

## RESEARCH COMMUNICATION

# Factors Affecting Oral Cancer Awareness in a High-risk Population in India

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### Abstract

**Objectives:** To evaluate the awareness of oral cancer, its risk factors and to estimate the prevalence of risk factors in a high-risk semi-urban population in India. **Methods:** A questionnaire-based survey was carried out by house-to-house interview on a single day by 120 health volunteers. The data were analyzed using SPSS 11.0 software for links between prevalence of risk factors and oral cancer awareness, as well as other confounding variables. **Results:** A total of 1885 persons participated in the survey. Of the surveyed population, 86% had heard about oral cancer and 32% knew someone with oral cancer. Sixty-two percent of the subjects correctly identified the causes; this included 77% of the subjects who identifying smoking, 64% alcohol and 79% pan chewing as a cause of oral cancer. More than 42% believed that poor oral health could lead to oral cancer and 53% thought that oral cancer is an incurable disease. Forty percent of males and 14% females had one or more high-risk habits. It was observed that the awareness was proportional to the education level ( $p < 0.001$ ) and inversely proportional to the prevalence of risk factor habits ( $p < 0.001$ ). Eighty-two percent of the smokers, 75% of the tobacco chewers and 66% of those who consumed alcohol were aware that their habits could lead to oral cancer. **Conclusions:** Overall, the awareness of oral cancer in this high-risk population was satisfactory, though certain gaps exist, pointing to a need for targeted health education and risk factor cessation counseling.

**Key Words:** Oral cancer - knowledge and awareness - practice - risk factors - health education - tobacco

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### Introduction

Oral cancer (ICD -10, C01-06) is one of the most common cancers in India, where an estimated 80,000 new cases and 46,000 oral cancer-related deaths occur yearly (Ferlay et al., 2004). In Kerala, oral cancer is the most common cancer, with age-adjusted rates of 17.7/100,000 among rural males and 9.3/100,000 among rural females (Cancer Incidence and Mortality, 2007). About 75-95% of oral cancers can be attributed to the prevalence of risk habits such as consumption of tobacco and alcohol (Johnson, 2003). In India, regular use of tobacco in one form or the other was reported by 43% of rural males and 28% of urban males (NSSO 1998). The estimated prevalence of tobacco consumption in Kerala was 31% among males and 5.7% among females in the rural population and 27% among males and 4% among females in urban population (NSSO 1998).

Although the majority of oral cancers are readily visible, almost 70% of the patients present with advanced stage III and IV disease (Barry and Katz, 1989; Vokes et al., 1993; Forastiere et al., 2001). Similar late presentation is observed in the cancer registry data of the state of Kerala (National Cancer Registry Program, 2007). Further, in high incidence areas, majority of oral cancers arise from longstanding premalignant lesions (Gupta et al., 1989;

Lumerman et al., 1995). It has been reported that lack of awareness among the public about oral cancer and the associated risk factors is the primary reason for delayed presentation of oral cancer (Warnakulasuriya et al., 1999). The objective of the present study was to determine the level of awareness of oral cancer and the associated risk factors in the high-risk population of Kerala, India. This knowledge is essential to implement an effective health education program to reduce the incidence and mortality from oral cancer.

### Materials and Methods

A questionnaire-based survey was conducted as part of a single day oral cancer awareness program at Thiruvankulam, a semi-urban area of Ernakulam district in Kerala. Amrita Institute of Medical Sciences and the Indian Dental Association jointly organized the survey. Volunteers from a local teachers training institute conducted the fieldwork using a pre-defined questionnaire. The volunteers visited all houses in the selected area-two wards of the Panchayat and collected the data by personal interview. Of the 890 houses in the selected area, 845 (95%) were visited by the volunteers. The rest of the houses were not accessible. All individuals over the age of 10 years were included in the survey. In

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**Table 1. The Questionnaire**

<b>A. Knowledge &amp; Awareness:</b>	
1.	Have you heard about mouth cancer?
2.	Do you know anyone who had mouth cancer?
3.	Do you know the cause of oral cancer?
4.	Is oral cancer a contagious disease?
5.	Can smoking cause oral cancer?
6.	Can alcohol cause oral cancer?
7.	Does pan chewing cause oral cancer?
8.	Is poor oral health a cause of oral cancer?
9.	Is oral cancer a curable disease?
<b>B. Presence of Symptoms:</b>	
10.	Do you have any white/red patches in your mouth?
11.	Do you have any ulcers in your mouth?
<b>C. Habits:</b>	
12.	Do you smoke cigarettes or beedi?
13.	Do you chew pan with tobacco?
14.	Do you chew pan without tobacco?
15.	Do you drink alcohol?

addition to demographic details, educational level and occupation were also recorded.

In the structured questionnaire there were fifteen questions to be answered by each respondent, which are listed in Table 1. The questionnaire elicited a 'yes' or 'no' response. The response 'no' was given a score of 1 and the response 'yes' a score of 2. The overall awareness about oral cancer and risk factors were assessed by the response to the questions 1-9 with a maximum score of 18, the knowledge of risk habits by the response to questions 5,6,7 with a maximum score of 6 and the prevalence of risk habits by questions 12,13,14,15 with a maximum score of 8. There were two questions (10 and 11) to assess the presence of lesions in the mouth. The awareness response was cross-tabulated with variables such as age, sex, education, and occupation. Education level was grouped as primary (at least five years of schooling), high school (≥10 years) and college. The data was entered in the SPSS software version 11.0. Chi square test employing both 2x2 and Mantel Haenszel were used to evaluate the statistical significance of the results. A detailed analysis was performed to correlate the mean age with the awareness of risk habits, symptoms and the prevalence of risk habits and the education level with the awareness and the prevalence of risk habits. Those subjects who have not responded to the questions were excluded from the analysis.

**Results**

A total of 1,885 persons participated in the survey: 1,028 (55%) males and 857 (45%) females. Sixty three percent of the subjects were in the 30 to 59 years age group. The demographic details are given in Table 2.

*Overall awareness of oral cancer and risk factors (1-9)*

Overall awareness of oral cancer in this high-risk community was good, with 50% scoring 12-16 out of the maximum score of 18. Only 2.2% (31 persons) were totally unaware of the oral cancer and its risk factors. Eighty six percent (n=1,621) of the subjects had heard

**Table 2. Demographic Details of the Interviewed Population**

	Males	Females	Total
Number	1,028 (54.5)	857 (45.5)	1,885 (100)
Age			
10-29	79 (7.7)	100 (11.7)	179 (9.5)
30-49	400 (38.9)	390 (45.5)	790 (41.9)
50-69	403 (39.2)	256 (29.9)	659 (35.0)
70-89	92 (8.9)	69 (8.1)	161 (8.5)
90-99	-	2 (0.2)	2 (0.1)
NM	54 (5.3)	40 (4.7)	94 (5.0)
Education			
Primary	180 (17.5)	214 (25.0)	394 (20.9)
High school	350 (34.0)	253 (29.5)	603 (32.0)
College	378 (36.8)	275 (32.1)	653 (34.6)
NM	120 (11.7)	115 (13.4)	235 (12.5)
Occupation			
Self employed	361 (35.1)	84 (9.8)	445 (23.6)
Industry	115 (11.2)	21 (2.5)	136 (7.2)
Public sector	208 (20.2)	49 (5.7)	257 (13.6)
Unemployed	245 (23.8)	581 (67.8)	826 (43.8)
NM	99 (9.6)	122 (14.2)	221 (11.7)

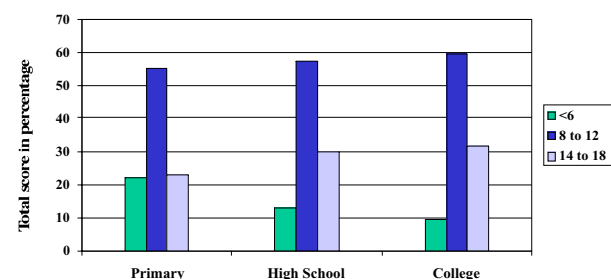
NM=Not Mentioned; Percentages are given within brackets

about oral cancer and 32% knew someone with history of oral cancer, 42% thought that poor oral health was a cause of oral cancer. Sixty two percent (n=1,169) correctly identified the causes of oral cancer. There were, however, certain misconceptions about oral cancer in this community. Twenty four percent believed that oral cancer is a contagious disease. Fifty three percent believed that oral cancer is not a curable disease. Overall, the awareness of oral cancer was proportional to the educational level of the subjects. It was highest among those who had their college education, followed by those who have had their high school and primary education respectively (p<0.001) (see Table 3). Those subjects who did not respond to the questions were excluded from the analysis and hence the difference in the total number in the Table.

No significant difference was observed among different age groups (p=0.767) and between males and females (p=0.879). Awareness of oral cancer was found to be not associated with age in either males (r = 0.019) or females (r = -0.038)

*Knowledge of risk factors: (qns.5,6,7)*

Seventy seven percent (males-77.9%, females-77.1%) subjects identified smoking as the cause of oral cancer, but only 64% (65.5% and 64.5%) recognized alcohol as a risk factor. Seventy-nine percent (males-78.9%, females-



**Figure 1. Overall Awareness of Oral Cancer Among the Educational Groups**

**Table 3. Education and Overall Awareness of Oral Cancer**

Education	Males			Females		
	No	Mean±SD	P	No	Mean±SD	P
Primary	152	13.9±2.19	0.002	190	13.7±2.28	<0.001
High School	290	14.4±1.92		213	14.5±1.95	
College	319	14.6±1.76		239	14.6±1.54	

**Table 4. Risk Factor Awareness and Mean Age**

Factor	No	Males		P	Females	
		Age±SD			No	Age±SD
<b>Smoking</b>						
No	177	49.4±14.6	0.836	159	49.4±16.6	0.009
Yes	760	49.6±14.0		629	45.6±14.2	
<b>Chewing</b>						
No	177	50.0±14.1	0.654	129	50.4±16.0	0.001
Yes	770	49.5±14.1		661	45.4±14.4	
<b>Consumption of alcohol</b>						
No	303	49.3±14.7	0.798	260	46.5±15.0	0.732
Yes	636	49.6±13.8		525	46.1±14.6	

80.9%) correlated pan chewing with oral cancer.

There was no significant difference in the awareness of risk factors between males and females. There was no significant association with age in males, but in the case of females, mean age was significantly lower (45 years) in those who were aware with respect to smoking and chewing. This was not found to be true in case of consumption of alcohol (Table 4).

*Prevalence of symptoms related to oral cancer (qns.10,11)*

Among those interviewed, 8% reported to have white or red patch in their mouth, 9% had ulcers in their mouth. They were subsequently referred to the nearest hospital for further evaluation.

*Prevalence of risk habits (qns. 12,13,14,15)*

Five hundred and thirty two (28%) subjects (40% males and 14% females) reported to have one or more risk habits. Four percent of the subjects had all the risk habits. The prevalence of each risk habit is given in Table 5.

**Smoking:** Among the surveyed public, 21% gave history of smoking cigarettes or bidis. Among males, the prevalence of smoking was 33%. Majority of these subjects (57%) were in the 40-59 years age group. Sixty-four females (7.5%) smoked; majority (48%) being in the 30-49 years age group. Eighty-two percent (83% of male smokers and 80% of female smokers) were aware that smoking could cause oral cancer.

**Pan chewing with tobacco:** Overall, 11% of the interviewed subjects chewed pan with tobacco. This included 12% of the males and 8% of the females. Among males 40-59 years age group was the commonest age group (58%) with this risk habit. Among females who chewed pan with tobacco, majority of them (55%) were in the 60-79 years age group. Among chewers, 71% (74% male and 67% female) were aware that pan chewing could cause oral cancer.

**Pan chewing without tobacco:** Seven percent of the interviewed subjects chewed pan without tobacco. This included 9% of the males and 6% of females. The peak

**Table 5. Prevalence of Risk Habits among Males & Females Aged >10 Years**

Habits	Male (%)	Female (%)
Smoking	339 (32.9)	64 (7.5)
Chewing pan with tobacco	126 (12.3)	65 (7.6)
Chewing pan without tobacco	90 (8.8)	48 (5.6)
Alcohol consumption	290 (28.2)	57 (6.7)
More than one habit	238 (23.2)	53 (6.2)
No habit	537 (52.2)	676 (79)

age group among both males and females was 40-59 years. Those subjects who did not respond to the questions were excluded from the analysis and hence the difference in the total number and that in the Table. Nearly 75% of the chewers were aware that pan chewing could cause oral cancer.

**Alcohol:** Eighteen percent of the surveyed public consumed alcohol. This included 290 (28%) males and 57 (7%) females. Alcohol consumption rate was the highest in the 40-59 age group in both males (61%) and females (64%). Among males and females who consumed alcohol, only 66% were aware that alcohol could cause oral cancer.

With increased level of education, there was significant increased overall awareness of oral cancer (p<0.001) and its risk factors (chi-square value=52.382, df=6, p<0.001). The prevalence of risk habits was significantly low with increased level of education (chi-square value=173.285, df=4, p<0.001) (Table 3).

The male subjects had high-risk habits despite awareness of its deleterious effect. Whereas in female subjects there was a significant positive association between risk habit prevalence and awareness (Table 6). In addition, among the different habitué education was not found to be associated with awareness.

Risk analysis (odds ratios) was carried out for habitué. It was found among males that the risk of having the habit in those who were not aware of chewing pan with tobacco as a risk factor was 1.67 times more than the risk of having the habit in those who were aware of the risk. Among females the odds ratio was 2.7. Both these odds ratios were found to be statistically significant. In case of other habits, it was not found to be associated with awareness.

**Discussion**

Awareness about cancer, its risk factors and their symptoms can lead to early clinical presentation. Unlike reported from low-risk populations (Warnakulasuriya et al., 1999; Tomar and Logan, 2007), the data from this study has suggested that the overall awareness of oral cancer in this high-risk population is high. However a considerable

**Table 6. Habits & Overall Awareness of Oral Cancer**

Habits	Males			Females		
	No	*Mean±SD	P	No	*Mean±SD	P
No	458	5.31±1.94	0.299	588	5.37±1.86	0.029
Yes	350	5.46±1.86		97	4.81±2.38	

\*awareness score

proportion of habitués were not aware of the risk of their habits. This included 18% of smokers, 34% of subjects who consumed alcohol, and 25% of pan-chewers. The data from this study has confirmed that the prevalence of risk habits and awareness about oral cancer and the knowledge of risk factors are proportional to the education level of the subjects.

Even with increased knowledge and awareness of oral cancer and their risk factors, one third of the subjects in this survey had one or more high-risk habits. The peak age group of the subjects with high-risk habits was 40-59 years. Although majority of the subjects with tobacco habits were aware that it is a risk factor for oral cancer, a significant proportion of subjects who consumed alcohol (34%) were not aware that alcohol consumption could lead to oral cancer.

These key findings could be taken into account in providing targeted health education in high-risk population. Further investigations have to be carried out to find out the reasons behind the continued practice of high-risk habits, despite knowledge. Health education should be carried out to bridge the gap between the knowledge and awareness of oral cancer and their risk habits and the practice of these habits. It has been reported that health education could result in a significant proportion of subjects giving up their tobacco habits (Gupta et al., 1995). Several recent smoking cessation studies have shown the quit rate ranging from 7.7 to 11% (Johnson 2003). Perhaps this strategy could be put into more effective use if addressed to the high-risk population with high-risk habits.

As there is good awareness of oral cancer in the high-risk community surveyed in this study, it may be appropriate to initiate intensive public education program for recognition of early warning signs of oral cancer and facilitate early detection by mouth self-examination. Mathew et al (1995) have demonstrated feasibility of this technique in high-risk population. It has also been shown that regular oral examination by trained health workers in high-risk population with high-risk habits can lower the mortality related to oral cancer (Sankaranarayanan et al., 2005). The role of the health workers can be extended to educate and train the public about the oral cancer, its risk factors, and methods to perform oral self examination, and habits cessation counseling.

Health education through mass media both print and visual can be effectively utilized in these communities with high-literacy level. Brochures containing information on oral cancer, risk factors, detailed harm caused by tobacco use, pan, alcohol, early warning signs of oral cancer, methods to perform oral self examination may be distributed to the public along with newspapers and similar approach may be undertaken through other mass media. The state of Kerala, the population studied, has high literacy level (96% of males and 93% of females are literates). This population has the highest proportion of persons who have completed at least 12 years of education (NFHS-3 2007). In this population, 87.6% of males and 59.6% of females read newspaper or magazine at least once a week, 80.7% of males and 73% of females watch television at least once a week, 49.5% of males and 41.5%

of females listen to radio at least once a week. Only 1.7% of males and 9.5% of females have no exposure to any mass media (NFHS-3 2007). A similar profile can be seen in other urban communities. Also health education of school children through self examination brochures, audio-visual teaching aids may further improve the awareness and motivate the public to stop their risk habits and improved reporting to the local screening clinic. In a study by Vaidya (1992), it was found that 40% of the respondents in the intervention group received health education messages from the school students compared to 1.4% from the Health workers. Targeted oral cancer health education and anti-tobacco campaign may be undertaken taking advantage of mass media, specifically addressing gap in the knowledge identified in studies such as this.

## References

- Barry P, Katz PR (1989). Oral cancer screening in the elderly. *J Am Geriatr Soc*, **37**, 913-4.
- Ferlay J, Parkin DM, Pisani P (2004). Cancer incidence, mortality and prevalence worldwide. GLOBOCAN 2002, Lyon:IARC Press.
- Forastiere A, Koch W, Trotti A, et al (2001). Head and neck cancer. *N Engl J Med*, **345**, 1890-900.
- Gupta PC, Bhonsle RB, Murti PR, et al (1989). An epidemiologic assessment of cancer risk in oral precancerous lesions in India with special reference to nodular leukoplakia. *Cancer*, **63**, 2247-52.
- Gupta PC, Murti PR, Bhonsle RB, Mehta FS, Pindborg JJ (1995). Effect of cessation of tobacco use on the incidence of oral mucosal lesions in a 10-yr follow-up study of 12,212 users. *Oral Dis*, **1**, 54-8.
- Johnson NW (2003). Aetiology and risk factors for oral cancer. In: Oral cancer. NWJ Jatin P Shah, John G Batskis, Martin Dunitz: 36.
- Johnson NW (2003). Prevention of oral cancer. In: Oral Cancer. N. W. J. Jatin P Shah, John G Batskis, Martin Dunitz: 464.
- Lumerman H, Freedman P, Kerpel S, (1995). Oral epithelial dysplasia and the development of invasive squamous cell carcinoma. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod*, **79**, 321-9.
- Mathew B, Sankaranarayanan. R, Wesley R, Krishnan Nair M., (1995). Evaluation of mouth self-examination in the control of oral cancer. *Br J Cancer*, **71**, 397-9.
- National Cancer Registry Program, India (2007). Consolidated report of Hospital based Cancer Registries, 2001-2003.
- NFHS-3 (2007). National Family Health Survey (NFHS-3) 2005-06. M. International Institute for Population Sciences.
- NSSO (1998). A note on the consumption of tobacco in India. National Sample Survey Organization NSS 50th Round (1993-1994), Sarvekshana(21).
- Sankaranarayanan R, Ramdas K, Thomas G, et al (2005). Effect of screening on oral cancer mortality in Kerala, India: a cluster-randomised controlled trial. *Lancet*, **365**, 1927-33.
- Tomar SL, Logan HL. (2007). Florida adults' oral cancer knowledge and examination experiences. *J Public Health Dent*, **65**, 221-30.
- Vaidya SG (1992). Assessment of the efficacy of an antitobacco community education programme. Goa Cancer Society, Goa.
- Vokes E E, Weichselbaum RR, Lippman SM, Hong WK (1993). Head and neck cancer. *N Engl J Med*, **328**, 184-94.
- Warnakulasuriya KAAS, Harris CK, et al (1999). An alarming lack of public awareness towards oral cancer. *Br Dental J*, **167**, 319-22.