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# Effect of health education on awareness about oral cancer and oral self-examination

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## Abstract:

**CONTEXT:** Oral cancer is preceded by visible changes in the oral mucosa. These lesions can be detected by oral self-examination, but awareness about oral cancer is still low in developing countries.

**AIM:** To evaluate the effect of health education on awareness about oral cancer and oral self-examination.

**SETTINGS AND DESIGN:** Quasi-experimental trial was conducted in an urban resettlement colony of Chandigarh, India.

**MATERIALS AND METHODS:** A brochure having information and pictorials on oral lesions was used for conducting health education sessions on a one-to-one basis in the household setting among 85 males in age group 15–59 years during 2013, and each participant was encouraged to perform an oral self-examination. Study participants were interviewed about their awareness on oral cancer and oral self-examination before- and after-health education using a pretested interview schedule.

**STATISTICAL ANALYSIS:** Awareness items were scored, and mean change in awareness score was computed. Paired *t*-test was used for testing statistical significance.

**RESULTS:** Thirty-three percent of the study participants were current smokers, 25% consumed alcohol, and 9.4% chewed tobacco. The awareness scores after health education increased significantly from 5.3 to 6.7 ( $P < 0.05$ ), and 34% of the tobacco or alcohol users expressed their intention to quit these habits, and two persons actually quit tobacco chewing. Out of the 77 study participants who performed oral self-examination, nine were able to detect lesions, and one was found to have submucous fibrosis.

**CONCLUSIONS:** Health education intervention was able to initiate a favorable behavior change in the community. Hence, oral self-examination programs should be promoted.

## Keywords:

Health education, oral cancer, quasi-experimental, self-examination

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## Introduction

Oral cancer is a growing health problem in several regions of the world. It is the sixth most common cancer globally. About three hundred thousand cases of oral cavity and lip cancers had occurred worldwide in 2012; most these cases had occurred in developing countries.<sup>[1]</sup> In India, the age-adjusted rate of oral cancer was 20/100,000 population, which is higher than that reported in the developed countries.<sup>[2]</sup>

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Etiology of oral cancer has been primarily linked to the use of tobacco in smoking and chewable form; other factors such as poor oral hygiene and nutritional influences also contribute in its etiology. Recently, human papilloma virus, particularly type 16/18, has been reported as one of the etiologic factors.<sup>[3,4]</sup>

Oral cancer is ideal cancer to be identified by screening program. However, majority of these cancers still present at an advanced stage when cure rates are abysmal. Ignorance

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about the danger signs or lack of health seeking behavior in case of premalignant lesions is perhaps responsible for this situation. The time taken by the patient with oral cancer to seek medical advice is the longest delay, and it is followed by the delay on the part of medical professionals to refer patients to specialized units for confirmation. The late diagnosis also leads to the high economic burden.<sup>[5-7]</sup>

Screening and health education are well-recognized approaches for preventing the occurrence of oral cancers.<sup>[8]</sup> In South India, a significant reduction in mortality was observed after implementation of oral, visual screening by the primary care workers.<sup>[9]</sup> Health education has also been instrumental in improving the health-related knowledge and behavior<sup>[10]</sup> Communities residing in an area where a poster campaign took place had better chances to be aware of oral cancer compared with a comparison community residents elsewhere.<sup>[11,12]</sup>

However, awareness about oral cancer prevention, especially about the role of oral self-examination, is still very low in developing countries where the incidence of oral cancer is quite high. Several types of health education modalities need to be tested in varied population groups to find out the most suitable approach in the local context. Hence, this study was carried out in an urban slum population of Chandigarh to assess the effect of a health education intervention package on the awareness about prevention of oral cancer and adoption of oral self-examination practice.

## Materials and Methods

This quasi-experimental study was conducted, after obtaining approval from the Dissertation Committee of the Institute, from May to June 2013 among males who were residing in an urban slum area of Chandigarh where Institute had established a health center. The study was restricted to adult males because oral examination of females by a male doctor was considered to be a sensitive issue in the community. Sample size estimate was based on a previous study in which the awareness of oral cancer was 60%.<sup>[13]</sup> For calculating sample size, we assumed that post health education intervention the awareness will increase from 60% to 80%. Thus, a sample of 93 was estimated at 95% confidence interval, 80% power, and 10% drop out rate.

Sampling methodology was finalized by three authors (RK, JS, and KG). The first author (KS) was involved in primary data collection and giving the health education intervention to study participants. Authors RK, JS, KG, and DS supervised the data collection.

The study was carried out in an urban slum area (Indira Colony) of Chandigarh city. It is inhabited by migrant laborers, who mostly belong to low socioeconomic strata of the society, and are more vulnerable to oral cancer due to high prevalence of risky habits This area was purposely selected because our Department of Community Medicine delivers health care services in this area through a health center; hence, follow-up of the study population could be easily ensured.

Systematic random sampling was used by DS under the supervision of JS for selecting the study participants in the age group of 15–59 years. The number of houses was divided by the sample size to find out the sampling interval. The first house was selected randomly, and then next houses were chosen by adding the sampling interval to the previous one. If the house to be studied was found to be locked or if it did not have a male in the eligible age group, the next house was chosen. In case, multiple households were staying within the same house, one household was chosen randomly from amongst them. Further, if there were more than one male in the sampled household in the eligible age group, Leslie Kish table was used to select one of them as a study participant.<sup>[14]</sup>

The study tool was a structured pretested close ended questionnaire which had questions on social and demographic aspects, awareness about oral cancer, and questions regarding substance abuse. This study tool was adapted from the study by Elango *et al.* for which prior permission was obtained.<sup>[15]</sup> A pilot study was conducted by the first author (KS), prior to the main study in an area other than the study area (Civil Dispensary of Sector 38, Chandigarh) in which ten patients attending dental clinic were administered the questionnaire. The results of this pilot study were used to improve upon the questionnaire. The post intervention questionnaire also included a few additional questions such as whether the study participant had performed oral self-examination, and whether he has found any lesions in the oral cavity or whether he has any intention to quit tobacco or alcohol, and whether he has actually quit any of these habits? The construct validity, face validity, and content validity of the questionnaire and health education brochure were tested by a group of three experts: community physician (RK), dental surgeon (KG), and sociologist (MK).

Study participants were interviewed in home setting individually by KS before the intervention after ensuring privacy and obtaining their informed written consent. Of the 93 sampled participants, eight could not be contacted despite repeated attempts. After completion of the interviews, investigator (KS) provided “oral cancer health education brochure” to the participants, and health education sessions were conducted on a one-to-one basis in the home setting by the first author (KS). This

brochure had information on risk factors, early warning symptoms, and signs of oral cancer along with steps for conducting oral self-examination, in a vernacular language with pictorial views of precancerous lesions and conditions [Figure 1].<sup>[16]</sup> The brochure had been extensively pretested and modified before final use.

KS instructed the participants to do oral self-examination in the morning after brushing of teeth and rinsing of mouth thoroughly. They were asked to stand in front of a mirror in good light and visualize the entire oral cavity well. Then with mouth closed, hold lip with the tips of your fingers, and evert it and look at it carefully. Curl lips back and inspects teeth by gritting them together. Curl tongue tip upward, then sideways and look at the floor of the mouth. Finally, stick tongue out as far as it can go and pull it back. Look at each cheek's inner surface and at the roof of the mouth. Feel systematically using the index finger of one hand, feel all the parts of the oral cavity in the same sequence as looked in the local examination.<sup>[17]</sup>

Two weeks after, the health education intervention, participants were again interviewed, and a dental surgeon (KS) conducted the oral examination. Those suspected of having a probable neoplastic lesion were referred to a senior dental surgeon (KG) in a tertiary care hospital for confirmation of diagnosis and management of the disease.

Statistical analysis was done using Epi info software for windows (version 7.0.8.0, Centre for Disease Control,

Atlanta). Each correct awareness question was awarded a score of one. Thus, awareness score ranged from zero to eight. Change in the awareness score after the intervention was computed. Paired *t*-test was used to test the statistical significance of the change.

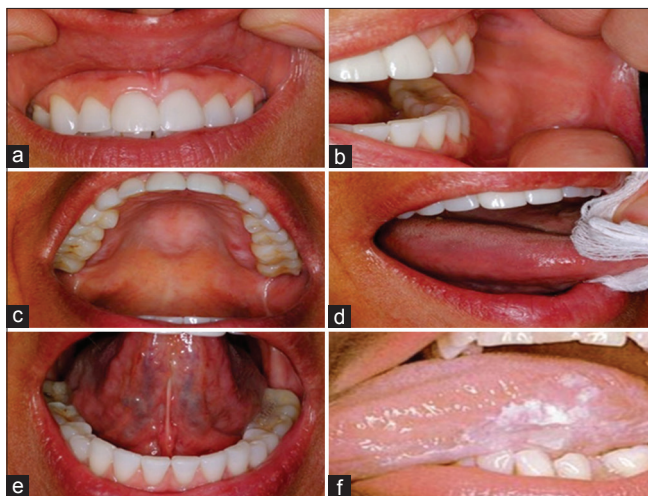
## Results

The mean age of study participants was 33.2 years (standard deviation 11.2 years). Socioeconomic characteristics and awareness level are presented in Table 1. About 16% of the respondents were illiterate, and about 18% had attained education level of graduate and above. More than 50% respondents were employed in private jobs, and about 8% were students. Only 22% had a monthly income of Rs. 15,000 or more.

Before the intervention, about 86% had heard about oral cancer. Around 26% reported it to be a contagious disease. Seventy-eight percent reported smoking as a cause of oral cancer, 55% felt that alcohol use can cause oral cancer, and 81% mentioned chewing "Gutkha" or "Khaini" or "Pan" as a cause oral cancer. As shown in Table 1, the awareness level was more in 15–19 years age group, higher income groups, and literates at graduation or above level. Awareness was maximum among students and minimum among self-employed.

After the health education intervention, awareness level increased significantly [Tables 1 and 2]. The mean awareness scores after the health education intervention increased from 5.3 (95% confidence interval [CI]: 4.8–5.8) to 6.7 (95% CI: 6.4–6.9). Out of the 85 study participants, 77 (90.5%) had performed oral self-examination, and 9 (11.6%) of them were able to suspect lesions in their mouth [Figure 2]. Among these nine participants, eight had aphthous ulcers, and one had difficulty in opening the mouth that was diagnosed as having sub-mucous fibrosis. He was referred to a tertiary hospital where the submucous fibrosis, which was in its late stage, was confirmed, and treatment was started.

Thirty-three percent of the study participants were current smokers, 9.4% were using tobacco in chewable forms like "Gutkha," "Khaini" or "Pan," and 25% consumed alcohol. After the health education intervention, in which the association of these risk factors with oral cancer had been explained, out of those, who had been using tobacco and or alcohol, 34% expressed the willingness to quit the tobacco/alcohol use; and two participants actually quit the oral tobacco use. Of those who detected the ulcer/lesions, 5 were either smoking or chewing tobacco or were drinking alcohol. Oral submucous fibrosis case had the habit of tobacco chewing and alcohol drinking.



**Figure 1:** Pictorial messages (a) Pull your upper lip up and look for any sores and color changes on your lips and gums. Repeat this on your lower lip. (b) Use your fingers to pull out your cheeks and look for any color changes such as red, white or dark patches. Put your index finger on the inside and your thumb on the outside of your cheeks to feel for any lumps. Repeat on other cheek. (c) Tilt your head back and open your mouth wide to see if there are any lumps or color changes. (d) Grab your tongue with a cotton gauge and examine for any swellings or color changes. Look at the top, back and each side of your tongue. (e) Touch the roof of your mouth with your tongue and look at the underside of your tongue and floor of the mouth. See if there are any color changes or lumps. (f) Leukoplakia

**Table 1: Change in awareness before-and-after health education according to sociodemographic characteristics**

Characteristics	Number (n)	Mean score			P*
		Before intervention	After intervention	Change	
Age group (years)					
15-19	9	6.2	7.2	1.0	0.04
20-24	13	6.0	7.1	0.9	0.03
25-29	17	5.4	7.0	1.6	0.003
30-34	8	5.0	6.7	1.7	0.07
35-39	12	5.0	6.6	1.6	0.01
40-44	8	5.7	6.8	1.1	0.04
45-49	12	5.0	6.0	1.0	0.03
≥50	6	3.6	5.3	1.7	0.04
Education					
Illiterate	14	2.5	5	2.5	0.001
Primary	17	3.8	6.5	2.7	0.001
Metric	22	6.0	7.1	1.1	0.001
Senior secondary	17	6.7	7.3	0.6	0.009
Graduation+	15	7.0	7.1	0.1	0.3
Household income/month (Indian rupees)					
<5000	22	3.6	6.3	2.7	0.001
5000-9,999	18	5.1	6.7	1.6	0.001
10,000-14,999	26	6.3	7.0	0.7	0.003
15,000+	19	6.1	6.7	0.6	0.004
Occupation					
Private job	43	5.5	6.9	1.4	0.001
Government job	14	5.4	6.5	1.1	0.03
Self-employed	21	4.2	6.0	1.8	<0.001
Students	7	7.1	7.4	0.3	0.1

\*Paired t test was used to compare changes before and after intervention

**Table 2: Awareness about oral cancer before- and-after health education intervention**

Awareness items	Before intervention		After intervention		Change percentage	P*
	n=85	Percentage	n=85	Percentage		
Have heard about oral cancer	73	85.8	85	100	16.4	0.001
Know any patient of oral cancer	14	16.4	14	16.4	0.0	1.0
Know the causes of oral cancer	58	68.2	82	96.4	41.4	0.0001
Oral cancer as contagious disease	22	25.8	6	7.0	-72.7	0.0001
Smoking can cause oral cancer	67	78.8	76	89.4	13.4	0.01
Alcohol can cause oral cancer	47	55.2	75	88.2	59.6	0.0001
Chewing tobacco can cause oral cancer	69	81.1	81	95.0	17.4	0.0001
Oral cancer is treatable	64	75.2	77	90.5	20.3	0.001

\*Z test was used to compare changes before and after intervention

## Discussion

The awareness levels about oral cancer prevention and control were already high in the study community, but none of the participants had performed an oral self-examination. The health education intervention initiated a favorable behavior change in the community. More than 90% of the study participants performed oral self-examination, and one case of submucosal fibrosis was identified. The awareness levels also increased further to a higher level [Tables 1 and 2]. Similar to our finding, a study among the patients attending dental hospital in Sri Lanka reported a high level of awareness

about oral cancer.<sup>[18]</sup> Similarly, in South India also, 86% of the respondents had heard about oral cancer.<sup>[19]</sup> Contrary to our finding, a study in the United Kingdom reported that general public had an alarming lack of awareness and knowledge about oral cancer and its risk factors.<sup>[20]</sup> Studies in North Carolina have also reported low awareness level.<sup>[21]</sup> Lower incidence of oral cancer in developed countries could be the possible reason of lower level of awareness, whereas, higher incidence of oral cancer in developing countries may have increased its awareness in the developing country setting.<sup>[22]</sup>

The awareness level about oral cancer in our study was comparatively less among the illiterates. This



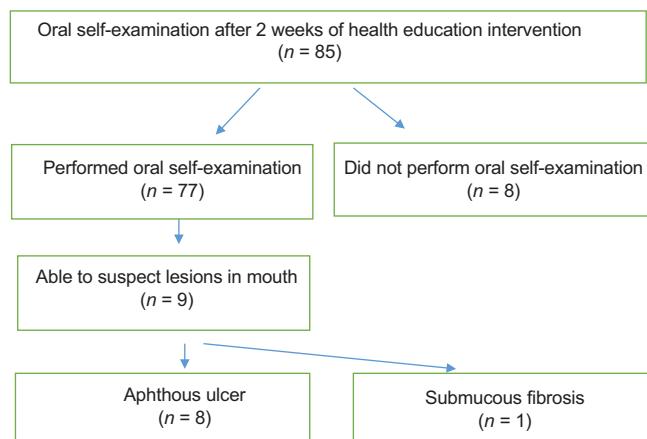


Figure 2: Outcome of health education on oral self-examination

finding is similar to the results of a study conducted in high-risk groups.<sup>[19]</sup> The awareness levels were highest in the high-income groups and lowest in lower income group respondents. Similar findings have been reported in Sri Lanka.<sup>[18]</sup> Therefore, the socioeconomic and educational status of the respondents should be an important consideration while designing health education programs.

Most of the respondents performed oral self-examination in our study after the health education intervention. This behavior change can be attributed to the health education intervention which was implemented over a short period of 2 months. We do not think there was any other source of information on this topic in the community. A parallel control population would have been a better study design but due to ethical reasons, it was not possible to include a control population, hence, a quasi-experimental pre- and post-test design was adopted. The health education brochure had simple, clear messages with a pictorial in the language which participants could understand. The brochure could be kept in the house for reading at any time according to the convenience of the study participant. Others have also reported significantly higher knowledge among those who had received information leaflets. In a randomized trial, public education campaigns using leaflets have been found to improve knowledge among general public and health service users.<sup>[23]</sup> Oral cancer screening programs have been found to be a cost-effective measure in raising the awareness and reducing mortality.<sup>[9,11]</sup> The follow-up period was only 2 weeks in our study. Future studies should assess whether the behavior change is sustained after longer time periods.

The prevalence of smoking and smokeless tobacco use was higher in the study community than the proportions reported in Global Adult Tobacco Survey report for Chandigarh City.<sup>[24]</sup> The reason for this may be that this study was conducted among an urban slum area of

Chandigarh city which is mainly inhabited by migrants from other states. After health education intervention, about one-third substance users expressed their intention to quit these habits. In future, some of them could enter into the next stage of quitting, thereby reducing the incidence of oral cancer. Hence, promotion of oral self-examination could be a potential primary preventive strategy.

## Conclusion

Health education intervention was effective in increasing the awareness about oral cancer and its risk factors in an urban slum area of Chandigarh. Moreover, health education was effective in motivating some of them to quit tobacco and alcohol habit. Hence, health education on oral cancer should be delivered through visual aids like brochures to encourage oral self-examination. Primary health care workers should be trained to educate people about the risk factors, precancerous conditions, early signs and symptoms of oral cancer and on how to conduct oral self-examination and report any abnormal lesion.

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## Conflicts of interest

There are no conflicts of interest.

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