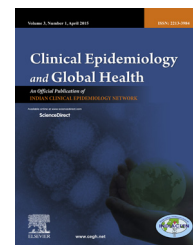


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Original Article

Significant effect of education & income on cancer control: Policy consideration for third world

Anupam Mishra^{a,*}, Ruchi Verma^b, Arvind Kumar^b, Abhishek Singh^b,
Abhinav Srivastava^b

^a Professor, Department of Otorhinolaryngology, King George Medical University, Lucknow, UP, India

^b Resident, Department of Otorhinolaryngology, King George Medical University, Lucknow, UP, India

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ABSTRACT

Background: Head and neck squamous cell cancer (HNSCC) is maximally encountered in India across the globe, and the environmental influences/interactions leading to cancer particularly education and income are very different in the developed countries than the third world.

Material and methods: A prospective assessment of 707 histologically proven HNSCC patients was undertaken regarding the possible role of 2 determinants viz. education and income on cancer prevalence. Standard questionnaires were filled up for the outpatients in the department of otolaryngology and variables such as demographics, site of involvement, the education and family income were analyzed accordingly.

Observations: The cancer was seen more among those with the education status of less than grade V (58%), than between VI and VIII grade (21%) or between IX and XII grade (8.5%) and higher. Of those with the education category of less than grade V, oral cavity was the most common site involved (29%). The cancer rates among income category of less than Rs. 1000/- (46%) was significantly more than those of Rs. 1001–2000 (29%) and Rs. 2001–4000 (10%). Thereafter there was a drastic fall in the cancer rates among the further higher income categories.

Conclusions: Two points have emerged from this study; that is likely to have the highest impact on cancer control: (1) implementing compulsory education till class VI and (2) Enhancing family income to Rs. 4000/INR per month. These are likely to have a complicated interaction with various procarcinogenic practices and environment and their correction is very likely to reduce the cancer occurrence through prevention.

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Head and neck squamous cell cancer (HNSCC) is the most common cancer seen among males in Indian subcontinent and is maximally encountered in India across the globe. The environmental practices herein probably have a larger

contribution in carcinogenesis (among the genetically predisposed) than the hereditary component as such. India is unique in terms of cancer related practices,¹ wherein pro- and anti-cancer practices vary widely across the different regions of the

* Corresponding author. Tel.: +91 9415022129.

E-mail address: amishra_ent@yahoo.com (A. Mishra).

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country. The individual preference of a particular practice is influenced by the education status and financial affordability of a person. Among the low-socioeconomic groups the existing literature reflects the favorable role of enhanced socioeconomic status on patients with bone/joint sarcomas, skin melanomas, endometrial carcinomas^{2–4} and cervical cancer⁵ in terms of prognosis. Education too has been cited as a strategic factor in cost effective cancer control^{5,6} in China, but no such study has been conducted in India to establish the minimum requirement of income and education needed to positively impact a cost effective cancer control. Hence an effort here has been made to work out the possible role of such variables in the capital city of the most populated province of India that harbors one of the largest populations of HNSCC across the country.

1. Patients and methods

This study is a prospective assessment of 707 patients of HNSCC that were selected randomly from the outpatient department of Otolaryngology (including referrals from the department of Radiotherapy) KG Medical University Lucknow, India from 2006 to 2013. The draining geographical areas of this center include the entire province (UP), the adjoining provinces (Bihar, MP, Jharkhand, Uttaranchal) and the adjoining part of Nepal. The inclusion of cases was done throughout the year on 3 days in a week except in the months of June and July. The exclusion criteria included those patients from Nepal/abroad or those with mental retardation and infants. Moreover the incompletely recorded or doubtful patient-information was not considered in the analysis. Apart from routine anamnesis the following information was obtained as a part of routine workup: (1) age, (2) sex, (3) education status, (4) income status, (5) site of involvement [categorized as per ICD-10 into nose including paranasal sinus (ICD D38.5, C76.0), oral cavity [ICD C02.0 (C02.1, C02.2, C02.3, C02.4, C02.8, C02.9), C03 (C03.0, C03.1, C03.9), C04 (C04.0, C04.1, C04.8, C04.9), C05 (C05.0, C05.1, C05.2, C05.8, C05.9), C06 (C06.0, C06.1, C06.2, C06.8, C06.9)], pharynx including oropharynx/nasopharynx/hypopharynx (ICD C01, C09 (C09.0, C09.1, C09.8, C09.9), C10 (C10.0, C10.1, C10.2, 10.3, C10.8, C10.9), C12, C13, C13.0, C13.1, C13.2, C13.8, C13.9), larynx (ICD D38.0, D37.01), salivary gland including parotid/submandibular gland (ICD C07, C08 (C08.0,

C08.1, C08.8, C08.9)), and ear (ICD D38.5, D48.5)]. In case of involvement of more than one site the respective case was categorized as per the site of maximum involvement. Every case was histologically proven squamous cell carcinoma while those with unknown primary had nodal metastasis proven by FNAC. An orientation program was conducted prior to the initiation of the data collection in order to train the postgraduate residents regarding the methodology of data collection. Daily random check up by the principal investigator was undertaken to ensure the quality of data collection.

1.1. Observations

The most common site as seen in the study was larynx 26.6% closely followed by oral cavity in 25.3%. The least common sites were salivary gland and ear. However the combined incidence of cancer oral cavity and oropharynx far exceeded other varieties.

1.1.1. Age and sex distribution (Tables 1 and 2)

An increase in incidence was seen from 3rd decade onwards with oral cavity being predominantly affected. Although oral cavity and oropharynx are in close proximity, yet there was a significant difference in the incidence at both sites especially in 3rd and 4th decades (7% oral cavity vs. 0.8% oropharynx). However in 5th decade, the above trend reversed, where pharyngeal involvement exceeded that of oral cavity (13% vs. 5%) and with further increase in age the involvement was appreciated at other sites as well. The gender bias for males in our population is well evident in Table 2. There appears to be a trend among females to favor pharyngeal/laryngeal involvement than the oral cavity, while the reverse is seen among males.

1.1.2. Education status

The preliminary comparison of education status with occurrence of HNSCC reveals inverse relationship. Accordingly the lower education status cohort showed a higher prevalence of cancer. The cancer was seen more among those with the education status of less than grade V (58%), than between VI and VIII grade (21%) or between IX and XII grade (8.5%) and higher. It is worth noting that with the education category of less than grade V, oral cavity was the most common site involved (29%); its prevalence decreased drastically (14%) with the education category of grades VI–VIII. These improved

Table 1 – Age vs. type of cancer.

Age group	Type of cancer							Total	Percentage
	Unknown primary	Nose	Oral cavity	Pharynx	Larynx	Salivary gland	Ear		
<10	4	0	0	0	0	0	0	4	0.5
11–20	2	4	1	0	0	0	0	7	1.0
21–30	4	4	12	2	2	0	0	24	3.4
31–40	16	0	43	4	26	4	0	87	12.3
41–50	31	8	36	93	39	1	0	208	29.4
51–60	45	4	65	47	44	1	4	210	29.7
61–70	16	0	19	25	54	0	2	116	16.4
>70	4	0	8	8	23	1	1	45	6.3
Total	122	20	184	179	188	7	7	707	
Percentage	17.2	2.8	26	25.3	26.6	1	1		

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