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Research Article

Oral cancer awareness of the general public in coastal village areas of Tamilnadu, India: a population based cross sectional study

Rajeshkumar Konduru, Ariarathinam Newtonraj*, Sugumaran Arun, Ananthan Velavan, Zile Singh

Department of Community Medicine, Pondicherry Institute of Medical Sciences, Puducherry, India

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***Correspondence:**
Dr. Ariarathinam Newtonraj,
E-mail: newton2203@gmail.com

ABSTRACT

Background: In India, the burden of oral cancer is very high, contributing greatly to morbidity and mortality. Primary prevention is the best approach to fight against this burden. For effective primary prevention, we need to assess the level of awareness among the population residing in rural India deprived of health facilities.
Methods: We conducted a population based cross sectional study in rural villages of Kancheepuram district, India, based on a pretested questionnaire, using one to one interview method, to assess the oral cancer awareness.
Results: Among the total interviewed (N=500) participants, 252 (50.4%) (CI-46.02-54.78) of the participants were aware about lung cancer followed by oral cancer 219; 43.8% (CI-39.45-48.15). Among the participants who were aware about oral cancer (n=219), most of the people were aware that alcohol (150; 68.5% (CI-62.34-74.65) and tobacco usage (147; 67.1 (CI-60.9-73.35)) are risk factors. Regarding signs and symptoms, about 89 (40.6% (CI-34.13-47.14)) participants aware that 'non healing mouth ulcer as a common sign, 81 (37%) (CI-30.59-43.38) participants aware about 'persistent white or red spots', 77 (CI-35.2% (28.84-41.48) participants aware 'lump or tissue over growth. Among the total participants (n=219), who were aware about the oral cancer, 23.3% disagreed with the question of luck, 31% believed that early detection can improve treatment, and 39.7% believed that lifestyle influence risk of oral cancer.
Conclusions: In general awareness about the oral cancer is very poor in these rural areas in South India and there is a need to device public health programme to improve the awareness and active screening of high risk population in rural areas area.

Keywords: Oral cancer, Awareness, Population based, Cross sectional study

INTRODUCTION

Cancer can occur at any age, site or tissue of the body and may involve any type of the cells. There are wide variations in the distribution of cancers throughout the world.

In India, the burden of Oral cancer is very high contributing greatly to morbidity and mortality due to various risk factors, most commonly being the tobacco and alcohol consumption.[1-4] In recent years, great advances have been made in the detection and treatment of oral cancers but mere diagnosis and management will not reduce the overall burden of the problem. The primary prevention which includes the removal of risk factors is of utmost importance in reducing the burden of the problem.

It is not easy to apply the primary prevention in the community unless the awareness levels and perceptions about the oral cancers in the community are well understood. Several studies are done among the patients

attending dental clinics and various other health care facilities to find out the knowledge and awareness levels regarding the oral cancers but very few studies are done among the apparently healthy rural population.[5,6] The purpose of this study is to find out the level of awareness and perceptions regarding the risk factors, warning signs and prevention and control measures among the rural population.

METHODS

Community based cross sectional study was carried out from first September to 30th September among the ten villages in Marakkanam Block, Vilupuram district, Tamilnadu (field practice areas of the Department of Community Medicine, Pondicherry Institute of Medical Sciences).

All the adults in the age group of 18 years and above willing to participate in the study were included. Face to face interviews were conducted by interns and medical social workers who were previously trained, under the supervision of faculty from department of community medicine.

Informed consent was obtained from all the participants after providing participants information sheet. Among the 10 villages of field practice area, 5 villages were selected randomly. Recruitment of study participants was by selection of first participants randomly followed by continuous selection from consecutive households till the required sample size was obtained. In case of multiple eligible participants in the same house hold, all were included in the study.

Of the 532 eligible participants 32 were declined to participate. The questionnaire was based on the previous similar works (available on web link by request from first author).[7,8]

However some questions were modified according to the Indian setup. A pilot study was conducted with 35 participants, followed by refinement of few questions. The questionnaire with 23 questions (modified) was divided in to three parts (1) socio-demographic aspect (2) oral cancer awareness, knowledge and cancer belief (main questionnaire) (3) section on smoking, alcohol consumption, fruit and vegetable intake, dentist visits and oral hygiene habits (i.e tooth brushing frequency).

The second part (oral cancer awareness part) of the questionnaire had 13 questions, of which three questions were designed to ask all the participants (n=500) (table 1 and table 3), whereas rest of the ten questions were asked only to the participants who were aware about oral cancer (n=219) (Table 2-6).

To assess the oral cancer awareness, we asked "Of the following cancers which one you know of or heard of?" listing a number of cancers including oral cancer. Then we asked "Have you ever examined your oral cavity by health professionals for any reason in the past one year?" to assess the opportunity for screening.

Subsequently questions related to awareness about the association of oral cancer with its risk factors (tobacco, alcohol) and awareness about the early manifestations (oral ulcer, red/white patch, swelling in the oral cavity) were asked. Current tobacco user defined as current smoking or use of any smokeless tobacco product, either daily or occasionally.

Ex-tobacco users defined as the number of ever tobacco smokers or smokeless tobacco users who currently don not smoke or use any form of tobacco. Never tobacco users were defined as adult who reported that they neither smoked nor used smokeless tobacco in their life time.[9]

Following three questions were asked regarding belief related to oral cancer, 'Getting oral cancer is a matter of luck and we cannot do anything to prevent this?', 'The early discovery of this cancer can increase the success of your treatment?', and 'Do you think we can change our lifestyle/habits to reduce the risk of cancer of the mouth?'. Results about these three questions were shown in the Table 6.

Statistics

Each questionnaire was coded and entered into Microsoft Excel. Data were analyzed using SPSS 16. Chi-square was used to analyze the difference between demographic and personal habits versus cancer awareness, cancer knowledge, and cancer beliefs. Pearson's Chi-square and fisher's exact test were used accordingly (wherever the expected count less than five).

RESULTS

Socio-demographic characteristics and their relations with some awareness and knowledge variables are shown in the Table 1 and 2. Most mentioned cancers in the survey are shown in the table 3. Knowledge of risk factors causing oral cancer is shown in the table 4. Knowledge about early manifestations of oral cancer are shown in Table 5.

Association of various socio-demographic factors with some cancer belief are shown in Table 6. When asked 'which cancer easier to detect by health professionals?' 6.4% mentioned lung cancer, 3% mentioned as breast cancer, 2% mentioned as mouth cancer, 0.6% mentioned as colon and pancreatic cancer each, 87.4% don't know the answer.

30.1% (66) of participants responded that oral cancer affects more male than female, 40.6% (89) responded females are more affected by oral cancer than males, whereas 29.2% (64) answered that oral cancer affect both sex equally.

Regarding the highest incidence of age group in oral cancer, 1.4% (3) responded 0-5 years, 3.2% (7) responded 6-25 years, 6.4%(14) responded 26-45 years, 66.7% (146) more than 45 years, 22.4% (49) responded 'don't know'.

Table 1: Socio-demographic characteristics and their relations with some awareness and knowledge variables (n=500).

Variables	N =500 n (%)	Oral cancer awareness (n=219;43.8%)	Oral cavity examination (n=157;31.4%)
Gender			
Male	189 (37.8)	91 (48.1)	68 (36.0)
Female	311(62.2)	128 (41.2)	89 (28.6)
P value		0.127	0.085
Age			
<49 years	283 (56.6)	150 (53.0)	101 (35.7)
≥ 49 years	217 (43.4)	69 (31.8)	56 (25.8)
p value		<0.001	0.018
Marital status			
Married	476 (95.2)	208 (43.7)	154 (32.4)
Unmarried	13 (02.6)	11(84.6)	3 (23.1)
Divorced/separated	11 (02.2)	0	0
p value		<0.001	0.068
Education			
Graduate/post graduate	5 (01.0)	4 (80.0)	3 (60.0)
High/secondary school	69 (13.8)	54 (78.3)	33 (47.8)
Middle school	117 (23.4)	62 (53.0)	49 (41.9)
Primary school	58 (11.6)	27 (46.6)	17 (29.3)
Literate below class 5	12 (02.4)	3 (25.0)	2 (16.7)
Illiterate	239 (47.8)	69 (28.9)	53 (22.2)
p value		<0.001	<0.001
Tobacco user			
Never	364 (72.8)	148(40.7)	114(31.3)
Current user	114 (22.8)	58 (50.9)	33 (28.9)
Past user	22 (04.4)	13 (59.1)	10 (45.5)
p value		0.053	0.311
Alcohol			
Never	430 (86.0)	179 (41.6)	131 (30.5)
Drinker	3 (00.6)	34 (64.2)	21 (39.6)
Ex-drinker	17 (03.4)	6 (35.3)	5 (29.4)
p value		0.006	0.393
Fruits			
<3 per week	478 (95.6)	208 (43.5)	148 (31.0)
>3 per week	22 (04.4)	11(50.0)	9 (40.9)
p value		0.549	0.326
Vegetables			
<7 per week	497 (99.4)	217 (43.7)	157 (31.6)
>7 per week	3 (00.6)	2 (66.7)	0 (00.0)
p value		0.584	0.555
Brushing			
<1 per day	183 (36.6)	39 (47.0)	26 (31.3)
≥ 1 per day	417 (83.4)	180 (43.2)	131 (31.4)
p value		0.522	0.987
Dental visit			
<1 per year	480 (96.0)	209 (43.5)	152 (31.7)
≥ 1 per year	20 (04.0)	10 (50.0)	5 (25.0)
p value		0.568	<0.001

Table 2: Socio-demographic characteristics and their relations with some awareness and knowledge variables: n=219.

	n=219	Tobacco as risk factor n=147 (67.1%)	Alcohol as a risk factor n=150 (68.5%)	Ulceras sign n=89 (40.6%)	Red/white patch as sign n=81 (37%)	Swelling as sign n=77 (35.2%)
Gender						
Male	91 (48.1)	59 (64.8)	65 (71.4)	37 (40.7)	38 (41.8)	30 (33.0)
Female	128 (41.2)	88 (68.8)	85 (66.4)	52 (40.6)	43 (33.6)	47 (36.7)
p value		0.543	0.430	0.996	0.217	0.567
Age						
<49 years	150 (53.0)	112 (74.7)	112 (74.7)	63 (42.0)	54 (36.0)	64 (42.7)
≥49 years	69 (31.8)	35 (50.7)	38 (55.1)	26 (37.7)	27 (39.1)	13 (18.8)
p value		<0.001	0.004	0.546	0.656	0.001
Marital status						
Married	208 (43.7)	138 (66.3)	142 (68.3)	84 (40.4)	79 (38.0)	73 (35.1)
Unmarried	11 (84.6)	9 (81.8)	8 (72.7)	5 (45.5)	2 (18.2)	4 (36.4)
p value		0.347	0.756	0.761	0.220	1.00
Education						
Graduate/post graduate	4 (80.0)	4 (100.0)	2 (50.0)	3 (75.0)	1 (25.0)	2 (50.0)
High/secondary	54 (78.3)	47 (87.0)	45 (83.3)	18 (33.3)	15 (27.8)	23 (42.6)
Middle	62 (53.0)	42 (67.7)	49 (79.0)	30 (48.4)	32 (51.6)	26 (41.9)
Primary	27 (46.6)	20 (74.1)	20 (74.1)	11 (40.7)	8 (29.6)	10 (37.0)
Literate below class 5	3 (25.0)	2 (66.7)	2 (66.7)	1 (33.3)	1 (33.3)	0 (0.0)
Illiterate	69 (28.9)	32 (46.4)	32 (46.4)	26 (37.7)	24 (34.8)	16 (23.2)
p value		<0.001	<0.001	0.410	0.108	0.094
Tobacco user						
Never	149 (40.9)	111 (74.5)	107 (71.8)	67 (45.3)	58 (38.9)	58 (39.2)
Current user	57 (50.0)	33 (57.9)	38 (66.7)	20 (34.5)	18 (31.6)	16 (27.6)
Past user	13 (59.1)	3 (23.1)	5 (38.5)	2 (15.4)	5 (38.5)	3 (23.1)
p value		<0.001	0.036	0.059	0.552	0.208
Alcohol						
Never	179 (41.6)	118 (65.9)	123 (68.7)	76 (42.5)	67 (37.4)	61 (34.1)
Drinker	34 (64.2)	27 (79.4)	23 (67.6)	12 (35.3)	10 (29.4)	15 (44.1)
Ex-drinker	6 (35.3)	2 (33.3)	4 (66.7)	1 (16.7)	4 (66.7)	1 (16.7)
p value		0.057	1.00	0.414	0.220	0.381
Fruits						
<3 time per week	208 (43.5)	144 (69.2)	142 (68.3)	84 (40.4)	76 (36.5)	74 (35.6)
>3 time per week	11 (50.0)	3 (27.3)	8 (72.7)	5 (45.5)	5 (45.5)	3 (27.3)
p value		0.007	1.00	0.761	0.540	0.751
Vegetables						
<7 times per week	217 (43.7)	145(66.8)	148(68.2)	89(41.0)	81(37.3)	77(35.5)
>7 times per week	2 (66.7)	2(100.0)	2(100.0)	0(00.0)	0(00.0)	0(00.0)
p value		1.00	1.00	0.515	0.532	0.542
Brushing						
<1 time per day	39 (47.0)	28 (71.8)	21 (53.8)	21 (53.8)	10 (25.6)	17 (43.6)
≥1 time per day	180 (43.2)	119 (66.1)	129 (71.7)	68 (37.8)	71 (39.4)	60 (33.3)
P value		0.493	0.030	0.064	0.105	0.224
Dental visit						
<1 time per year	209 (43.5)	138 (66.0)	144 (68.9)	84 (40.2)	77 (36.8)	72 (34.4)
≥1 time per year	10 (50.0)	9 (90.0)	6 (60.0)	5 (50.0)	4 (40.0)	5 (50.0)
p value		0.115	0.554	0.537	1.00	0.327

Table 3: Most mentioned cancers in the survey.

Type of cancer	n=500	% (CI)
Lung	252	50.4 (46.02-54.78)
Mouth	219	43.8 (39.45-48.15)
Breast	170	34.0 (29.85-38.15)
Cervix	167	33.4 (29.27-37.53)
Stomach	144	28.8 (24.83-32.77)
Thyroid	133	26.6 (22.73-30.47)
Skin	89	17.8 (14.45-21.15)
Colon	88	17.6 (14.26-20.94)
Prostate	29	05.8 (03.75-07.85)
Pancreas	21	04.2 (02.44-05.96)

Table 4: Most risk factors or causes for oral cancer.

Causes of cancer	N=219	% (CI)
Alcohol	150	68.5 (62.34-74.65)
Tobacco	147	67.1 (60.90-73.35)
Infections in the teeth	106	48.4 (41.78-55.02)
Reduced oral hygiene	59	26.9 (21.06-32.82)
Smoke from cars	56	25.6 (19.79-31.35)
Low consumptions of vegetables and fruits	38	17.4 (12.34-22.37)
Coffee consumption	29	13.2 (08.75-17.73)
Close contact	28	12.8 (08.36-17.21)
Treatments at dentist	20	09.1 (05.32-12.95)
Sun exposure	14	06.4 (03.15-09.63)

Table 5: Most mentioned early manifestations of oral cancer.

Signs and symptoms	N=219	% (CI)
Non healing mouth ulcer	89	40.6 (34.13-47.14)
Bleeding from the mouth	85	38.8 (32.36-45.27)
Abscess ,boil or infection	84	38.4 (31.92-44.80)
Persistent white or red spots	81	37.0 (30.59-43.38)
Lump or tissue over growth	77	35.2 (28.84-41.48)
Difficulty in opening the mouth	71	32.4 (26.22-38.62)
Have aphthous ulcers very often	60	35.2 (21.49-33.30)
Difficulty swallowing	44	20.1 (14.78-25.40)
Gastric pain	23	10.5 (06.44-14.56)
Prosthesis that fails to fit	20	09.1 (05.32-12.95)

Table 6: Socio-demographic characteristics and their relations with some cancer beliefs variables (n=219).

Variables	n=219 n (%)	Disagree with question of luck 51 (23.3%)	Early detection can improve treatment 68 (31%)	Lifestyle influence risk of oral cancer 87 (39.7%)
Gender				
male	91 (48.1)	26 (28.6)	31 (34.1)	37 (40.7)
female	128 (41.2)	25 (19.5)	37 (28.9)	50 (39.1)
p value		0.119	0.416	0.812
Age				
<49 years	150 (53.0)	35 (23.3)	51 (34.0)	62 (41.3)
≥49 years	69 (31.8)	16 (23.2)	17 (24.6)	25 (36.2)

p value		0.981	0.164	0.474
Marital status				
Married	208 (43.7)	48 (23.1)	63 (30.3)	82 (39.4)
Unmarried	11 (84.6)	03 (27.3)	05 (45.5)	05 (45.5)
p value		1.00	0.323	0.757
Education				
Graduate/post graduate	4 (80.0)	1 (25.0)	2 (50.0)	2 (50.0)
High/secondary	54 (78.3)	11 (20.4)	20 (37.0)	21 (38.9)
Middle	62 (53.0)	15 (24.2)	21 (33.9)	29 (46.8)
Primary	27 (46.6)	7 (25.9)	7 (25.9)	9 (33.3)
Literate below class 5	3 (25.0)	1 (33.3)	2 (66.7)	2 (66.7)
Illiterate	69 (28.9)	16 (23.2)	16 (23.2)	24 (34.8)
p value		0.969	0.261	0.600
Tobacco user				
Never	149 (40.9)	37 (24.8)	51 (34.2)	62 (41.6)
Current user	57 (50.0)	13 (22.8)	14 (24.6)	18 (31.6)
Past user	13 (59.1)	1 (7.7)	3 (23.1)	7 (53.8)
p value		0.361	0.297	0.202
Alcohol				
Never	179 (41.6)	40 (22.3)	56 (31.3)	70 (39.1)
Drinker	34 (64.2)	9 (26.5)	9 (26.5)	14 (41.2)
Ex-drinker	6 (35.3)	2 (33.3)	3 (50.0)	3 (50.0)
p value		0.671	0.483	0.864
Fruits				
<3 times per week	208 (43.5)	46 (22.1)	61 (29.3)	80 (38.5)
>3 times per week	11 (50.0)	5 (45.5)	7 (63.6)	7 (63.6)
p value		0.134	0.038	0.119
Vegetables				
<7 times per week	217 (43.7)	51 (23.5)	68 (31.3)	87 (40.1)
>7 times per week	2 (66.7)	0 (0.0)	0 (0.0)	0 (0.0)
p value		1.00	1.00	0.519
Brushing				
<1 time per day	39 (47.0)	8 (20.5)	15 (38.5)	22 (56.4)
≥1 time per day	180 (43.2)	43 (23.9)	53 (29.4)	65 (36.1)
p value		0.651	0.270	0.019
Dental visit				
<1 time per year	209 (43.5)	46 (22.0)	64 (30.6)	81 (38.8)
≥1 time per year	10 (50.0)	5 (50.0)	4 (40.0)	6 (60.0)
p value		0.055	0.505	0.201

DISCUSSION

Awareness of oral cancer in our study is 43.8%. Population based Study conducted by Warnakulasuriya in Great Britain showed 58% and by LS Monteiro in Portugal showed 68.6%.[8,10] But in contrary one of the study conducted by Elango et al in Kerala(India) showed awareness of about 98% and by Agrawal M el al showed 91.2%.[6,11] When compared to other cancers, most people aware about lung and oral cancer; may be due to the awareness campaign by the government of India under COTPA (Cigarette and Other Tobacco Product Act). But the proportion of knowledge level is low; nearly 60% of the people were not even aware about oral cancer. This study was conducted in a remote village, in which literacy and age of the participants play an important role in awareness; most of the people unaware of oral cancer are elderly people with educational qualification below the level of primary school.

Among the people who were aware of oral cancer (n=219), tobacco (68.5%) and alcohol (76.1%) were equally perceived as a risk factor of oral cancer. But still the proportion of knowledge is very low when compared in the other hospital based studies.[8,10]

Maximum participants (40.6%) said non healing ulcer as a sign. However lesser subjects were able to identify lump or tissue over growth (35%) or presence of persistent red/white spots (37%) as a sign of oral cancer.

This can lead to late presentation of oral cancer patients to the health care facilities followed by poor outcome.

To evaluate possibility of opportunistic screening programme at the health centre, we asked that how many of them had oral examination by health professionals in the past one year. Interestingly 31.4% had responded that they had their oral cavity examined by a health professional. But unfortunately high risk population (elderly, lower educational qualification) had lesser opportunity to opportunistic screening when comparing to others. Studies conducted in India has shown that the median age of oral cancer is 56 in male and 58 in female.[12,13]

So while designing hospital based opportunistic screening programme, high risk population should also be actively screened in the community. Some studies also evaluated the oral cancer awareness among the medical practitioner for screening and early diagnosis.[14,15] Apart from health professional paramedics can also be involved in initial screening.[5]

India has committed to screen the major three cancers (Breast, Cervical and Oral) through the public health infrastructure. This is implemented through National Cancer Control Programme(NCCP) and National Programme for Prevention and Control of Cancers, Diabetes, Cardiovascular diseases and Stroke (NPCDCS).[16,17] It is surprising to note that most of the people (6.4%) believe that lung cancer is the easiest cancer to detect by the health professionals followed by breast and oral cancer. This may be due to the awareness towards lung cancer in media and cigarette packs, but the fact that oral cancer can be easily detected than lung cancer should be reached to the public through mass campaign.

It is also noted that 77% of the people still believe that oral cancer can happen due to luck. This explains the association fatalism concept, which was explained by Warnakulasurya et al. and LS Monteiro et al but the proportion of fatalism is very high (77%) when comparing to Warnakulasurya et al (43%) and LS Monteiro et al (39.5).[8,10]As is it is a population based study conducted in the rural villages in South India, we didn't find any major limitations.

CONCLUSION

In general the awareness about the oral cancer is poor in rural villages in India. Cancer screening programmes should be actively done among high risk populations in rural villages, in India.

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REFERENCES

1. Rajaraman P, Anderson BO, Basu P, Belinson JL, D'Cruz A, Dhillon PK, et al. Recommendations for screening and early detection of common cancers in India. The Lancet Oncology. 2015;16(7):e352-e61.
2. Coelho KR. Challenges of the oral cancer burden in India. Journal of cancer epidemiology. 2012.
3. Mallath MK, Taylor DG, Badwe RA, Rath GK, Shanta V, Pramesh C, et al. The growing burden of cancer in India: epidemiology and social context. The Lancet Oncology. 2014;15(6):e205-e12.
4. Blot WJ, McLaughlin JK, Winn DM, Austin DF, Greenberg RS, Preston-Martin S, et al. Smoking and drinking in relation to oral and pharyngeal cancer. Cancer research. 1988;48(11):3282-7.
5. Sankaranarayanan R, Ramadas K, Thomas G, Muwonge R, Thara S, Mathew B, et al. Effect of screening on oral cancer mortality in Kerala, India: a cluster-randomised controlled trial. The Lancet. 2005;365(9475):1927-33.
6. Elango JK, Sundaram KR, Gangadharan P, Subhas P, Peter S, Pulayath C, et al. Factors affecting oral cancer awareness in a high-risk population in India. Asian Pac J Cancer Prev. 2009;10(4):627-30.
7. Prayman E, Yang Y-H, Warnakulasuriya S. Oral cancer awareness of patients attending health centres in trinidad. J Int Clin Dent. 2009:2(4).
8. Warnakulasuriya K, Harris C, Scarrott D, Watt R, Gelbier S, Peters T, et al. Oral cancer: an alarming lack of public awareness towards oral cancer. Br Dent J. 1999;187(6):319-22.
9. Palipudi KM, Gupta PC, Sinha DN, Andes LJ, Asma S, McAfee T, et al. Social determinants of health and tobacco use in thirteen low and middle income countries: evidence from Global Adult Tobacco Survey. PLoS One. 2012;7(3):e33466.
10. Monteiro LS, Salazar F, Pacheco J, Warnakulasuriya S. Oral cancer awareness and knowledge in the city of Valongo, Portugal. International journal of dentistry. 2012.
11. Agrawal M, Pandey S, Jain S, Maitin S. Oral cancer awareness of the general public in Gorakhpur City, India. Asian Pac J Cancer Prev. 2012;13(10):5195-9.
12. Balaram P, Sridhar H, Rajkumar T, Vaccarella S, Herrero R, Nandakumar A, et al. Oral cancer in southern India: The influence of smoking, drinking, paan-chewing and oral hygiene. International journal of cancer. 2002;98(3):440-5.
13. Mehrotra R, Singh M, Kumar D, Pandey A, Gupta R, Sinha U. Age specific incidence rate and

pathological spectrum of oral cancer in Allahabad. Indian journal of medical sciences. 2003;57(9):400.
14. Carter L, Ogden G. Oral cancer awareness of general medical and general dental practitioners. British dental journal. 2007;203(5):E10-E.
15. Carter LM, Ogden GR. Oral cancer awareness of undergraduate medical and dental students. BMC medical education. 2007;7(1):44.
16. National Programme for Prevention and Control of Cancer, Diabetes, Cardiovascular Diseases and Stroke (NPCDCS). Accessed on 19/12/2015. Available at: http://health.bih.nic.in/ Docs/ Guidelines/ Guidelines-NPCDCS.pdf.
17. Kulkarni PR, Rani H, Vimalambike MG, Ravishankar S. Opportunistic screening for cervical cancer in a tertiary hospital in Karnataka, India. Asian Pac J Cancer Prev. 2013;14(9):5101-5.

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