



ORIGINAL ARTICLE

## Oral cancer preventive campaigns: are we reaching the real target?☆



Renato Paladino Nemoto\*, Alana Ascitti Victorino, Gregory Bittar Pessoa, Lais Lourenção Garcia da Cunha, José Antonio Rodrigues da Silva, Jossi Ledo Kanda, Leandro Luongo de Matos

Faculdade de Medicina do ABC (FMABC), Santo André, SP, Brazil

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### KEYWORDS

Mouth neoplasms;  
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### Abstract

**Introduction:** Oral cavity malignant neoplasms have a high mortality rate. For this reason, preventive campaigns have been developed, both to educate the population and to diagnose lesions at an early stage. However, there are studies that contest the validity of these endeavors, principally because the target audience of the campaigns may not conform to the group at highest risk for oral malignancy.

**Objective:** To describe the profile of patients who avail themselves of the preventive campaign, identify the presence of oral lesions in that population, and compare that data with the epidemiological profile of patients with oral cancer.

**Methods:** Cross-sectional historical cohort study performed by analysis of epidemiological data of the campaign "Abra a Boca para a Saúde" collected in the years from 2008 to 2013.

**Results:** In the years analyzed, 11,965 people were treated and 859 lesions were diagnosed, all benign. There was a female predominance (52.7%), with mean age of 44 years ( $\pm 15.4$  years); 26% were smokers and 29% reported alcohol consumption. It is known that the group at highest risk to develop oral cancer is 60- to 70-year-old men, who are alcoholic smokers.

**Conclusion:** The population that seeks preventive campaigns is not the main risk group for the disease. This fact explains the low number of lesions and the lack of cancer detection.

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\* Corresponding author.

E-mail: [renato.nemoto@hotmail.com](mailto:renato.nemoto@hotmail.com) (R.P. Nemoto).

**PALAVRAS-CHAVE**

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bioestatística

**Campanha de prevenção do câncer de boca: estamos atingindo o verdadeiro público-alvo?****Resumo**

*Introdução:* As neoplasias malignas de cavidade oral possuem alta taxa de mortalidade. Por essa razão, existem diversas campanhas de prevenção do câncer bucal, visando orientar a população e diagnosticar lesões em estágio precoce. Contudo, vários estudos contestam a validade dessas iniciativas, uma vez que o público alvo atingido pode não representar o verdadeiro grupo de risco.

*Objetivo:* Descrever o perfil dos pacientes que procuraram a campanha de prevenção, identificar a presença de lesões orais e comparar os dados com o perfil epidemiológico de pacientes portadores de câncer bucal.

*Método:* Coorte histórica transversal. Foram levantados os dados epidemiológicos da campanha "Abra a boca para a saúde" dos anos de 2008 a 2013.

*Resultados:* Nos anos avaliados, 11965 pessoas foram atendidas e 859 lesões diagnosticadas, todas benignas. A predominância foi do sexo feminino (52,7%), com média de idade de 44 anos ( $\pm 15,4$  anos), 26% eram tabagistas e 29% relatavam uso de álcool. Sabe-se que o grupo de risco corresponde a homens, entre 60 e 70 anos, tabagistas e etilistas.

*Conclusão:* A população que procura a campanha não é o principal grupo de risco para a doença, fato que explica o baixo número de lesões detectadas e nenhum câncer.

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**Introduction**

Malignant neoplasms of the head and neck region account for 10% of all human malignant tumors and approximately 40% of them occur in the mouth. Oral cancer is the fifth most common malignancy affecting men and approximately 275,000 new cases are diagnosed annually; it has a high mortality.<sup>1-4</sup> The most common histological type is squamous cell carcinoma,<sup>2</sup> with a predominance of male patients; about 75% of cases are diagnosed between the ages of 50 and 70 years.<sup>5</sup>

The main etiological factor is smoking. There are more than 30 carcinogens found in tobacco and its derivatives, of which the best known are aromatic hydrocarbons and nitrosamines.<sup>6</sup> Approximately 90% of individuals with oral cancer smoke cigarettes or pipes, or use other types of tobacco products. Smokers are six to 16 times more likely to develop cancer than non-smokers, and 37% of treated individuals who persist in smoking develop a second primary tumor or have disease recurrence.<sup>7</sup>

Alcohol is the second most important risk factor. Approximately 75% of individuals with oral carcinoma were alcoholics, and this disease is six times more common in these individuals than in non-consumers of alcoholic beverages. The combination of alcohol and tobacco enhances the chance for the development of oral cancer by approximately 100-fold.<sup>6</sup> The maintenance of habits after treatment is also associated with a higher chance of recurrence and development of a second primary tumor.<sup>4</sup> Other known risk factors include: ultraviolet radiation for cancer of the lip, immunosuppression, infection by human papillomavirus (HPV), and poor oral hygiene.<sup>6</sup>

In many countries, such as Brazil, when patients are diagnosed, they frequently already have advanced or metastatic

disease, which, added to the aggressiveness of the tumor itself, complicates treatment and significantly worsens prognosis.<sup>1,8</sup> The treatment of these patients is mainly surgical and often leads to esthetic and functional deformities, with severe impact on quality of life. For all these reasons, this type of neoplasm is an important public health issue.<sup>4</sup>

This is a preventable disease with a change in lifestyle (especially the discontinuation of smoking and drinking habits) and treatment of premalignant lesions such as leukoplakia and erythroplasia.<sup>1,8,9</sup> The most commonly employed method in screening for early lesions is visual inspection of the oral cavity (oral exam), which has a specificity of about 98%.<sup>8</sup> This is a non-invasive, fast, and inexpensive technique that can be performed by medical professionals from different fields.<sup>1</sup>

Aiming at reducing the mortality and morbidity of this disease, several oral cancer prevention campaigns have been launched, whose goal is to educate the population at greatest risk of developing the disease (mainly alcohol and tobacco consumers) and secondarily, to diagnose lesions at an early stage. However, although it is common sense that screening and early detection have great potential in fighting the disease, studies have challenged the validity of these initiatives. Evidence related to the effectiveness of prevention campaigns is still controversial and the individuals who are actually assessed during such campaigns may not represent the true risk group, which is one of the main reasons for this debate.<sup>1,8-11</sup>

The aim of the present study is to describe the profile of individuals assessed during the annual campaign for oral cancer prevention, to identify the presence of oral lesions, and to compare them with the epidemiological profile of patients with cancer of the oral cavity.

## Methods

The oral cancer prevention campaign has been held annually since 2008 in São Bernardo do Campo, state of São Paulo, and is called “Abra a boca para a saúde” (“Open your Mouth for Oral Health”). It consists of a free oroscopy performed by trained professionals (physicians and dentists) from the public health network to detect lesions in the oral mucosa and verbal recommendations, as well as distribution of educational leaflets on oral self-examination and suspicious lesions. Patients are not selected, but rather spontaneously seek the campaign through “Poupatempo” agencies (a one-stop service for citizens who need documents such as ID cards, driver’s licenses, and criminal records. Consumers can also pay utility bills, settle debts, and dispute charges), which are places of great public circulation.

Patients with oral mucosal lesions were referred for diagnostic investigation and treatment in two services: benign lesions to the Dental Specialty Center and lesions suspected to be malignant or pre-malignant to the Service of Head and Neck Surgery.

All voluntary patients had a form completed comprising identification, demographic data, and the oral assessment description. Based on the information collected on this form, the data were tabulated and stored in a database without identification, so they could be analyzed. Individuals who smoked at least one cigarette daily were considered smokers. Moreover, alcohol consumption referred to weekly or daily ingestion of alcoholic beverages, even in small amounts. Gross data from the 2008 to 2013 campaigns were collected.

The number of people assessed in each campaign was obtained through the final report issued by those responsible for organizing the campaigns. The characteristics of the oral lesions found (malignant or benign) were obtained from the services to which patients were referred. However, only demographic data from the years 2008 (first year of the campaign) and 2012 (the last assessable year of the campaign) were quantified for comparison purposes. Demographic data for the years 2009–2011 campaigns were not available from the Health Secretariat of the Municipality, and the data of the sixth campaign (2013) had not yet been tabulated and therefore were not available for analysis.

## Results

In the six assessable years (Table 1), 11,965 individuals were evaluated. Of these, 7.2% (859 individuals) had a lesion in the oral cavity that was considered benign after a second assessment in reference services.

In the years 2008 and 2012, 1809 and 1241 people were assessed, respectively. The epidemiological characteristics observed in the individuals who sought the campaigns in these years are shown in Table 2. It should be noted that the mean age was 44.1 years, with a predominance of women, and 49.2% of individuals had less than 11 years of education (incomplete high school education). Smokers were the minority (26%), with the main type of tobacco product being cigarettes (81.5%), and alcohol consumers were also a minority (29%). The mean periods of smoking and alcohol consumption were 21.7 years and 22.5 years, respectively.

**Table 1** Number of examinations and referred cases with oral lesions during campaigns 2008–2012.

Year	Number of examinations performed	Referred cases (% of individuals with lesions)
2008	1809	126 (6.9%)
2009	2740	201 (7.3%)
2010	1664	81 (4.9%)
2011	2402	222 (9.2%)
2012	1241	126 (10.1%)
2013	2109	103 (4.9%)
<b>Total</b>	<b>11,965</b>	<b>859 (7.2%)</b>

Of the assessed individuals, 60.8% had a personal or family history of cancer. Regarding the condition of oral health, 46.2% had fair or poor dental status and 31.8% wore a dental prosthesis.

## Discussion

The present study demonstrates that the population at risk for developing oral cavity cancer is not being effectively reached by the prevention campaign in São Bernardo do Campo, a problem that may also be occurring in other Brazilian cities.

Analyzing the results, we observed that 7.2% of treated subjects had oral lesions referred for investigation, and none were diagnosed as oral cancer after a second assessment. Regarding the population that sought assessment through the campaigns, that represents a small number of lesions in the oral cavity, none confirmed as oral cancer.

This finding is consistent with a literature review by Franceschi et al.,<sup>10</sup> in which the proportion of individuals with suspicious lesions ranged from 1% to 16%, and of these, most were smokers and/or alcohol drinkers. A large study carried out in Minnesota, in the United States, assessed 23,616 individuals, of whom 10% had suspicious lesions, and of these, 12% had spinocellular carcinoma.<sup>12</sup> The largest study to date was performed in India by Sankaranarayanan et al.,<sup>8</sup> in which 87,655 patients were evaluated, which identified 5145 (5.9%) suspicious lesions, but with only 205 (0.2%) cases of carcinomas. That is, in the general population, the number of individuals who need to be assessed for the detection of a small number of precursor lesions or carcinomas is proportionally enormous.

In public health policy, because of the financial and technical organizational complexity, evidence of efficacy in prospective studies is of great importance.<sup>8</sup> Although early detection of oral cancer leads to better prognostic indices, there are not enough unequivocal data to support the current prevention programs for the population in general.<sup>13</sup>

The same conclusion was obtained by the UK Working Group on Screening for Oral Cancer and Pre-Cancer,<sup>2</sup> and the United States Preventive Services Task Force, which did not observe any evidence demonstrating that visual inspection of the oral cavity is an effective prevention assessment in both risk and non-risk groups. Moreover, there are not enough data to suggest that other screening methods (such as toluidine blue, fluoroscopy, and exfoliative cytology)

**Table 2** Epidemiological characteristics of the individuals attended to in the 2008 and 2012 campaigns.

Characteristics	2008		2012		Total	
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%
<i>Gender<sup>a</sup></i>						
Male	819	45.3	625	50.4	1444	47.3
Female	990	54.8	616	49.6	1606	52.7
<i>Ethnicity</i>						
White	937	51.8	539	43.5	1476	48.3
Black	130	7.2	266	21.5	396	12.9
Mixed-race	742	41	805	35	1547	38.8
<i>Degree of schooling</i>						
Did not finish elementary school	468	25.9	275	22.2	743	24.3
Finished elementary school	193	10.7	163	13.2	356	11.6
Did not finish high school	284	15.4	124	10	408	13.3
Finished high school	586	32.4	441	35.6	1027	33.6
Did not finish college/university	59	3.3	43	3.5	102	3.3
Finished college/university	112	6.2	137	11.1	249	8.1
Illiterate	54	3	58	4.4	112	3.6
Did not answer	53	3.1	-	-	53	2.2
<i>Smoking<sup>b</sup></i>						
Smokers	548	30.3	245	19.8	793	26
Non-smokers	1261	69.7	996	70.2	2257	74
<i>Type of tobacco</i>						
Cigarettes	465	85	182	74.3	647	81.5
Chewing tobacco	10	2	7	2.8	17	2.1
Cigarettes and chewing tobacco	20	4	2	0.8	22	2.7
Other/did not answer	53	9	56	22.1	109	13.7
<i>Use of alcohol<sup>c</sup></i>						
Yes	539	29.8	348	28.1	887	29
No	1270	70.2	893	71.9	2163	71
<i>History of cancer</i>						
Yes	1146	63.4	711	57.3	1857	60.8
No	663	36.6	530	42.7	1193	39.2
<i>Dentition</i>						
Poor	247	13.7	140	11.3	387	12.6
Regular	613	33.9	412	33.2	1025	33.6
Good	736	40.7	560	45.2	1296	42.4
Toothless	213	11.7	129	10.2	342	11.4
<i>Use of dental prosthesis</i>						
Yes	593	32.8	378	30.5	971	31.8
No	1216	67.2	863	69.5	2079	68.2

<sup>a</sup> Mean age: 42.5 ± 15.6 years (2008); 45.7 ± 15.2 years (2012); 44.1 ± 15.4 years (total).

<sup>b</sup> Mean time of smoking: 20.8 ± 12.6 years (2008); 22.6 ± 14 years (2012); 21.7 ± 13.3 years (total).

<sup>c</sup> Mean time of alcohol consumption: 18 ± 12.4 years (2008); 27 ± 17.2 years (2012); 22.5 ± 14.9 years (total).

are beneficial for this screening.<sup>1,10,13</sup> Downer et al.<sup>13</sup> also observed that most programs were conducted in developed countries, and had a short duration and a small number of participants. Although there are exceptions, this aspect contributes to the fact that there are no incontestable data supporting campaigns worldwide, especially in developing countries.

Factors that decrease the effectiveness of the campaigns are the lack of information about the disease, lack of contact with the importance of prevention, geographic and/or

economic inaccessibility to health services, lack of support from family or society/community, and low adherence by the target population.<sup>8</sup>

The current adherence to campaigns is small. The percentage of the population of São Bernardo do Campo reached by campaign was 0.2% in 2008 and 0.15% in 2012. However, although one of the essential components of prevention campaigns is to attain the maximum possible participation of the population, especially the risk group,<sup>8</sup> strategies tend to be inefficient. Unfortunately, it was not

possible to include data from 2009 to 2011 campaigns, for these were not available; however, the comparative analysis of the years 2008 and 2012 showed very similar relative frequencies and, it is probable that, the absence of data from other years does not represent a large information bias.

One way to improve public strategies of prevention campaigns is to identify the profile of participants and non-participants in order to obtain the maximum possible adherence and help those who cannot be benefited. However, few data are available on the subject. The main studies on this subject were conducted in developed countries, performed by dental or general practice clinics, whose method of contact is sending letters to invite individuals to participate in the campaign. This system, while useful, is ineffective in most developing countries, where much of the population at risk do not have access to dental treatment, live in remote areas away from large cities, or are not reached by the mail system.<sup>8</sup> Thus, a greater effort by national agencies for better collection and updating of data on prevention campaigns is necessary.

This difficulty in reaching at-risk groups begins precisely with the characteristics of these groups.<sup>8,13</sup> The main individuals at risk, smokers and/or alcohol drinkers, are not easily convinced to undergo a diagnostic test. The adherence of these individuals in oral cancer prevention campaigns is approximately three-fold lower than that of individuals not in the risk group.<sup>8,13</sup> The results of this study indicate a low participation of this group (approximately 30% of the participants).<sup>13</sup>

Another negative point to be assessed is the risk of reinforcing bad habits.<sup>13</sup> For instance, a person tested as having no oral disease may understand that he or she is not sick and thus decide not to quit smoking and/or drinking.<sup>10</sup> Additionally, more sensitive methods help to detect oral lesions more accurately; however, the number of unnecessary biopsies and their risks also tend to increase.<sup>10</sup>

Lower socioeconomic levels are related to poorer medical follow-up, which can be another obstacle to healthcare, especially in the case of Brazil, where most of the at-risk population has low educational level.<sup>9</sup> This point was also identified in the present study, in which 49.2% of people assessed in the campaigns had not finished high school, with an illiteracy rate of 3.6%.

This study showed that the profile of the population that sought the prevention campaign does not represent the population at risk. It is known that the risk group for the development of carcinoma of the oral cavity corresponds to men (76% of cases), age 50–70 years, smokers (85%), and heavy drinkers (70%).<sup>5</sup> In the 2008 campaign, most participants were females (54.8%), with a mean age of 42 years. Smokers and drinkers accounted for only 30% of the assessments. In 2012, the scenario was very similar, suggesting that for the other years, the profile was probably similar. These figures are alarming, as the target population of cancer in the oral cavity is not being reached by the campaign.

This fact is even more alarming if one takes into consideration that Sankaranarayanan et al., in 2005,<sup>8</sup> calculated that visual assessment of the oral cavity is only protective for the population at risk.

In that prospective study, there was no statistically significant reduction in mortality from oral cancer in the screened

group, when compared with the non-screened group. However, among smokers and drinkers only, the chance of death in the screened group decreased by a relevant 34%. The authors also stated that the visual examination has the capacity to prevent 37,000 deaths from cancer of the oral cavity; however, to attain such purposes, a wider range of the population at risk needs to be reached by prevention campaigns.

To decrease any obstacles and improve the effectiveness of prevention programs in the study carried out in India,<sup>8</sup> the methods used included personal invitations, with evaluations performed during home visits by trained professionals, free of charge, in addition to providing information about the disease and the importance of prevention. In this case, the evaluators sought at-risk groups, and the latter did not need to seek assessment through the campaigns. This improves the population selection and makes the campaign more effective by eliminating obstacles, such as limited mobility and accessibility, among others.

To increase the post-detection follow-up of the lesion, a study by Ramadas et al. (in which the method also consisted of home visits conducted by professionals) sent letters to individuals that did not attend the referral consultation, and visits were provided to those that did not respond to the invitations sent by mail.

That study had the participation from virtually all the individuals to whom the visual inspection of the oral cavity was offered, and sending letters increased follow-up by 11%.<sup>9</sup> Chacra Jr. et al.<sup>14</sup> studied the presence of lesions stained in toluidine blue in members of Alcoholics Anonymous groups and identified 47.7% of patients with oral lesions, and of these, almost 5% of cases of dysplasia. These results are also important to demonstrate that there are methods that can be effective for the evaluation of large numbers of individuals, and that they can be adapted to achieve wider adherence by the population at risk and increase the effectiveness of the home visit strategy.

The “Open your Mouth for Oral Health” campaign, evaluated in this study, has some points that may need to be changed. The main one is its strategy: with the current model, the population needs to travel to the examiners, allowing the emergence of difficulties, such as accessibility, something that home visits eliminate. Moreover, it is carried out during a specific period (one week per year), which may coincide with a period in which patients are unable to attend, without having another opportunity to participate. The campaign should take place at different times of the year if possible, although all campaigns are subject to this restriction.

Perhaps the model to be adopted should be the home visit, which allows greater participation and the possibility of directing the prevention campaign to at-risk populations, as studies have shown. However, the cost-benefit ratio of mobilizing a large contingent of trained professionals to carry out the assessments must be considered. Additionally, there is a tendency to have a greater participation of women, as proportionally they are more often at home than men, who are at higher risk of developing the disease.<sup>10</sup> To avoid this situation, visits must be timed in order to perform them when the men are at home.

Another idea is to add the visual examination of the mouth to other prevention programs that already include



home visits, such as prevention campaigns against dengue fever and Chagas disease, training of community health workers to perform visual inspection of the oral cavity, and likewise, increasing the number of these agents. By adopting the strategy of home visits, the examiners could not only visit the homes, but also go to bars, businesses, factories, and places with populations at high risk of developing cancer of the oral cavity, especially in economically disadvantaged regions.

Prevention campaigns should also invest in increasing the population's knowledge and raising awareness and, in this sense they are successful. They should be directed to at-risk groups and/or their acquaintances and family members, and should focus on eliminating tobacco and alcohol consumption, as well as the importance of self-examination of the mouth and adequate oral hygiene.<sup>1,2</sup> The lack of knowledge about oral cancer, its symptoms, and its risk factors are of concern, and correlate with late diagnosis and poor prognosis.<sup>15</sup>

In addition to implementing more public campaigns, the government can play an important role in terms of legislation: cigarettes are very inexpensive in Brazil, compared to other countries in the world, which facilitates access to tobacco. Taking that into account, the government could increase taxation on the product, in an attempt to limit access.

The media also has an important role in this scenario. Media campaigns help to increase adherence, and the means of mass communication more easily reach the target population of these campaigns.<sup>9</sup> Thus, television, radio, the internet, social networks, newspapers, and magazines should be further explored for both the dissemination of information on the disease and forms of prevention, as well as information on the campaigns, such as dates and locations.

## Conclusion

The population that spontaneously seeks the oral cancer prevention campaigns is not the main risk group for the disease. This explains the low number of lesions detected and the fact that no malignancies were diagnosed. Thus, although the campaign is well structured and reaches a large number of people, other forms of prevention should be developed in order to reach the real risk group for this disease.

## Conflicts of interest

The authors declare no conflicts of interest.

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