

# ORAL CAVITY CANCERS IN NORTH WEST PAKISTAN: A HOSPITAL BASED STUDY

Naseem Begum, Gulshan Naheed, Shagufta Nasreen,  
Ayub Khan

Department of Radiotherapy,  
Institute of Radiotherapy and Nuclear Medicine (IRNUM), Peshawar, Pakistan

## ABSTRACT

**Objectives:** To identify the common anatomical location, the prevalent age, sex, geographical and gender distribution, the use of tobacco and the histopathological characteristics in patients with oral cavity cancers.

**Material and Methods:** A hospital based retrospective study, conducted at the Institute of Radiotherapy and Nuclear Medicine (IRNUM), Peshawar, Pakistan. The medical records of 628 patients of oral cavity cancers registered at IRNUM during the period of five years (1st Jan 1999 to 31st Dec 2003) were studied. A Proforma was designed and completed from these records. The information regarding the anatomical location (topography), geographical distribution, age and sex distribution, addiction to any form of tobacco and histopathological characteristics was extracted from these medical records and analyzed.

**Results:** In this study, oral cavity cancers were more common in males (73.4%) than females (26.6%). The majority of cases i.e. 39% reported from Mardan and Peshawar divisions. The maximum numbers of oral cancer cases were seen in alveolus (40.7%). Next common sites were tongue (18.4%) and buccal mucosa (17.8%). Majority of oral cancers were squamous cell carcinomas (96.6%) and only 3.5% were non-squamous cell cancers. The majority presented in the age group between 40-60 years (63.8%) with a median age of 60 years. Addiction to tobacco was noted in 440/628 (70%) of cases.

**Conclusion:** Oral cavity cancers affect people of over forty years of age and are related to tobacco use in various forms specially naswar in North Western areas of Pakistan. Alveolus is the most frequent site affected.

**Key words:** Oral Cavity Cancers, Squamous Cell Carcinoma, North West Pakistan, Snuff Dipping, Naswar.

## INTRODUCTION

Oral cavity cancers (OCC) represent about 5% of all malignant tumours in humans and constitute the majority of head and neck cancers.<sup>1</sup> In some parts of the world including Indian subcontinent oral cancer is a major problem. Bhurgri Y et al from Pakistan have reported an annual incidence rate of oral cancers of 4.1 per 100,000/year in males and 4 per 100,000/year in females.<sup>2</sup>

Mehrotra R and Singh M have reported head and neck neoplasia as one of the common most cancers in India<sup>3</sup> and of these cancers oral

cavity cancer ranks No.1.<sup>4</sup> In United States of America oral cavity cancer represents 3 per cent of all malignancies.<sup>5</sup>

About 95% percent of cancers of oral cavity are squamous cell carcinoma. Practically speaking cancer of the oral cavity mucosa is synonymous with squamous cell carcinoma (SCC).<sup>6</sup> The non squamous cell cancers include adenocarcinoma of minor salivary glands, malignant melanomas, clear cell and adenoid cystic carcinomas.

Oral cavity cancers frequently involve tongue, alveolus, floor of mouth, lips, palate and

## TOPOGRAPHICAL DISTRIBUTION OF SQUAMOUS AND NON SQUAMOUS CELL CANCERS IN ORAL CAVITY

Sub sites	*Sq. cell cancers n=605 (96.3%)		Non Sq. cell cancers n=23 (3.7%)		Total N=628	
	No	(%)	No	%	No	%
Lips	103	16.4	4	0.6	107	17
Alveolus	252	40.1	4	0.6	256	40.7
Oral tongue	115	18.1	2	0.3	117	18.4
Buccal mucosa	110	17.5	2	0.3	112	17.8
Palate	8	1.3	8	1.3	16	2.6
FOM**	5	0.8	2	0.3	7	1.1
RTM***	12	1.9	1	0.2	13	2.1

(Abbreviations =\*Sq: Squamous, \*\* FOM: Floor of mouth, \*\*\*RTM: Retro molar trigone)

Table 1

buccal mucosa. Male to female ratio is 2:1. Epidemiological studies have shown that the incidence of oral cancers varies significantly amongst the continents and within developed and developing countries.<sup>5,7</sup>

Known etiologic factors in the pathogenesis of oral cancer include tobacco, alcohol, nutritional deficiencies, chewing betel nut and betel leaf (pan), poor orodental hygiene and ultra violet light in case of lips. Particularly implicated is the chewing tobacco. Non drinking smokers have two fold greater risk of developing these cancers than matched controls subjects do. The risk increases 6-15 fold with both drinking and smoking<sup>8</sup> A major regional predisposing influence is the chewing of tobacco, betel nut, pan, cigarette smoking and huqqa or chilam in India, Pakistan and parts of Asia.<sup>9</sup>

Protracted irritation as from ill fitting dentures, jagged teeth or chronic infection is no longer thought to be an important direct antecedent to oral cancer but it may contribute to leukoplakia. Actinic radiations, sunlight and pipe smoking are known predisposing influences to the development of cancer of the lower lip. All these environmental influences presumably act on a fertile genetic soil.<sup>10</sup> Human Papilloma Virus (serotypes 16 and 18) have been identified in 10% to 15% of oral carcinomas arising in tongue and other parts of oral cavity and in half of the cancers arising in Waldeyer's tonsillar ring.<sup>11</sup> In a study carried out in Sweden, amongst the possible risk factors studied, HPV infection appears to be strongest.<sup>12</sup>

Leukoplakia and erythroplakia are premalignant lesions of oral cavity. Leukoplakia is a white plaque on oral mucous membrane that cannot be removed by scraping and can not be classified clinically or microscopically as another

disease entity. Other white lesions are lichen planus or candidiasis.<sup>13</sup> Although these lesions have multifactorial origins, the use of tobacco (cigarettes, pipes, cigars and particularly chewing tobacco) is the most common antecedent.<sup>14,15</sup> The frequency of overt cancerous changes in leukoplakia is 5 to 6 percent as compared to 50% in the case of erythroplakia.<sup>16</sup>

In North Western Frontier Province (NWFP) of Pakistan, tobacco is used in various forms e.g. smoking tobacco in huqa or chilam (Hubble bubble), as cigarettes or more commonly especially in rural areas in the form of oral snuff (naswar). The oral snuff used in the study population is a mixture of crushed tobacco, powdered lime, and ash, placed in the form of a small ball in oral cavity between cheek and lower gum.

The purpose of this study was to look at the common anatomical location, geographical and age and sex distribution, addiction to any form of tobacco and histopathological characteristics in patients with oral cavity cancers which is preventable and curable if detected early and managed optimally.

### MATERIAL AND METHODS

This retrospective study carried out at IRNUM, Peshawar, included 628 patients of oral cavity cancers. The case records of all the new histo pathologically proven cases with oral cavity cancers registered at IRNUM from 1<sup>st</sup> Jan 1999 to 31<sup>st</sup> Dec 2003 (5 years) were collected. A Proforma was designed in EPI info version 6.04d and completed for every case, which included age and sex, particular site of oral cavity affected, addiction to tobacco or betel nut (pan) and histopathological characteristics. Address or living area of the patients was noted to assess the

### AGE GROUP DISTRIBUTION IN VARIOUS SUB SITES OF ORAL CAVITY N=628

Sub sites	Under 40	40 - 60	61 - 80	Over 80	Total
Lip	5	63	34	5	107
Alveolus	11	169	70	6	256
Oral tongue	18	64	34	1	117
Buccal mucosa	4	84	24	0	112
Palate	1	3	3	0	7
Floor of mouth	2	9	5	0	16
Retro molar Trigone	1	9	3	0	13
Total	42 (7%)	401(64%)	173 (27%)	12 (2%)	628

Table 2

geographical distribution.

To look at the anatomical distribution of cancer, as per guidelines of World Health Organization (WHO)'s International Classification of Diseases ICD-O version 10 the oral cavity was divided into the following seven zones. The number and percentage of cancer in each zone was calculated.

Different zones of oral cavity are:

- Lips:** including only the vermilion surface and comprising an upper and lower lip joined at the commissure of mouth
- Oral tongue:** the portion of tongue anterior to circumvallate papillae
- Alveolar ridge or alveolus:** the mucosa covering the mandible or maxilla from the gingivobuccal gutter to the origin of the mobile mucosa.
- Floor of mouth:** A U shaped area bounded by the lower gingiva and the oral tongue.
- Buccal mucosa:** which covers the inner surface of the cheeks and lips
- Palate:** A semi lunar area located between the upper alveolar ridge and the mucous membrane covering the palatine process of the maxillary bones
- Retro molar trigone (RTM):** A small triangular surface behind the third molar covering the ascending ramus of the mandible

## RESULTS

Total number of patients with oral cavity cancers visiting IRNUM during 5 years period (from 1<sup>st</sup> Jan1999 to 31<sup>st</sup> Dec 2003) was 628. These patients were referred from different districts of NWFP, from Federally Administered Tribal Areas (FATA), Afghanistan and a few odd cases from Punjab (Fig-1).

The referral from Peshawar was from Khyber College of Dentistry, Khyber Teaching Hospital, Postgraduate Medical Institute and private clinics. The maximum number of oral cancers originated in alveolus i.e. 256/628 (40.7%). The next common site was oral tongue 117/628 cases (18.4%) and buccal mucosa 112/628 cases (17.8%). Other sites for oral cavity cancers in descending order of frequency were lips 107 cases (17%), palate 16 cases (2.6 %), and RTM 13 cases (2%), floor of mouth 7 cases (1.1%).Table-1

In the alveolus, out of the total 256 cases, 227 cases (88.6%) originated in lower alveolus as compared to 29 cases (11.3%) in the upper alveolus.

Histo pathologically, out of 628 cases of oral cancers, 605 (96.6%) cases were squamous cell carcinomas and 23 (3.5%) were non squamous cell cancers. The non squamous cell cancers comprised of adenocarcinomas, adenoid cystic carcinomas, mucoepidermoid carcinoma, malignant melanomas, granular cell tumours and clear cell carcinomas. Table -1

Oral cancers were more common in males as compared to females. Out of a total 628 oral cavity cancers, 461 (73.4%) cases were males and 167 (26.6%) cases were females with a male to female ratio of 2.8:1

In all the different zones of oral cavity e.g. lips, alveolus, tongue, buccal mucosa floor of mouth (FOM) and retro molar trigone (RTM), male preponderance was noted, except in palate where it was more common in females. Ten females while six male patients had cancer of palate Fig-2. The male to female ratio in cases of palate cancers was 1:1.6.

Regarding the prevalence of OCC in different age groups, the maximum number of cases 401/628 (63.8%) was seen in age group 40 to 60 years. 173 cases (27.5%) were seen in age

**Geographical Distribution of Oral Cavity Cancers**

N=628

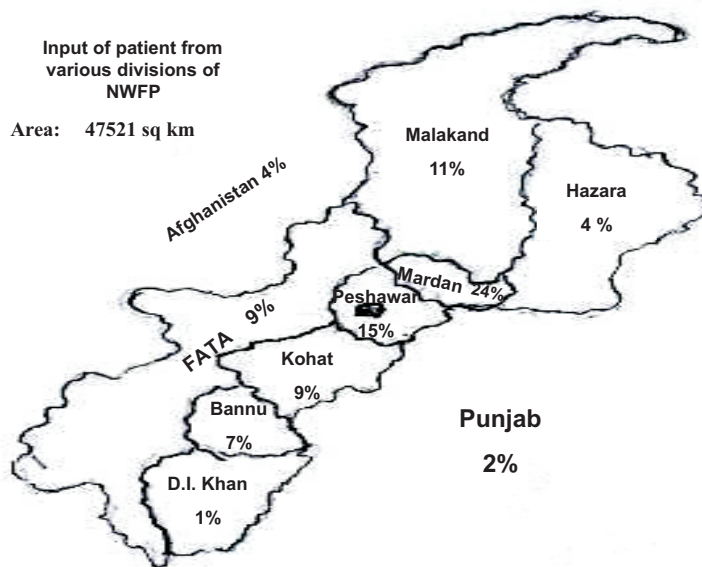


Fig - 1

group 61 – 80 years. 42 cases (6.7%) were of less than forty years of age and 12 cases (1.8%) were over eighty years of age Fig -3.

Table-2 shows the prevalence of oral cavity cancers in various age groups with regard to sub sites.

Four hundred and forty (70%) patients of oral cancer gave the history of addiction to niswar, cigarette smoking, huqa or chilam smoking and pan or betel nut chewing. Three hundred and thirty (53%) patients were addicted to niswar, 17 to huqa, 33 to cigarette smoking and only two patients (0.3%) used pan or betel nut Fig-4.

**DISCUSSION**

Cancer of the oral cavity is one of the common most malignancy and represents 5% of all malignant tumours in humans. The squamous cell carcinoma is the most frequently occurring histopathological type in oral cavity cancers. The neoplastic change may afflict any site but frequently involves tongue, lips, buccal mucosa and gingiva or alveolus. Less common sites within oral cavity are palate, floor of mouth and retro molar trigone (RTM). The male to female ratio was 2 to 1.

In this study of oral cancers out of 628 patients 461 patients (73.45%) were males and 167 patients (26.6%) were females with a male to female ratio of 2.8:1.

In the study of Iype EM and Pandey M, male to female ratio of 2.3:1 was observed, indicating that oral cancer is two to three times

more common in men than women. In the study of Mehrotra R and Singh M, male to female ratio was 3.27: 1.

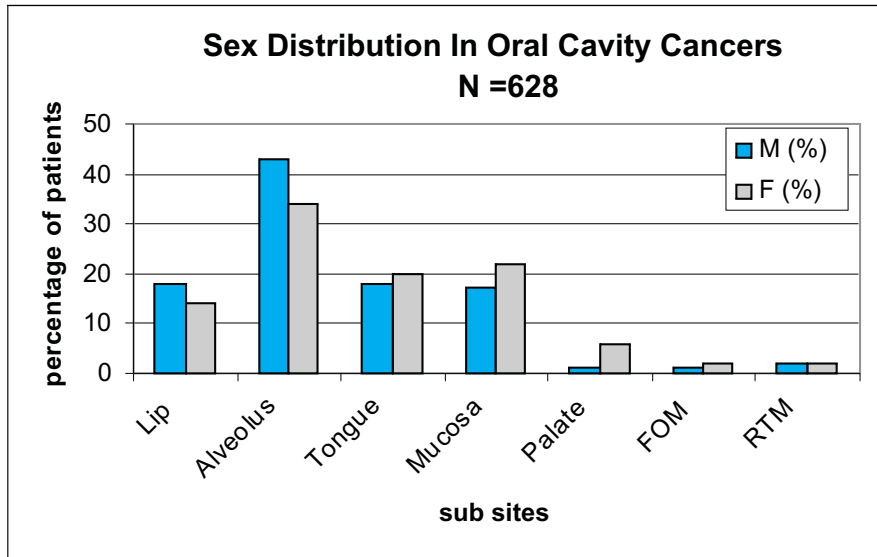
There are substantial variations in the geographic distribution of oral cavity cancers for example it is the single most common cancer of men in India<sup>4,17</sup> and Pakistan.<sup>2</sup>

The environmental etiologic factors in the pathogenesis of oral cancer include tobacco, alcohol, ultraviolet light on the lip, physical and chemical irritants Tobacco alone has been implicated as the main factor in the etiology of oral cancer at any age<sup>3,18</sup>

In our study 333 patients (53 %) with oral cancer were addicted to naswar (crushed tobacco) and highest number amongst niswar users i.e.120 patients developed carcinoma of alveolus. 17 cases were addicted to huqqa and 33 to cigarette smoking, while 2 cases (0.3%) were addicted to pan (betel nut). The reason for high incidence of oral squamous cell carcinoma in lower alveolus in our study is that niswar is kept in lower alveolus more commonly.

Hashibe M and Brennan P, in their study, carried out in France, have stated that cigarette smoking was associated with an increased risk of head and neck cancer including oral cavity.<sup>19</sup>

Similar results were noted by Applebaum KM in his study at Harvard school of public health Boston USA<sup>20</sup> and Syme SE at Daltrimore Maryland, USA.<sup>18</sup> They stated that tobacco is a risk factor in oral cavity cancers.



Abbreviations: FOM – floor of mouth; RTM- Retro molar Trigone

Fig - 2

In our study 2 patients 0.3% were addicted to pan or betel nut Pan is very commonly used in India and south of Pakistan, where the incidence of oral cancer is high in pan users<sup>3,4</sup> whereas oral snuff is more frequently used in north west of Pakistan.

Mehrotra R, Singh M in their study carried out in India have documented that the use of smokeless tobacco (pan masala) is on an increase in north India and is responsible for large majority of oral cancers.<sup>3,4</sup>Tobacco smoking is one of the main risk factors for oral, pharyngeal and esophageal cancers in developed countries.<sup>21</sup>

According to Mehrotra Rana and Singh M

studies, the prevalence of oral cancer was highest in patients with age group 50-60 years.<sup>3</sup> Squamous cell carcinoma of buccal mucosa is predominantly a cancer of elderly people and is seen rarely in young adults. In our study maximum number of oral cancer patients was in 40-60 years age group (63.8%) with a median age of 60 years.

In this study the most common site of involvement was alveolus i.e. 256 cases (40.7%). The next common site was oral tongue 117 cases (18.4%), buccal mucosa 112 (17.8%) and lip 107 (17%) cases. Oral tongue was the principal site affected by cancer in studies of Dias GS and Almedia AP at Lisbon, Portugal.<sup>22</sup> Elango JK and Gangadharan in their studies on head and neck

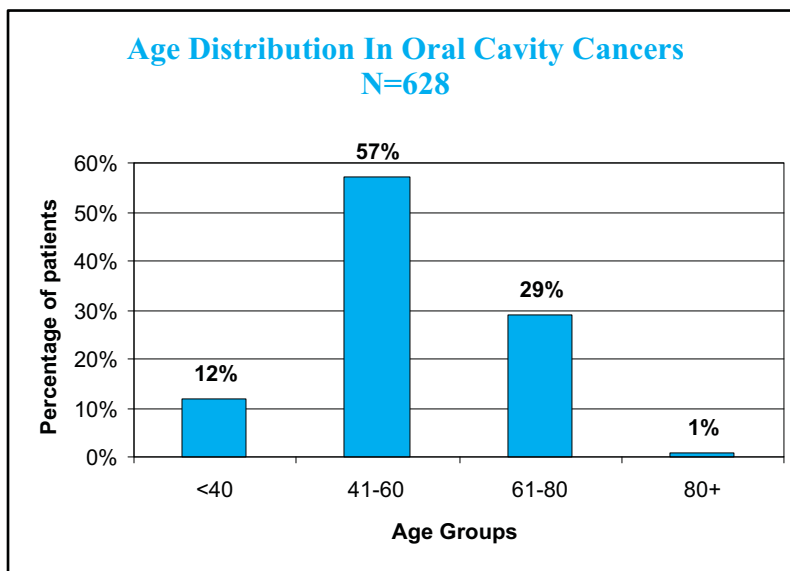
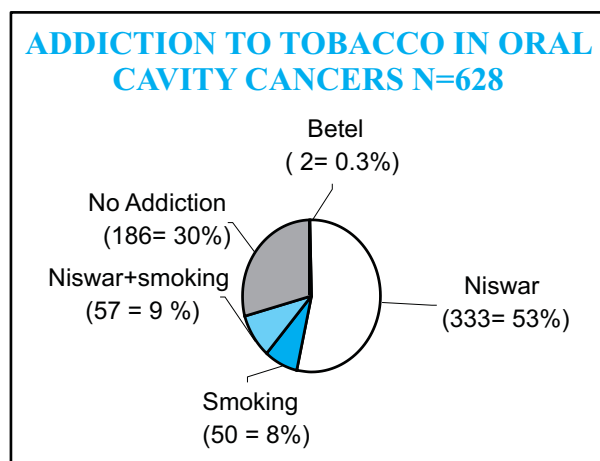


Fig -3

**Fig-4**

cancers have stated that oral cancer formed the majority of head and neck cancers with predilection for tongue.<sup>1</sup>

Oral tongue was the commonest site identified in 135 (52%) patients followed by buccal mucosa in 69 (26%) patients out of total 264 patients of oral cancers in a study carried out by Iype EM and Pandey M.<sup>17</sup>

In North West Frontier Province (NWFP) of Pakistan tobacco is used in various forms, smoking tobacco in Huqa or chilam or as cigarette smoking. Other more common form of tobacco, used especially in rural population, is in the form of Naswar (oral snuff). Naswar is crushed tobacco placed in the form of a small ball about 2 cm in size in oral cavity between cheek and lower gum. In this study the reason for high incidence of squamous cell carcinoma in lower alveolus is that niswar is placed in the lower alveolus more commonly.

In this study histological confirmation revealed 605 cases of squamous cell carcinomas (SCC). The study of Iype EM and Pandey M also revealed that majority of oral cancers are SCC (85.9%).<sup>17</sup> In a similar study carried out at medical center for Dentistry Amsterdam 90% of oral cancers were SCC.<sup>23</sup> The remaining 10% of malignancies consisted of malignant melanomas, carcinomas of intra oral salivary glands and sarcomas of soft tissues. In this study the remaining non squamous cancers were malignant melanomas, clear cell carcinomas and adenoid cystic carcinomas.

Regarding the histo pathological differentiation of SCC, in this study, 53 % of cancers were well differentiated, 17 % were moderately differentiated and 3 % were poorly differentiated. In 26 % of cases the differentiation was not recorded. In the study of Mehrotra R in India, moderately differentiated SCC was the most

prevalent type.<sup>31</sup>

## CONCLUSION

Cancer of the oral cavity is one of the commonest cancers in humans with high prevalence in some regions of the world like Pakistan, India and Bangladesh, the most common cancer in males. The major associated risk factors are tobacco and alcohol in western countries, betel nut (pan masala) smoking, and pan in India and naswar in North West of Pakistan.

## REFERENCES

1. Elango JK, Gangadharan P, Sumithra S, Kuriakose MA. Trends of head and neck cancers in urban and rural India. *Asian Pacific J Cancer Prev* 2006; 7:108-12.
2. Bhurgri Y, Rahim A, Bhutto K, Bhurgri A, Pinjani PK, Usman A, et al. Incidence of carcinoma of oral cavity in Karachi: District South. *J Pak Med Assoc* 1998; 48: 321-5.
3. 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 J Cancer* 2005; 43:89-93.
4. Mehrotra R, Singh M, Kumar D, Pandey AN, Gupta RK, Sinha US. Age specific incidence rate and pathological spectrum of oral cancer in Allahabad. *Indian J Med Sci* 2003; 57: 400-4.
5. Kademani D. Oral cancer. *Mayo Clin Proc* 2007;82: 878-87.
6. Rosai J. *Ackerman's surgical pathology*. 9th ed. St Louis: Mosby;2004: 254-255.
7. Jovanovic A, Kostense PJ, Snow GB, van der Waal I. Tobacco and alcohol related to the anatomical site of oral squamous cell carcinoma. *J Oral Pathol Med* 1993; 22:459-62.
8. Sankaranarayanan R, Duffy SE, Padmakumary G, Day NE, Krishan-Nair N. Risk factors for cancer of buccal and labial mucosa in Kerala, southern India. *J Epidemiol Community Health* 1990; 44: 286-92.
9. Park S, Bae J, Nam BH, Yoo KY. Aetiology of cancer in Asia. *Asian Pac J Cancer Prev*.2008;9:371-80
10. Jordan RC, Daley T. Oral squamous cell carcinoma: New insights. *J Can Dent Assoc* 1997; 63:517-8.
11. Paz IB, Cook N, Odom-Maryon T, Xie Y, Wilczynski SP. Human papilloma virus (HPV) in head and neck cancer, an association of

- HPV16 with squamous cell carcinoma Waldeyers tonsillar ring. *Cancer* 1997; 79: 595-604.
12. Rosenquist K, Wennerberg J, Annertz K, Schildt EB, Hansson BG, Bladström A, et al. Risk factors in oral and oropharyngeal squamous cell carcinoma: A population based case control study in Southern Sweden. *Swed Dent J Suppl* 2005;179:1-66.
  13. van der Waal I, Schepman KP, van der Meij EH, Smeele LE. Oral leukoplakia: A clinicopathological review. *Oral Oncol* 1997, 33:291-301.
  14. Sutor VG, Morger R, Spieler P, Bornstein MM, Altermatt HJ. Oral erythroplakia and erythroleukoplakia: red and red-white dysplastic lesions of oral mucosa-part2: Cytodiagnosis, pathogenesis, therapy and prognostic aspects. *Schweiz Monatsschr Zahnmed* 2008;118:510-8.
  15. Sciubba JJ. Opportunistic oral infections in the immunosuppressed patient. Oral hairy leukoplakia and oral candidiasis. *Adv Dent Res* 1996; 10:69-72.
  16. Hogewind WF, van der Kwast WA, van der Waal I. Oral leukoplakia with emphasis on malignant transformation: A follow up study of 46 patients. *J Craniomaxillofac Surg* 1989; 17:128-33.
  17. Iype EM, Pandey M, Mathew A, Thomas G, Sebastian P, Nair MK. Oral cancer among patients under the age of 35 years. *J Postgrad Med* 2001; 4:171-6.
  18. Syme SE, Drury TF, Horowitz AM, Maryland Dental hygienists assessment of patients risk behaviors for oral cancer. *J Dent Hyg* 2001; 75: 25-38.
  19. Hashibe M, Brennan P, Benhamous, Castellsague X, Chen C, Curado MP. Alcohol drinking in never users of tobacco, cigarette smoking in never drinkers and the risk of head and neck cancers. *J Natl Cancer Inst* 2007; 99 : 777-89.
  20. Applebaum KM, Furniss CS, Zeka A, Posner MR, Smith JF, Brayan J. Lack of association of alcohol and tobacco with HPV 16 associated head and neck cancer. *J Natl Cancer Inst* 2007; 99:1801-10.
  21. Gallus S, Altieri A, Bosettie C, Franceschi S, Levi F, Negri E. Cigarette tar yield and risk of upper digestive tract cancers-Control studies from Italy and Switzerland. *Ann Oncol* 2003;14: 209-13.
  22. Dias GS, Almeida AP. A histological and clinical study on oral cancer: Descriptive analysis of 365 cases. *Med Oral Patol Oral Cir Buccal*, 2007; 12: 474-8.
  23. Van der wall R, Van der wall I. Oral non squamous malignant tumour diagnosis and treatment. *Med Oral Patol Oral Cir Buccal* 2007; 12: 486-91.

**Address for Correspondence:****Dr Naseem Begum**

Consultant Clinical Oncologist (MCPS)

IRNUM, Peshawar, Pakistan

E mail naseembm@yahoo.com