

Awareness of Oral Cancer among Patients at a Tertiary Dental Care Center

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Abstract



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Objective Awareness of etiology and clinical presentation of oral cancer among general population would help in the early detection of oral cancer and a favorable outcome for the patients. The aim of the present study was to assess the awareness regarding oral cancer among patients of a tertiary dental care center.

Material and Methods A cross-sectional descriptive survey was conducted among patients of a tertiary dental care center using a self-administered questionnaire comprising of 18 questions to assess the awareness related to risk factors, clinical presentation, and treatment options. Data was entered in MS Excel and analyzed using SPSS software version 28. Descriptive statistics was used to summarize the data and percentage of patients responding to various options in questions. Association between variables was assessed by chi-square test. A *p*-value of < 0.05 was considered significant.

Results A total of 325 dental patients responded to the questionnaire. Tobacco smoking and chewing were identified well as risk factors by almost all respondents; however, alcohol, human papillomavirus, and poor oral hygiene were less identified. Statistically significant differences were observed in the people's awareness of oral cancer based on various sociodemographic variables.

Conclusion The patients had a basic awareness of oral cancer. However, they had limited knowledge on risk factors other than tobacco. Knowledge has to be improved on risk factors other than tobacco. Patient's level of awareness also varied based on socioeconomic differences among them. Oral cancer awareness programs conducted at the primary health center level may ensure proper awareness in the general population which could enable prevention and/or early detection of such conditions.

Keywords

- ▶ oral cancer
- ▶ awareness
- ▶ prevention

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Introduction

Bray et al in the global cancer statistics 2018 have mentioned cancers of lip and oral cavity as the most frequent type of cancer in South Asian countries.¹ Until recently, oral cancer was considered to be a disease more common among older adults. Nowadays, a high occurrence of oral squamous cell carcinoma (OSCC) is reported worldwide in younger individuals aged less than 40 years also.² Risk factors for oral cancer include alcohol consumption, tobacco use, nutritional deficiency, etc. Apart from these, human papillomavirus infection and chronic trauma from sharp teeth or broken appliances may eventually lead to cancer.

Oral cancer is relatively curable if identified early. However, more than 50% of oral cancer cases are diagnosed at advanced clinical stages which may be associated with metastasis to local lymph nodes. Advanced stage oral cancer requires aggressive treatment which is often unsuccessful.³ Public awareness about oral cancer, its risk factors, and signs and symptoms can help in early diagnosis, thus increasing the survival rate of patients. This study was conducted to assess the knowledge about oral cancer among patients attending a tertiary dental care center.

Materials and Methods

Study Design

A cross-sectional descriptive survey was conducted for a period of 6 months from March 2022 to August 2022 among the patients attending Government Dental College, Thrissur, Kerala, India which aimed to assess their awareness regarding oral cancer using a self-administered questionnaire. Ethical clearance was obtained from the Institutional Ethics Committee (no 005/IEC/GDCTSR/2022).

Questionnaire Development

A structured questionnaire which is pretested and validated by subject experts was used for collecting the data from the patients (see [Supplementary Material Questionnaire](#), online only). The questionnaire had two sections, section A comprising of demographic characteristics such as age, gender, place of residence, education, occupation, and socioeconomic status. Section B comprised 18 questions to assess the person's awareness regarding oral cancer. The questions were prepared after reviewing relevant literature.

Part of the questionnaire was modified from survey instrument used in the cross-sectional study conducted by Shimpi et al, along with a few questions developed by the authors.³ Questions were included to assess the awareness of various domains of oral cancer, that is, risk factors, clinical presentation, management, and prevention.

Content validity of the questionnaire was assessed by three experts consisting of specialists in oral medicine and oral pathology. Item content validity index (I-CVI) for all the items ranged between 0.7 and 1 indicating that all items were clear, understandable, and relevant. Scale CVI (S-CVI) was greater than 0.90 confirming the content validity of the scale. For all items, kappa statistics were excellent (> 0.8)

which indicated excellent agreement between the experts and not due to chance.

Face validity of the questionnaire was assessed by administering it to 20 participants. They were asked for any difficulty in readability or understanding of the questions. Necessary modifications were made based on their suggestions.

Reliability of the questionnaire was assessed by test-retest method. It was administered twice to the same subjects ($n = 50$) at an interval of 2 weeks. The intraclass correlation coefficient (ICC) for 7 items ranged between 0.6 and 0.7 indicating that the reliability was good and ICC for the remaining items ranged between 0.8 and 0.9 indicating excellent reliability. Internal consistency of the questionnaire as assessed by Cronbach's α (0.80) was good.

Collection of Data

The sample size was calculated using the formula for prevalence study with prevalence (p) = 72 and precision (d) = 5%, hence $n = 322$ (minimum sample size required).⁴ The final questionnaire along with an informed consent form was distributed in-person to all participants in the waiting area of the dental college after describing the aim of the study. Patients older than 18 years who were attending clinics at the dental college and were at the waiting area of the clinics were included. Patients diagnosed with oral cancer or visited for emergency care (trauma or acute pain) were excluded from the study. Completed questionnaires and consent forms were collected back. Incompletely filed forms were omitted.

Data Management and Analysis

Data analysis was performed using Statistical Package for Social Sciences (SPSS) software version 28. Descriptive statistics were used to summarize the data and percentage of people responding to the various options in question. The association between the responses and sociodemographic variables was analyzed using the chi-square test. p -Values were derived and values < 0.05 were considered significant. For questions in binary response format, a score of 1 was given for positive response and 0 for the negative response.

Results

A total of 325 surveys were collected during the study period of which 133 participants were males and 192 females. Patient's age ranged from 18 to 68 years. A total of 237 respondents were from rural areas whereas 88 people belonged to the urban population. Education status also varied from illiterate persons to professionals; however, most of them had completed high school or college education. Occupation also ranged from unemployed to professionals. Socioeconomically, 210 participants were above poverty line (those with annual family income $> 24,000$ INR, as per the Government norms) and 115 were below poverty line. Responses to various questions have been summarized in [Table 1](#).

Note that 94.5% of respondents identified tobacco as the risk factor for oral cancer, followed by alcohol (38.2%), viruses (34.2%), and poor oral hygiene (28%). Nutritional deficiency was the least identified risk factor (13.2%).

Table 1 Participants' responses to various questions in the survey questionnaire (N = 325)

Sl. no.	Question	Response (Yes)	Response (No)
1.	Do you think cancer may occur individuals without deleterious habits?	260	65
2.	Does cancer show a familial tendency?	90	235
3.	Can chronic nonhealing ulcers due to sharp tooth, broken tooth or broken teeth set lead to cancer?	177	148
4.	Do you know that some white or red patches may develop in mouth before oral cancer?	251	74
5.	Initial lesions of oral cancer could be painless	275	50
6.	Do you think cancer from other organs or sites can spread into mouth?	180	145
7.	Do you think cancer can affect jaw bones?	216	109
8.	Do you know to self-examine your mouth?	109	216
9.	Do you perform self-examination of your mouth?	228	97
10.	Do you think self-examination of mouth has role in prevention and early diagnosis of oral cancer?	215	110
11.	Is oral cancer a disease that can affect younger individuals (< 40years) also?	277	48
12.	Do you think early detection of oral cancer gives a better survival outcome?	298	27
13.	Can some viruses cause oral cancer?	244	81
14.	Is oral cancer a contagious disease?	54	271

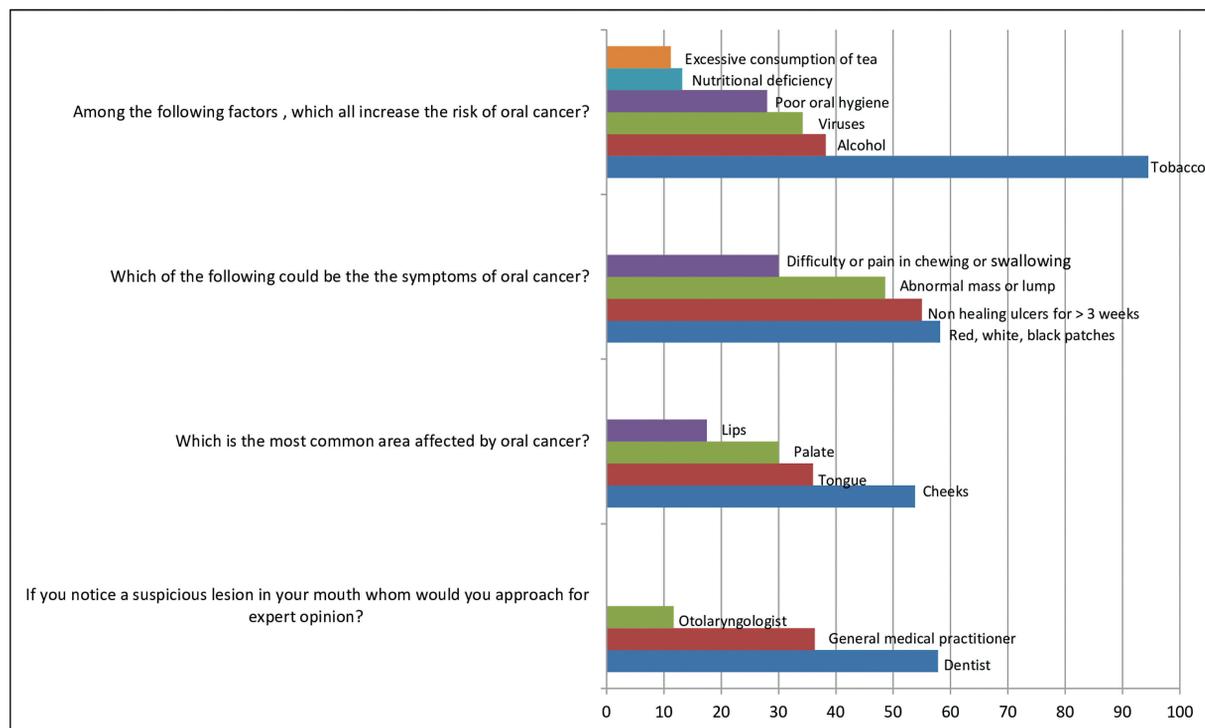


Fig. 1 Patient's responses to questions on various domains oral cancer.

Excessive tea consumption was also identified by 11.2% of respondents (- Fig. 1).

Abnormal mass or lump (58.2%), followed by nonhealing ulcers for more than 3 weeks (55%), red, white or black patches (48.6%), and pain (30%) were identified as symptoms of oral cancer. Note that 53.8% of respondents selected cheeks

as the most common site affected by oral cancer followed by tongue (36%), palate (30%), and lips (17.5%). A total of 57.8% of participants opined that they would consult a dentist if a suspicious lesion was noticed, followed by a general practitioner (36.3%) and an otolaryngologist (ear, nose, and throat specialist) (11.7%).

Table 2 Responses that showed significant differences in oral cancer awareness between urban and rural participants (significant at p -value < 0.05)

Sl. no.	Question	Rural	Urban	p-Value
1	Does cancer show a familial tendency?			0.016
	Yes	57	33	
	No	180	55	
2	Do you think cancer from other organs or sites can spread into mouth?			0.010
	Yes	121	59	
	No	116	29	
3	Do you know to self-examine your mouth?			0.048
	Yes	72	37	
	No	165	51	
4	Do you think early detection of oral cancer gives a better survival outcome?			0.010
	Yes	223	75	
	No	14	13	

Table 3 Association between oral cancer awareness and education status of participants (significant at p -value < 0.05)

Sl. no.	Questions	Illiterate	Primary school	High school	Graduate/Degree	Postgraduate	p-Value
1	Does cancer show a familial tendency?						< 0.001
	Yes	4	7	18	47	14	
	No	9	16	108	84	18	
2	Do you know that some white or red patches may develop in mouth before oral cancer?						0.009
	Yes	7	15	103	96	30	
	No	6	8	23	35	2	
3	Initial lesions of oral cancer could be painless						0.002
	Yes	8	14	110	114	29	
	No	5	9	16	17	3	
4	Do you think cancer can affect jaw bones?						0.034
	Yes	5	11	83	95	22	
	No	8	12	43	36	10	
5	Is Oral cancer a disease that can affect younger individuals (< 40 years) also?						< 0.001
	Yes	3	13	109	122	30	
	No	10	10	17	9	2	
6	Do you think early detection of oral cancer gives a better survival outcome?						<0.001
	Yes	7	19	115	126	31	
	No	6	4	11	5	1	

Statistically significant differences were observed in the people's awareness of oral cancer based on various socio-demographic variables. Urban residents were more aware of the spread of oral cancer from other organs to the mouth. They knew better than rural people to self-examine their mouth. However, most of the rural residents believed that cancer does not show familial occurrence and that early detection gives better survival outcomes (→ Table 2).

People with different levels of education also showed statistically significant differences in their responses (→ Table 3). Those who had high school level education were more aware of the occurrence of oral potentially malignant disorders and the possible painless nature of initial lesions of oral cancer. They knew better that oral cancer can affect younger individuals and may spread to jaw bones. They believed that early detection improves survival outcomes.

Table 4 Association between oral cancer awareness and employment of participants (significant at $p < 0.05$)

Sl. no.	Questions	Professional	Office job	Self employed	Daily wages job	House wife	Student	Unemployed	p-Value
1	Does cancer show a familial tendency?								0.002
	Yes	18	10	5	9	16	29	3	
	No	23	36	27	33	46	42	28	
2	Do you think cancer can affect jaw bones?								0.030
	Yes	31	32	20	24	44	52	13	
	No	10	14	12	18	18	19	18	
3	Do you know to self-examine your mouth?								0.018
	Yes	23	15	8	14	14	27	8	
	No								
4	Do you think self-examination of mouth has role in prevention and early diagnosis of oral cancer?								0.007
	Yes	31	36	20	23	37	54	14	
	No	10	10	12	1	25	17	17	
5	Is Oral cancer a disease that can affect younger individuals (< 40 years) also?								0.004
	Yes	41	36	30	33	48	65	24	
	No	0	10	2	9	14	6	7	
6	Do you think early detection of oral cancer gives a better survival outcome?								0.010
	Yes	41	42	30	34	59	67	25	
	No	0	4	2	8	3	4	6	
7	Is oral cancer a contagious disease?								0.030
	Yes	2	13	6	9	5	15	4	
	No	39	33	26	33	57	26	26	

Employed respondents showed better awareness of oral cancer (→Table 4). They were more aware that oral cancer may affect jaw bones. A significant percentage of them opined that self-examination has a role in early diagnosis. Most of the professionals knew to self-examine their mouth while all of them believed oral cancer can affect younger individuals and early detection improves survival outcomes.

Respondents with a higher economic status were more aware of risk factors such as chronic nonhealing ulcers and viruses. They knew better to self-examine their mouth and believed self-examination has a role in prevention and early diagnosis. Most of them opined that oral cancer can affect younger individuals and early detection improves survival outcomes (→Table 5).

Discussion

Most oral cancers are diagnosed in advanced stages, thus requiring aggressive treatment and associated morbidity. The lack of awareness of presenting symptoms and risk factors of oral cancer among general population is a potent hurdle for the early detection of oral cancer.⁵ This study evaluated the knowledge of patients visiting a tertiary dental care center with a self-administered questionnaire comprising 18 questions on various aspects of oral cancer.

Similar to the data from studies across the world,^{3,6-13} respondents in the present study also were well aware of the

risk associated with tobacco use. The high awareness of tobacco as a risk factor may be due to the continuous antitobacco campaigns in the country.

Alcohol abuse was the next well-identified etiologic factor in studies conducted by Shimpi et al, Saini et al, and Babiker et al.^{9,12} However, in the present study only one-third of respondents were aware of the role of alcohol in oral cancer development. Similarly, alcohol abuse was less identified as a risk factor in many studies conducted in Australia.¹¹

Participants reported lower rates of knowledge regarding other risk factors associated with oral cancer. Only one-third of participants were aware of the role of viruses in oral cancer development. A similar trend was observed in studies conducted by Shimpi et al and Formosa et al from the United States of America and Australia where only a quarter of participants were aware of the role of viruses in oral cancer.^{3,11}

Participants of the present study were less aware of poor oral hygiene as a risk factor for oral cancer. Conversely, majority of respondents (> 70%) in the surveys conducted by Zachar et al and Babiker et al identified poor oral hygiene as an etiologic factor.^{5,12} This highlights the need for initiating educational programs to improve the health literacy of population regarding less known risk factors of oral cancer.

In the present study, approximately half of the respondents correctly identified common presenting symptoms of oral cancer—abnormal mass or lump, nonhealing ulcers for

Table 5 Association between oral cancer awareness and socioeconomic status of participants (significant at $p < 0.05$)

Sl. no.	Questions	Above poverty line	Below poverty line	p-Value
1	Does cancer show a familial tendency?			0.042
	Yes	66	24	
	No	144	91	
2	Can chronic nonhealing ulcers due to sharp tooth, broken tooth or broken teeth set lead to cancer?			0.044
	Yes	123	54	
	No	87	61	
3	Do you perform self-examination of your mouth?			0.001
	Yes	160	68	
	No	50	47	
4	Do you think self-examination of mouth has role in prevention and early diagnosis of oral cancer?			0.001
	Yes	152	63	
	No	58	52	
5	Is Oral cancer a disease that can affect younger individuals (< 40 years) also?			< 0.001
	Yes	190	87	
	No	20	28	
6	Do you think early detection of oral cancer gives a better survival outcome?			< 0.001
	Yes	201	97	
	No	9	18	
7	Can some viruses cause oral cancer?			0.012
	Yes	167	77	
	No	43	38	

more than 3 weeks, and red, white, or black patches. Nearly one-third of people identified pain and difficulty in swallowing as other presenting symptoms. This suggests that further oral health education is required. This level of awareness was less than that reported by Zachar et al and Babiker et al, but higher than that of some other studies conducted by Reddy et al, Hassona et al, Peker et al, Pakfetrat et al, and Al-Maweri et al.^{5,6,8,12-15}

A total of 53.8% of respondents selected cheeks as the most common site affected by oral cancer followed by tongue (36%), palate (30.2%), and lips (17.5%). Buccal mucosa and mandibular gingivobuccal sulcus are the most common sites affected in the Indian population probably due to the habitual placement and holding of betel quid in the area. The tongue and floor of the mouth are common sites affected in the western population.¹⁶ However, chronic mucosal irritation from ill-fitting dentures or broken teeth may increase the risk for the occurrence of cancer on the lateral border of tongue even in individuals with no deleterious habits.¹⁷ Hence, awareness needs to be created regarding the lateral border of tongue as a high-risk area for oral cancer.

In the present study, an association between knowledge regarding oral cancer and family income was observed, which was significantly associated with education level. An increased level of education was linked to greater awareness

of oral cancer. Zachar et al and Hassona et al have also reported that those respondents with secondary or university level education were more likely to identify and report common early symptoms of oral cancer such as a red patch than those with no formal education.^{6,8} Participants with no school education were less likely to report the common signs and symptoms of oral cancer.⁷

More than half of the participants reported that they would consult a dentist if oral cancer was suspected. However, this finding may be biased because the study was conducted in the waiting rooms of a tertiary dental care center.

Participants of the present study showed good awareness (85%) regarding the possible occurrence of oral cancer in younger individuals less than 40 years. Similar to the reports by Hassona et al, 16% of respondents in the present study also believed oral cancer to be a contagious disease.⁸

Conclusion

In summary, even though patients attending this tertiary dental care center had a basic awareness of oral cancer, they had limited knowledge regarding risk factors other than tobacco and various clinical presentations of OSCC. This emphasizes the importance of organizing educational programs along with treatment procedures for patients seeking

care at dental care centers. Government and professional organizations have to act together for raising awareness of oral cancer among the general population. The present study was conducted among a population that visited dental care settings who would be more informed than an average man who visits the dentist infrequently. Community-level surveys are required to obtain oral cancer awareness of the population for designing effective strategies for awareness creation among them.

Authors' Contributions

- D.A.G.: conceptualization, investigation, data curation, and writing original draft.
- I.G.: conceptualization, investigation, and methodology.
- S.S.: conceptualization, review and editing of draft, and project administration.
- R.G.N.: conceptualization, methodology, review, and editing of original draft.

Statement of Institutional Review Board Approval and/or Statement of Conforming to the Declaration of Helsinki

The study was reviewed and ethical approval was obtained from the Institutional Ethical Committee of Government Dental College, Thrissur, Kerala, India (Study no. 005/IEC/GDCTSR/2022).

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Conflict of Interest

None declared.

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