

## RESEARCH COMMUNICATION

# Retrospective Study on Risk Habits among Oral Cancer Patients in Karnataka Cancer Therapy and Research Institute, Hubli, India

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### Abstract

**Background:** Retrospective studies on oral cancer patient profiles related to risk habits could provide etiologic clues for prevention in specific geographic areas. **Objective:** To study risk habit characteristics of oral cancer patients. **Methods:** A cross sectional retrospective case record study of oral cancer patients who reported during 1991-2000 to Karnataka Cancer Therapy and Research Institute, Hubli, India was conducted. Data on socio-demography, histopathology, site of cancer and risk habit profiles of the patients were recorded in a predesigned Performa by one calibrated examiner with internal validity checks. **Results:** The 1,472 oral cancer patients constituted 11% of total cancer patients. Mean age of the patients was 55 years, ranging from 12-88, with a male: female ratio of 2:1. 1,110 (75%) oral cancer patients had risk habits, 55% were habituated for >10 years and 25% were habit free. 751 (51%) patients had individual and 359 (24%) had combined risk habits. Majority 59% were chewers of betel quid alone (17%) / betel quid with tobacco (42%); smokers were (31%) and alcohol users were (14%) of patients. Chewers of gutkha, khaini were more in <40 years and betel quid in >40 years. Risk habituates were highest (87%) in patients with cancer of buccal mucosa, commonly affected site attributed to chewing habit in (51%) of patients. **Conclusions:** The prevalence of oral cancer was higher among elderly males predominantly with risk habits of betel quid/tobacco chewing and smoking for more than 10 years.

**Keywords:** Oral cancer - risk habits - Karnataka, India - tobacco - betel quid - retrospective study

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### Introduction

Oral cancer is the sixth most common cancer worldwide and shows marked geographic variation in occurrence (Warnakulasuriya, 2008). Oral cancer is of paramount importance to Dental professionals and constitutes a major public health problem in India as common cancer site observed by Indian cancer registries (ICMR, 1992). Epidemiological studies have shown that incidence of oral cancer varies significantly in different continents, and also between developed and developing countries, high incidence rates were reported in Asia region (India, Sri Lanka, Pakistan and Taiwan), parts of Europe (France, Hungary, Slovakia, and Slovenia), parts of Latin America and the Caribbean (Brazil, Uruguay and Puerto Rico), and in the Pacific region (Melanesia and Papua New Guinea) largely attributed to exposure to specific risk factors for oral cancer (Warnakulasuriya,

2008).

The disproportionately higher prevalence of oral cancer in India as one of the five leading cancer in either sex are related to the use of tobacco in various forms, consumption of alcohol and low socioeconomic condition related to poor hygiene, poor diet or infections of viral origin (Mehrotra et al., 2003; Gupta, 1999). The most widespread form of tobacco is chewing of betel-quid with tobacco and this has been demonstrated as a major risk factor for cancer of oral cavity (Gupta, 1999; Balaram et al., 2002). Betel quid with or without tobacco is one of the independent major risk factors for oral cancer (Gupta, 1982; Jacob et al, 2004). In countries where such habits were prevalent and had cultural importance in traditional and religious ceremonies, oral cancer was one of the most common cancers (Ariyawardana et al., 2007; Subapriya et al., 2007). Apart from tobacco use ill-fitting dentures, poor oral hygiene, syphilis, inadequate diet, malnutrition and

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chronic irritation from rough or broken teeth were reported more frequently in oral cancer patients (Ko et al., 1995).

The study of geographic variations of cancer risk in India with a huge population of diverse cultures, habits and dietary practices ought to be particularly fruitful in generating aetiological hypotheses that could open the doors for investigation of one or more cancers. Thus, descriptive oral cancer data for each specific geographic area are important for many reasons, including understanding the extent of the problem, determining which groups within the population are at highest and lowest risk, and relating the burden of oral cancer to that of other cancers to evaluate the allocation of resources for research, prevention, treatment and support services. The readily available comprehensive source of information on oral cancer occurrence and absence of previous reported studies from this part of the country related to magnitude and characteristics of oral cancer focused to implement the present retrospective study based on ten years institutional records. Despite the limitation of institutional records as source of cancer morbidity compared to population based epidemiological study, an effort was made to study risk habits among oral cancer patients reported during the year 1991-2000 to Karnataka Cancer Therapy & Research Institute, Hubli, Karnataka, India.

## Materials and Methods

### *Introduction to the study area:*

The present retrospective case record study on oral cancer was conducted at Karnataka Cancer Therapy and Research Institute (KCTRI) a Voluntary Charitable Institute, situated at Navanagar, Hubli in Karnataka state, India which was established in the year 1974. Before starting the study, permission was obtained from the concerned authorities at KCTRI. This is a specialty Centre for the management of cancer referred by medical practitioners, medical officers of government / private medical institutions from various parts of North Karnataka region, neighboring districts in the states of Maharashtra, Andhra-Pradesh and Goa. The medical and dental colleges at Hubli, Davanagere, Belgaum and Bijapur refer cancer patients to this institute especially for radiotherapy.

### *Study design and sample population:*

An observational cross sectional retrospective study of 1472 case records of oral cancer patients registered at K.C.T.R.I. during January 1991-December 2000. pilot study was conducted at K. C. T. R. I. by retrieval and analysis of 10 oral cancer case records per year from 1995- 2000 before starting the study to determine the its feasibility, availability of the information from case records and scheduling. The study was conducted over a period of 4 months (from August 2001 to December 2001) by one calibrated investigator under internal validity checks. Case records of patients with histo- pathological confirmatory diagnosis of primary malignant neoplasm of the oral cavity were included. Based on the availability of primary information on oral cancer cases recorded in the case records by the concerned authority at KCTRI from 1991 to 2000, secondary data collection Performa was

designed to include the following: 1. Socio demographic characteristics of patients at the time of diagnosis; 2. Reported Risk habits/ frequency/duration. a) Chewing habit: Betel quid alone; Betel quid + tobacco, alternative chewing mixtures (Gutkha, khaini, pan masala). b) Tobacco Smoking Beedi, Cigarette. c) Snuff d) Alcohol; 3. Site of cancer occurrence was recorded according to WHO International Classification of Diseases, 9th version under the Rubrics 140-145 (WHO, 1978).

### *Exclusion criteria:*

Histopathology confirmed pre-malignant lesions / conditions. Metastatic lesions in the oral cavity from other sites. Soft palate, Uvula / Tumors of major Salivary Glands were excluded as malignancies, which occur at that site, differ in etiology, histology and natural history from those arising in the covering epithelium of the upper aero digestive tract. Use of dentures/Food habits/frequency of risk habits were excluded due to incomplete data.

### *Statistics*

Data entered in the data collection form were coded and entered into the computer software Excel-2000 and analyzed by using STATISTICA and SPSS statistical software. Proportions and percentages were calculated.

## Results

The 1,472 oral cancer patients included in the study constituted 11% of total cancer patients reported to KCTRI during the year 1991 to 2000. The mean age of all patients was 55 years (range 12 years -88 years) with maximum patients (64%) in >50 years age group. The male: female ratio for oral cancer was 2:1 with (67%) male and (33%) female patients. Of the total patients 23% were urban and 77% were rural residents. Among 1110 (75%) patients reported with risk habits, majority (55%) were habituated for >10 years. Histological types of oral cancer included (96%) squamous cell carcinoma, (3%) verrucous carcinoma and (1%) of other types.

Table 1 illustrates distribution of risk habits according to gender and age among 1110 oral cancer patients (67%) were males and (33%) were females, comprising (65%) of the 220 patients in <40 years and (77%) of the 1252 patients in >40 years age group. Majority of female patients (39%) and patients <40 years were habit free. Of (51%) individual risk habituates, (40%) were chewers, (10%) were smokers, rest were snuff and Alcohol users. 359 patients (24%) had combination of risk habits, with (10%) chewers and smokers, (5%) smokers and Alcohol users, (5%) chewers + smokers + Alcohol users and rest being negligible. The individual habits like Chewing betel quid (223; 15%), betel quid with tobacco (22; 1%) and (350; 24 %) alternative chewing mixtures were predominantly reported among 57% of females compared to 32% among males; Snuff dipping was reported only among 4 females, whereas alcohol intake was reported among 9 males only. Smoking of beedi /cigarette (120; 8%) (23; 2%), alcohol intake (9; 1%) and multiple risk habits were predominantly reported among (349; 35%) males, of those (143; 14%) had combined habit of

**Table 1. Distribution of Risk Habits in the Study Group according to Gender and Age**

Risk Habits	Male		Female		<40 Years		>40 Years		Total	
	987 cases (67%)		485 cases (33%)		220 cases (15%)		1,252 cases (85%)		1,472 cases (100%)	
With Risk habits	816	83	294	61	143	65	967	77	1,110	75
Individual risk habits	467	47	284	59	94	43	657	52	751	51
Chewing	318	32	277	57	73	33	522	42	595	40
Betel quid.	41	4	182	38	10	4.5	213	17	223	15
Betel quid + tobacco	7	0.7	15	3	5	2	15	1.2	22	1
Alternative	270	27	80	16	58	26	292	23.3	350	24
Smoking:										
Beedi	117	12	3	0.6	11	5	109	9	120	8
Cigarette	23	2	-	-	8	4	15	1.2	23	1.5
Snuff dipping	-	-	4	0.8	1	0.4	3	0.2	4	0.2
Alcohol	9	1	-	-	1	0.4	7	0.5	9	1
Multiple risk habits	349	35	10	2	49	22	310	25	359	24
Chewers (272 patients)	265		7		40		232		272	
Betel quid.	16		4		4		16		20	
Betel + tobacco quid.	18		2		3		17		20	
Gutkha/khaini/panmasala	231		1		34		198		232	
Smokers (307)	299		8		39		268		307	
Beedi.	268		8		29		247		276	
Cigarettes	31		-		10		21		31	
Alcohol (208)	206		2		20		188		208	
Chewing + smoking	143	14	2	0.4	18	8	127	10	145	10
Chewing+ alcohol	56	6	1	0.2	9	4	48	4	57	4
Smoking+ alcohol	78	8	2	0.4	8	4	72	6	80	5
Chewing+ smoking+ alcohol	68	7	2	0.4	12	5	58	5	70	5
Other combinations+snuff	4	0.4	3	0.6	2	1	5	0.3	7	0.4
None of the risk habits	171	17	191	39	77	35	285	23	362	25

Alternative chewing mixtures: Gutkha/khaini/panmasala

**Table 2. Distribution of Cancer in Different Anatomical Sites of the Oral Cavity Risk Habits in the Study Group**

Risk Habits	Isolated sites 1023 (69%)						Multiple sites 449 (31%)	
	Lip	Tongue	Gingiva	Floor of the mouth	Hard palate	Buccal mucosa	Gingiva + buccal mucosa	Others
	25	365	149	39	33	412	211	238
	2	25	10	3	2	28	14	16

Individual risk habits 751 patients

Chewing habit 595								
Betel quid 223	-	20 (5.4)	20 (14)	10 (26)	6 (18)	117 (28)	40 (19)	10 (4)
Betel quid+tobacco 22	-	3 (1)	3 (2)	-	-	10 (2)	4 (2)	2 (0.8)
Alternative 350	2 (8)	87 (24)	60 (40)	3 (8)	2 (6)	85 (21)	40 (19)	71 (30)
Beedi 120	8 (32)	18 (5)	6 (4)	-	10 (30)	42 (10)	13 (6)	23 (9.6)
Cigarette 23	-	9 (2.4)	2 (1)	-	1 (3)	8 (2)	2 (1)	1 (0.4)
Snuff dipping 4	2 (8)	-	-	-	-	1 (0.2)	-	1 (0.4)
Alcohol 9	1 (4)	1 (0.2)	1 (1)	2 (5)	-	2 (0.4)	2 (1)	-
Multiple risk habits								
In 359 patients	1 (4)	102 (28)	24 (16)	4 (10)	2 (6)	95 (23)	79 (37)	52 (22)
In 1110 patients	14 (56)	240 (66)	116 (78)	19 (49)	21 (64)	360 (87)	180 (85)	160 (67)

Alternative chewing mixtures: Gutkha/khaini/panmasala

chewing+ smoking and rest (202;21%) had multiple risk habit of alcohol combined with either smoking /chewing alone or both. The 92(42%) of patients in <40 years were chewers of alternative chewing mixtures compared to 490(39%) in >40years age group, whereas traditional betel quid chewers with /without tobacco were more 261(21%) in >40 years. The multiple risk habits were more (25%) in >40years compared to (22%) in <40 years age group.

The distribution of cancer in different anatomic sites of oral cavity attributed to various risk habits among 1472 oral cancer patients are shown in (Table 2). Buccal mucosa was the most commonly affected isolated intraoral site for oral cancer among (28%) patients followed by tongue

among (25%) patients. The risk habits were highest among (87%) patients with cancer of buccal mucosa attributed to chewing habit of betel quid(28%), betel quid with tobacco (2%)and alternative chewing mixtures(21%) alone in (51%) 212 patients. Cancer of lip among 9 patients (32%) and cancer of hard palate among 10 patients (30%) were attributed to beedi smoking habit alone. The 83 patients (56%) with cancer of gingiva were attributed to chewing habit alone having 60(40%) alternative chewing mixtures. The chewing of betel quid alone /with tobacco and alternative chewing mixtures were more in 40% followed by multiple risk habits in (37%) of patients with cancer of gingiva+ buccal mucosa.

## Discussion

Oral cancer for the developing world is certainly of great significance, oral cancer patients accounted for 11% of total cancer patients reported during 10 years is comparable to study in India (Sankaranarayanan, 1990). The characteristics of oral cancer patients in this study has typical pattern as described in the literature reported in older age group >50 years, higher among males and commonly associated with risk habits. The incidence of oral cancer increases with age, predominantly in people aged 50 years and above (Howell, 2003). This has generally been attributed to indiscriminate substance abuse, particularly use of tobacco related products over considerable period of time. While most studies reported a mean age of more than 60 years old (Arbes, 1999), recent studies in India have shown an increase in incidence of oral cancer in younger age group with mean age of 51 years old (Subapriya et al., 2007). This variation in the mean age of oral cancer patients may reflect either early detection of the lesion by improved screening programs or an increase in incidence among the younger age groups due to early exposure of deleterious risk habits.

The male to female ratio of 2:1 is lower than the range of oral cancer incidence rate ratios other than in India between 3 and 10 and higher than approximately 1 at (Madras) or lower than 0.5 at (Bangalore). Such very high incidence rates in Indian women reflect the persistent importance in India of pan chewing innocuous habit with sociocultural acceptance equally common in both genders. (Franceschi et al., 2000; IARC, 1985). Majority (77%) of the patients were from rural area which is comparable to study by (Winn et al., 1981) and contrasts to (Vogler et al., 1962) study with more urban patients. The present study results on histological type of oral cancer are in line with the results from cancer hospitals in India, comprising majority 98.7% of squamous cell carcinoma and its variants, 7.4% of verrucous carcinoma and 1.3% of other types of oral cancer (Sankaranarayanan et al., 1990).

Among the total patients, 75% had risk habits and 25% were habit free, which is less than 84.5% with habits; 15.5% habit free by (Sankaranarayanan et al., 1990) and higher than 51% with habits; 49% habit free reported by (Winn, 1981). The reason for higher proportion of patients with habits is probably related to the early initiation of betel nut/ tobacco use especially in chewing form due to its easy availability, low cost and sociocultural acceptance. Even though the age of commencement of chewing habit was not specified, the data from various cancer hospitals in India showed mean age of commencement of chewing was 22 years in males and 25 years in females with oral cancer. Majority 55% of the patients had risk habits for more than 10 years (Sankaranarayanan et al., 1990) stepwise analysis found that duration of risk habit was more important than frequency in determining the potential risk of the habit for oral cancer causation and (Castellsague et al., 2004) reported great risk of oral cancer with great number of years of tobacco quid chewing. The frequency of a habit along with duration would be more important in determining the severity of the effects in relation to oral cancer.

For Indian population, tobacco use both in chewing and smoking form act synergistically in oral carcinogenesis and that persons with mixed habits form a substantially high risk population (Jussawalla, 1971; Jayant et al., 1977). The overall etiologic fractions due to smoking and/or chewing tobacco for cancer of the oral cavity among 1085 (74%) is more than 70% reported by (Jayant et al., 1977) and parallels to findings from various cancer registries in India (Gupta, 1999). The predominant risk habit of chewing betel quid with / without tobacco either alone or in combination reported among (59%) of oral cancer patients could be one of the independent major risk factors for oral cancer as reported by (Gupta, 1982; Jacob et al., 2004). The various epidemiological studies conducted by (Jussawalla, 1971; Sankaranarayanan et al., 1990; Nandakumar et al., 1990) reported use of smokeless tobacco as an important cause of oral cancer particularly in India and risks of developing oral cancer in chewers (combinations of betel leaf, Areca nut, lime and tobacco) were 2-4 times higher as compared to those with no tobacco habits. The consumption of alternative chewing mixtures reported among 42% of young oral cancer patients is consistent with hypothesis of an increase in oral cancer among young patients aged <50 year between 1983-1987 and 1995 were due to increased consumption of alternative chewing mixtures as reported by (Gupta, 1999).

Of 450 (31%) oral cancer patients with smoking habit, (27%) were beedi smokers, Studies in India have shown that beedi produce more carbon dioxide, nicotine, tar and alkaloids than regular cigarettes, the filter less design of beedi combined with low combustibility may contribute to higher toxin yields than with cigarettes (Pakhale, 1990; 1998). Alcohol consumption is less compared to chewing and smoking habits which coincides with (Notani, 1985; Sankaranarayanan et al., 1990) study where alcohol drinking does not emerge as a strong independent risk factor for oral cancer, as the risks reported for alcohol consumers were relatively much lower than those for tobacco chewers and smokers. High risk habit of combined tobacco (smoking or chewing) and alcohol-drinking were reported among (214; 14%) patients. The study results of (Rothman, 1972) showed that people who smoked and consumed alcohol were 15.5 times more prone to develop oral cancer compared to people without risk habits. The role of snuff dipping reported among 11 oral cancer patients in the present study can be compared to high prevalence of oral cancer among women with snuff dipping habit in southern United States (Hirayama, 1966).

The maximum affected anatomic site for oral cancer was buccal mucosa followed by tongue and gingivo-buccal mucosa is consistent with studies in India by (Jussawalla, 1971; Sankaranarayanan et al., 1990). The higher proportion of buccal mucosa cancers in patients at Bangalore, Madras, and Singapore Indians (ethnically south Indians) could be attributed to highly prevalent tobacco and betel quid chewing habit affecting the anatomic site of oral cavity where the betel / tobacco quid is habitually kept which act as contact carcinogen (Muir et al., 1988; Hirayama, 1966). The highest age adjusted rate for buccal mucosal cancer was reported in

Madras for males and in Bangalore for females (Muir et al., 1988). However, the length of time of contact with the tar and nicotine products in the tobacco smoke and tobacco quid seems to be the crucial factor in causation of cancer at particular anatomic site. The highest relative risks have been related to retaining the quid during sleep. Smokeless "Spit" tobacco contains over 2000 chemicals, five of which have been directly related to causing cancer. Mostly these quids (Gutkha, khaini) are kept where it is gradually absorbed after dilution with saliva affecting floor of mouth the site of maximum insult among (48 %) of the patients. The risk habits among 78% of gingival cancer patients is slightly lower than descriptive study in India that reported 85% and 51% of gingival cancer patients indulged in pan-tobacco chewing and smoking respectively (Srivastava and Sharma, 1968).

Despite the methodological limitations, this retrospective study is first to report on risk habits among oral cancer patients reported to KCTRI, Hubli and supports many studies that showed chewing of betel quid alone/ with tobacco and smoking as important risk habits for oral cancer. This baseline data provides a prospect of averting oral cancer by risk habit control and valuable springboard for future hospital / population based prospective epidemiological studies. Among oral cancer patients 25% without risk habits considered in the study, role of dietary factors, poor oral hygiene, poor dental status, denture irritation, genetic predisposition, oncogenic viruses (human papilloma virus), occupation, exposure to sunlight, Hormones (estrogens), sexual practices cannot be neglected and directs further studies to establish their role in oral cancer causation. This study implicates seriousness of the need to implement and sustain appropriate oral cancer preventive measures including health education to the public emphasizing on early symptoms, risk habits particularly tobacco chewing/smoking, self-examination instructions, regular visits to the dentist and oral cancer screening programs for the community.

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