasopharyngeal tumour in Zhongshan country. China Med J 1983; 96(7): 511-6.
11. Hording V, Nielsen HW, Albeck H, Daugaard S. Nasopharyngeal carcinoma: histological types and association with Epstein-Barr virus. Eur J Cancer. 1993; 29(2): 137-39.
12. Spano JP, Busson P, Atlan D, Bourhis J, Pignon JP. Nasopharyngeal carcinoma: an update. Eur J Cancer. 2003; 39: 2121-35.
13. Vaughan TL, Shapiro JA, Burt RD, Swanson GM, Berwick M, Lynch CF, et al. Nasopharyngeal cancer in a low-risk population: defining risk factors by histological type. Cancer Epidemiol Biomarkers Prev 1996; 5: 587-93.
14. Sun LM, Epplein M, Li CI, Vaughan TL, Weiss NS. Trends in the incidence rates of nasopharyngeal carcinoma among Chinese Americans living in Los Angeles County and the San Francisco metropolitan area, 1992-2002. Am J Epidemiol. 2005; 162: 1174-78.
15. McDermott AL, Dutt SN, Watkinson JC. The aetiology of nasopharyngeal carcinoma. Clin Otolaryngol 2001; 26: 82-92.
16. Armstrong RW, Armstrong MJ, Mimi C Yu, Handerson BE. Salted fish and inhalants as risk factors for nasopharyngeal carcinoma in Malaysian Chinese. Cancer Res 1983; 43: 2967-70.
17. Khademi B, Mahmoodi J, Omidvari S, Mohammadianpanah M. Treatment results of nasopharygeal carcinoma; a 15 year single institutional experience. J Egypt Natl Canc Inst. 2006; 18(2): 147-55.
18. Tiong TS, Selva KS. Clinical presentation of nasopharyngeal carcinoma in Sarawak Malaysia. Med J Malaysia. 2005; 60: 624-8.
19. Wei K, Xu Y, Liu J, Zhang W, Liang Z. No incidence trends and no change in pathological proportions of nasopharyngeal carcinoma in Zhongshan in 1970-2007. Asian Pacific J Cancer Prev. 2010; 11: 1595-9.

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