DOI: 10.1590/1413-81232015207.15272014

Greater access to information on how to prevent oral cancer among elderly using primary health care

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Abstract *Educative actions are an important component of health promotion in Brazil's primary healthcare program, the Family Health Strategy (FHS). The efficacy of these actions is evidenced by compliance with healthy behaviors and in the reduction of rates of mortality and morbidity. The objective of this study was to identify whether access to information regarding the prevention of oral cancer is greater among elders whose residences are registered with the FHS. SPSS® was utilized to obtain estimates that were corrected for sample design, considering the magnitude of the associations between access to such information with personal determinants, the use and cost of healthcare, health-related behaviors and health outcomes. 58.9% of the 492 participating elders reported having access to such information. We verified that there was a greater chance for access among residents of houses registered by the FHS; those with greater per capita income (2.01/1.18-3.43); non-smokers (2.00/1.16-3.46); those that realized oral self-examination (6.35/3.46-11.64); and those that did not perceive discomfort in the mouth, head or neck (2.06/1.02-4.17). Access was greater among residents of homes registered by the FHS. Personal determinants of health, health-related behaviors and health outcomes are influenced or influence access to information regarding the prevention and management of oral diseases.*

Keywords *Oral cancer, seniors, health literacy, primary healthcare, Family Health Strategy*

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Introduction

Brazilian elders are exposed to risk factors that increase their rates of morbidity and mortality as a result of chronic degenerative diseases[1], especially cancer, which is considered a public health problem due to its high rate of mortality and fatality[2,3]. Oral cancer generates high rates of mortality and fatality[2], and has a negative impact on people's quality of life[4]. According to global estimates from the Project Globocan 2012, by the *International Agency for Research on Cancer*, of the World Health Organization (WHO), there were 14.1 million new cases of cancer and 8.2 million deaths due to cancer in the world in 2012. The burden of cancer will continue to increase in developing countries and will rise even more in developed countries if preventive measures are not widely adapted. Oral cancer is an public health problem across the globe. In the case of Brazil, it has been estimated that in the year 2014, 11,280 new cases of this cancer were reported in men and 4,010 in women. These values correspond to an estimated risk of 11.54 new cases per 100,000 men and 3.92 new cases per 100,000 women. Not considering non-melanoma skin tumors, oral cancer in men is the fifth most common form and the eleventh most common form in women[5]. In Brazil, the distribution of new cases of cancer is heterogeneous, with higher concentrations in the Southeastern and Southern regions[6].

The rates of mortality for oral cancer stand out among the rates of mortality for other types of neoplasty[7-9]. Diet[10,11], low income, education[11] and infection by the *Human papillomavirus* (HPV)[12], as well as the synergy created by the concurrent use of tobacco and alcohol[13], are risk factors for diverse types of oral cancer. A randomized trial[14] was conducted in Kerala, India, with 167,741 participants over the course of nine years (1996 to 2004). The participants in the intervention group (87,655) participated in educative actions, during three distinct periods every three years, which included education regarding the harmful effects of tobacco and alcohol in terms of the risk for oral cancer and screenings conducted by trained professionals to identify cancerous lesions, as well as early diagnosis and immediate treatment of oral cancer. On the other hand, participants in the control group (80,086) were evaluated at the beginning and at the end of the study and received routine services from health services. The rates of mortality and fatality due to oral cancer were less in the intervention group than in the control group. The association between mortality rates and the intervention among all the participants was not statistically significant, however, among men who had drinking or smoking habits, the rates of mortality in the intervention group were lower[14]. This suggests that educative actions, especially among those with known risk factors, may minimize the rates of mortality and fatality due to oral cancer. In conclusion, health promotion strategies, including those aimed education at prevention, early diagnosis and treatment of oral cancer are important.

The importance of health education, prevention, tracking, early diagnosis and treatment of oral cancer has been recognized by the WHO[15]. Subsequently, policies supporting the promotion of health education and prevention regarding oral cancer were implemented[16], as part of primary health care (PHC). In Brazil, PHC is carried out through the Family Health Strategy (FHS), the strategy chosen for the reorganization of PHC within Brazil's "Unified System of Health" (SUS)[17,18]. Among the characteristics of SUS, comprehensive coverage stands out, with emphasis on health promotion strategies that are aimed at developing health education that focuses on the improvement of self-care by individuals[19]. In the context of health promotion, educational health interventions have the objective of increasing the level of health literacy. Sorensen et al have proposed a theoretical model that presents variables that influence and are influenced by the level of health literacy[20] (Figure 1).

The model identifies proximal and distal factors that determine or are determined by the levels of health literacy. Oval forms that are concentrically related to the nucleus of the model represent these factors. The following variables were considered in the identification of the levels of health literacy: previous knowledge regarding health issues; necessary competencies for self-care and motivation to access, understand, appraise and apply information related to health. Access, the first condition of health literacy, refers to the capacity to seek, find and obtain information regarding health; understanding refers to the capacity to comprehend health related information; appraise is considered to be the capacity to interpret, filter and judge this information; and apply refers to the capacity to communicate and use this information to make decisions that maintain and/or improve one's health status. The model also identifies factors dynamically associated to health literacy or, in other words, its principle determinants and/or consequences. These

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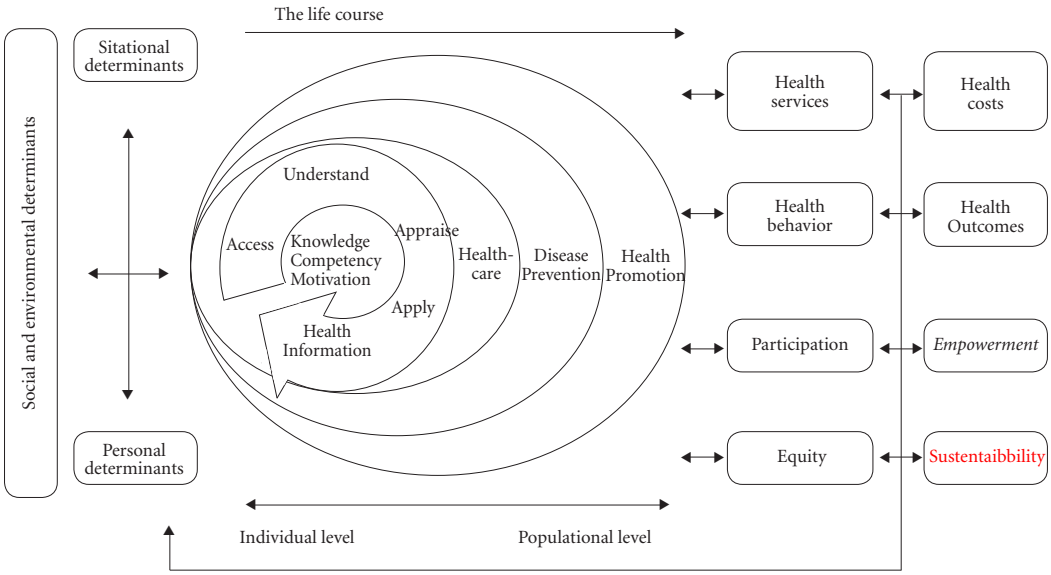

Figure 1. Theoretical model of health literacy presented by Sørensen et al. in 2012.

Source: Sørensen et al., 2012[20].

factors include distal determinants that can be social or environmental (demographics, culture, language, political forces and social systems), proximal determinants that can be social or situational (social support, the influence of family and colleagues, the use of media and the physical conditions of the environment) and personal determinants (age, sex, race, socioeconomic condition, marital status, formal education, occupation and salary). There are other factors that have been presented as possibly associated with health literacy (determinants or consequences): the use of health services, the cost of healthcare, health-related behaviors, health outcomes, the participation of people, empowerment, equity and maintenance. In this model, it is important to consider feedback relationships between the presented factors and health literacy[20]. The age and race of people are the only factors that do not present a feedback relationship, as increasing health literacy cannot modify them. In the context of health promotion, access to information related to health is essential to improving health literacy levels. Therefore, identifying the prevalence of access to information about the prevention of oral cancer and discovering if seniors living in residences registered by the FHS have more access to this information than those that are not registered may lead to improvements in health policies that prioritize elderly health. However, studies regarding this issue were not identified.

The FHS provides an adequate context for interventions related to the promotion of health, emphasizing health education and encouraging the implementation of health-related information and the adaption of healthy behaviors. As such, the objective of this study is to identify, based on the theoretical model of health literacy[20], whether access to information regarding the prevention of oral cancer is greater among elders who residences are registered by the FHS.

Methods

Cross-sectional study conducted with a complex probabilistic sample organized by conglomerate in two stages of elders from Montes Claros, a Brazilian city with a high population, situated in the Northern region of the state of Minas Gerais. For the purposes of this study, elders were considered to be people between the ages of sixty-five and seventy-four, as recommended by the WHO[21]. In the sample calculation, the estimate for the proportion of occurrence of events or illnesses was considered to be 50% of the population, with an

error of 5.5%, a rate of non-response of 20%, the guarantee of proportionality by sex and a design effect (*deff*) of 2.0. In this way, a sample of 740 elders was estimated[22]. Conglomerates, census tracts and blocks were selected by simple random sampling and the collection was conducted in the homes of the participants. The diagnostic criteria of oral conditions were those recommended by the WHO in 1997[21]. Twenty-four trained and calibrated dentists conducted oral exams in the homes of participants in an open environment under natural light, using a sterilized mirror and CPI *(Community Periodontal Index*) probe[21]. Additionally, twenty-four interviewers (students) and twenty-four dentistry trained and calibrated[23] participated in the collection of data (the Kappa coefficient of inter-rater correlation was above 0.60)[24]. Handheld computers with specially-designed a software program, entitled "Program for the Collection of Health Data"[25] allowed for the simultaneous collection of data and building of the database.

Among those that agreed to participate in the study, those that related never having accessed dental services and those that did not respond to the question regarding access to information on how to prevent oral cancer were excluded from the study. The construction of the dependent variable – access to information on how to prevent oral cancer – was obtained only from elderly who did not present cognitive problems. The identification of cognitive problems was carried out using a version of the mini-exam of mental status (MEEM)[26] that has been validated for use in Brazil, taking into account the level of education of the elder[27]. Those who responded positively to the question "Have you received information regarding how to avoid oral cancer from your dental service provider?" were considered to be elders that had access to information on how to avoid oral cancer.

Adapting the model of Sorensen et al., 2012[20], as a theoretical reference, the independent variables were organized in five groups: 1) access to health-related information (the initial condition for heath literacy), 2) personal determinants of health, 3) use of health services/ health costs, 4) health-related habits and behaviors, and 5) health outcomes[20].

The personal determinants considered in this study were age in years, self-declared race, sex, marital status, schooling in years of study and *per capita* income (reported as number of monthly minimum wages earned). The variables related to health services and health costs were dental services utilized, registration of residence with the FHS, time since the last dental use and motive for using dental services.

The health-related behaviors considered in this study were presence of past or current habitual use of tobacco, presence of past or current use of alcohol and practice of oral self-examination. It is important to note that, for the purposes of our study, past users of tobacco were grouped with current users. Regarding health outcomes, two subgroups were considered: 1) self-reported general health in terms of the presence of diseases and the use of medications and 2) normative and subjective conditions of oral health. Normative conditions of oral health included alterations in the oral soft tissues and the use of removable dental prostheses. The subjective conditions of oral health were self-perception, considering the perception of the need for treatment, the perception of pain in the teeth and gums in the last six months, the perception of discomfort in the mouth, head or neck and the identification of the possible consequences (impacts) of oral disorders, using the validated Brazilian version of the *Oral Health Impact Profile* (OHIP)[28]. All of the individuals that affirmed the presence of dental issues (by indicating repeatedly or always) for at least one of the fourteen questions on the OHIP, are considered to have reported some negative consequence, impact or outcome related to their condition of oral health.

SPSS® 18.0 was used to analyze the collected data. We adjusted for estimated sample design effects in the analysis of data. The descriptive analysis included relative frequencies with corrections for the sample design effect, standard error (SE) and conglomerate effect (Deff) for the categorical variables. For the quantitative variables, the mean, SE and Deff were estimated. Bivariate analyses were conducted to select the variables ($p < 0.20$) that were included in the multivariate analyses. During the bivariate and multiple analyses (logistic regression), the odds ratio and confidence intervals were estimated as 95% (OR/IC 95%). In the final model the variables associated ($p < 0.05$) with access to information regarding the prevention of oral cancer were maintained. This study was approved by the relevant Institutional Review Boards and adhered to the ethical principles of Resolution 196/96 of the Brazilian National Council for Health[29].

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Results

Among the 740 elders evaluated (the response rate was 92%), 492 elders were included in the study as they fit the inclusion criteria. Of these, 58.9% reported that they had access to information regarding the prevention of oral cancer. The mean age of the elders was 68.35 years, SE=0.16 and Deff=1.47. A majority self-reported age as between 65 and 68 years old, race as mixed "brown", sex as female and being married or in a stable civil union. The mean number of years of formal education was 5.07, SE = 0.36, Deff = 4.04; the mean per capita monthly income in Brazilian currency was R$ 404.17, SE = 34.37, *Deff* = 2.65. A majority reported residing in a home registered by the FHS and most seniors reported favorable health-related behaviors regarding tobacco and alcohol. A majority reported having a chronic disease diagnosed by a physician. Most elders did not have alterations in the oral soft tissues, used removable prostheses and did not report negative consequences, impacts or outcomes related to the condition of oral health (Table 1).

In the bivariate analysis, the following variables showed association ($p \leq 0,20$) with access to information on the prevention of oral cancer: self-declared race, marital status, formal education, *per capita* income, registration of residence by the FHS, presence of past or present tobacco habit, practice of oral self exam, presence of chronic disease, self-reported perception of discomfort in the mouth, head or neck and impact on various aspects of oral health (Table 2).

In the multiple analysis, access to information regarding the prevention of oral cancer was associated with: personal determinants of health, the use and costs of health services, health-related behaviors and health outcomes (Table 3).

Discussion

Evaluation of the level of health literacy is a relatively new approach in the field of health promotion, as it is based on a conception of health education that goes beyond the offer of information, focusing on the capacity of people to effectively access, understand, evaluate and apply this information. Improvement in health literacy rates depends on several variables, among these, empowerment[20] stands out. It refers to social actions that promote the participation of individuals, organizations and communities in controlling their own destinies and the destiny of society. In this way, people create or are given opportunities to care for their own health, through a series of experiences through which they learn to see a more direct relationship between their objectives and a sense of how to reach them, and, in this way, they obtain more access and control over their own resources and over public and community resources available through governmental or non-governmental organizations that seek to promote health and prevent disease[30].

The prevalence of access to information (the initial condition for oral health literacy) regarding the prevention of oral cancer, was 58.9%. The odds of self-reporting such access was approximately three times greater among elders registered with the FHS than those who were not registered by the FHS, even after controlling for personal determinants of health, health-related behaviors and health outcomes. The odds of access to this information was greater among those with a higher *per capita* income, that did not smokers, that did oral self-examiners, and those that did not perceive discomfort in the mouth, head or neck. We were not able to directly compare the findings of our study in Montes Claros with similar studies in other cities as articles with directly comparable results were not found in the recent relevant literature. However, related studies that consider degrees of knowledge or awareness regarding oral cancer, its determining factors and preventive measures were identified[31-34].

More than a third of the evaluated elders reported not having any type of access to information regarding the prevention of oral cancer provided their health professional, a worrisome fact, considering that the acquisition of consistent information regarding oral cancer, its determining factors and preventive measures can support the adoption of healthy habits and contribute to the prevention and early diagnosis of this type of cancer[20,31-36]. Among participants in the Campaign for the Prevention and Early Diagnosis of Oral Cancer, in one Brazilian municipality (Taubaté in the state of São Paulo), knowledge about oral cancer was evaluated in the years 2001, 2003 and 2005. Reported knowledge regarding the causes of this type of cancer varied between 32.68% - 40.52%. In 2001, 16.52% reported knowing what is an oral self-examination, in 2003, 31.97% and in 2005, 22%[31], demonstrating a low prevalence of knowledge regarding this preventive measure among those interviewed[31]. Possibly, as proposed by the theoretical model of Sørensen et al.[20], the low rate of knowledge might be influenced by the rates of previous knowledge and by the competence and motivation of people

Table 1. Access to health-related information, personal determinants , health. use / health costs, health behaviors (related), and health outcomes among elders in Montes Claros/MG. 2008/2009. n = 492.

	n	%	%[a]	Standard error	Deff
Access to health-related information					
Access to information on how to prevent oral cancer[b]					
No	201	40.9	41.1	5,5	
Yes	291	59.1	58.9		6.891
Personal determinants					
Age range (in years)					
69 to 74	209	42.5	41.5	2,6	
65 to 68	283	57.5	58.5		1.495
Self-declared race[b]				3,7	
Brown "mixed"	232	47.3	45.4	2,2	2.949
Black	70	14.3	16.1	0,4	1.903
Indigenous	2	0.4	0.5	0,5	1.653
Asian "yellow"	5	1.0	0.9	4,7	1.319
White	182	37.1	37.1		5.133
Sex					
Male	231	47.0	47.8	2,7	
Female	261	53.0	52.2		1.645
Marital status					
Single/ Widowed/ Divorced	170	34.6	30.8	3,4	
Married/ Stable union	322	65.4	69.2		2.972
Schooling (years of study)					
0 to 4	285	57.9	59.1	5,2	
5 and above	207	42.1	40.9		3.958
Per capita monthly income in number of minimum wages[b, c]					
1 or less	310	65.1	66.8	4,0	
More than 1	166	34.9	33.2		3.842
Health services/ health costs					
Dental service used[b]					
Supplemental or private services	360	73.5	72.1	4,4	
Governamental or philanthropic services	130	26.5	27.9		5.229
Residence registered in the FHS					
No	242	49.2	43.6	8,4	
Yes	250	50.8	56.4		15.885
Time since last dental visit (years)					
1 or more	360	73.2	72.9	2,8	
Less than 1	132	26.8	27.1		2.112
Motive for use of dental service[b]					
Appointment for treatment	296	60.4	62.9	3,6	
Regularly scheduled check-up	194	39.6	37.1		2.994
Health behaviors (related)					
Past or present tobacco habit					
Yes	175	35.6	36.4	3,2	
No	317	64.4	63.6		2.500
Past or present alcohol habit[b]					
Yes	188	38.2	39.9	2,7	
No	304	61.8	60.1		1.718
Oral self-exam					
No	391	79.5	77.6	2,9	
Yes	101	20.5	22.4		2.604

it continues

Table 1. continuation

	n	%	%[a]	Standard error	Deff
Health outcomes					
Reported general health					
Presence of chronic disease[b]					
Yes	405	82.3	79.7		
No	87	17.7	20.3	3,2	3.520
Use of medications					
Yes	344	69.9	68.7		
No	148	30.1	31.3	2,8	1.942
Normative conditions of oral health					
Alterations in the soft tissues[b]					
Yes	81	17.1	16.5		
No	393	82.9	83.5	2,4	2.193
Use of removable prostheses					
No	94	19.1	17.7		
Yes	398	80.9	82.3	2,9	3.170
Subjective conditions of health...					
... Self-reported need for dental treatment[b]					
Yes	278	56.7	59.7		
No	212	43.3	40.3	3,9	3.489
... Pain in teeth over the past six months[b]					
Yes	125	25.6	25.2		
Noo	364	74.4	74.8	2,8	2.229
... Discomfort in the mouth. head or neck					
Yes	98	19.9	19.2		
No	394	80.1	80.8	2,6	2.360
OHIP[b]					
Impact	92	18.7	17.8		
No impact	399	81.3	82.2	2,0	1.568

[a] Estimated values corrected for design effect. [b] Variation in n = 492 due to loss of information. [c] Based on the minimum wage in 2008. R$ 415.00.

who have had access to health-related information. Improvements also depend on the degree of understanding of this information in a context of vast demographic, cultural and educational diversity as well as a variety of situational and personal factors that may facilitate or prevent the application of health-related knowledge[20].

In the context of health promotion, educative actions influence perceptions regarding oral conditions, support self-diagnosis and self-care in search of preventing and/or curing oral diseases in their initial stages[37]. A majority of Brazilian elders perceived their oral health as satisfactory, even though they presented oral health issues[38]. Perhaps, due to this positive perception of oral health, elders do not feel it is necessary to seek information about oral health, compromising their access to information on how to prevent oral cancer. Alternately, in studies conducted in the United States, some dentists have justified not providing orientation regarding oral diseases, including cancer, due to lack of time[39], often explaining that they do not feel it is necessary or that they are not paid for such services[40]. Furthermore, the compliance of health professionals with permanent education strategies is associated with the appropriateness of physical space, multidisciplinary approaches and epidemiological characteristics of the population[41]. Perhaps employment issues, such as time and financial compensation, and other professional development factors, such as the available quality and content of accessible education for appropriate health professionals, can explain the fact that dentists do not ensure that their patients have access to information regarding the prevention of oral cancer.

In one study that was conducted in a rural location in the South of Brazil, more than half

Table 2. Bivariate analysis between access to information regarding the prevention of oral cancer and personal determinants, the use of health services/ health costs, health-related behaviors and health outcomes among elders in Montes Claros/MG. 2008/2009. n = 492

Access	No % [a]	Yes % [a]	OR[a]	CI 95%[a]	P	Standard error	Deff
Personal determinants							
Age (in years)							
69-74	60.6	39.4	1.00				
65-68	57.8	42.2	1.12	0.70-1.79	0.607	0.23	1,69
Self-declared race [b]							
Brown "mixed"/ Black/ Indigenous	51.2	48.8	1.00				
White/ Asian "yellow"	71.7	28.3	0.41	0.23-0.71	0.002	0.27	2,11
Sex							
Male	59.4	40.6	1.00				
Female	58.5	41.5	1.03	063-1.70	0.876	0.24	2,00
Marital status							
Single/ Widowed/ Divorced	54.4	45.6	1.00				
Married/ stable union	61.0	39.0	0.76	0.54-1.07	0.118	0.16	0,80
Schooling (years of study)							
0 to 4 years	65.0	35.0	1.00				
5 and above	50.1	49.9	1.85	1.06-3.22	0.030	0.27	2,40
Per capita monthly income (number of minimum wages)[b, c]							
1 or less	63.8	36.2	1.00	1.05-2.78	0.030	0.23	1,64
More than 1	50.6	49.4	1.71				
Use of health services/ health expenditures							
Dental service used [b]							
Supplemental or private services	59.2	40.8	1.00				2,75
Governamental or philanthropic services	58.3	41.7	1.03	0.54-1.98	0.905	0.32	
Residence registered in the FHS							
No	72.7	27.3	1.00				4,86
Yes	48.3	51.7	2.85	1.25-6.49	0.014	0.40	
Time since last dental visit (years)							
1 or more	57.6	42.4	1.00				2,16
Less than 1	62.6	37.4	0.81	0.45-1.45	0.471	0.29	
Motive for use of dental service [b]							
Appointment for treatment	57.6	42.4	1.00				1,53
Regularly scheduled check-up	60.7	39.3	0.88	0.56-1.38	0.570	0.22	
Health-related behaviors							
Past or present tobacco habit							
Yes	69.7	30.3	1.00				1,43
No	52.8	47.2	2.05	1.30-3.23	0.003	0.22	
Past or present alcohol habit [b]							
Yes	60.3	39.7	1.00				2,33
No	58.1	41.9	1.09	0.63-1.89	0.738	0.27	
Oral self-exam							
No	68.3	31.7	1.00				1,94
Yes	26.4	73.6	5.99	3.14-11.44	0.000	0.32	

it continues

of the participants (65%) reported receiving information on how to avoid oral problems. However, although a vast majority (83%) was satisfied with what they received, 42.6% felt that the dentist could have provided more information. This study revealed that this educative measure is not always carried out with satisfactory quality[42]. Health professionals, upon passing out information regarding health, need to previously know the level of health literacy of the patients and their relatives in order to refine educational strategies to meet the needs of the population

Table 2. continuation

Access	No % [a]	Yes % [a]	OR[a]	CI 95%[a]	P	Standard error	Deff
Health outcomes							
Reported general health							
Presence of chronic disease [b]							
Yes	61.1	38.9	1.00	0.79-2.99	0.199	0.32	2,38
No	50.5	49.5	1.53				
Use of medications							
Yes	58.7	41.30	1.00	0.53-1.75	0.919	0.29	2,45
No	59.4	40.6	0.97				
Normative conditions of oral health							
Alterations in the soft tissues[b]							
Yes	72.0	28.0	1.00	1.00-4.14	0.048	0.35	1,86
No	55.7	44.3	2.04				
Use of removable prostheses							
No	69.7	30.3	1.00	0.24-1.34	0.190	0.42	3,13
Yes	56.6	43.4	0.56				
Subjective conditions of health...							
... Self-reported need for dental treatment[b]							
Yes	63.3	36.7	1.00	0.77-2.43	0.264	0.28	
No	55.5	44.5	1.37				2,50
... Pain in teeth over the past six months[b]							
Yes	58.4	41.6	1.00	0.59-1.58	0.906	0.24	
Noo	59.1	40.9	0.97				1,44
... Discomfort in the mouth. head or neck							
Yes	75.2	24.8	1.00	1.40-4.38	0.003	0.28	
No	55.1	44.9	2.47				1,33
OHIP[b]							
Impact	71.9	28.1	1.00	1.00-3.91	0.047	0.33	
No impact	56.3	43.7	1.98				1,89

[a] Estimated values corrected for design effect. [b] Variation in n = 492 due to loss of information. c Based on the minimum wage in 2008. R$ 415.00.

being served. Perhaps the collection and analysis of more information regarding the health literacy and empowerment of study participants[20,36,43] could provide explanations for the absence of associations between access to information on how to avoid oral cancer and some of the variables considered in this attempt to operationalize the theoretical model[20]. Probably, the professionals that carried out the treatment of these elders did not consider all of the variables proposed in the adapted theoretical model, indicating a need for health education initiatives within the context of health promotion[20].

Among elders in Montes Claros, the prevalence of the offer of educational measures related to the prevention of oral cancer by dentists was not investigated. Perhaps a greater proportion of elders had access to preventive information, but as the access achieved did not lead to the acquisition and retention of knowledge, they do not remember having received this information. Additionally, those that were oriented and obtained understandings may or may not have put them to practice, considering their appraise of the information and/or due to their level of *empowerment*[20].

Elders in residences registered by the FHS have a greater chance of accessing information regarding the prevention of oral cancer. Perhaps this is due to the greater emphasis on actions for health promotion and the prevention of disease in the context of the FHS as a public primary care system[44]. The continuing education of professionals that work in this sector may also contribute to this result. This finding deserves recognition and suggests advancements in the performance of public oral healthcare services, a fact that should be recognized. However, 48.3%

Table 3. Multiple analysis between access to information regarding the prevention of oral cancer among elders in Montes Claros/MG, adjusted for statistically significant variables ($p \leq 0.05$). 2008/2009.

	OR	CI 95%	p
Personal determinants			
Per capita monthly income (number of minimum wages)[b, c]			
1 or less	1.00		
More than 1	2.016	1.182-3.437	0.011
Health services/ health costs			
Residence registered in the FHS			
No	1.00		
Yes	3.137	1.353 -7.277	0.009
Health-related behaviors			
Past or present tobacco habit			
Yes	1.00		
No	2.005	1.161-3.461	0.014
Oral self-exam			
No	1.00		
Yes	6.350	3.462 -11.646	0.000
Health outcomes			
Reported general health			
Discomfort in the mouth, head or neck			
Yes	1.00		
No	2.063	1.021 - 4.170	0.044

[a] Based on the minimum wage in 2008. R$ 415.00.

of elders that live in residences registered in the FHS report not having access to such information, and this also deserves attention. While advances in public policies have been registered in the past few years, such as the inclusion of oral healthcare providers in the FHS, efforts for vast policies to reduce social inequalities in the access and process of care, as well as in the evaluation of results in the area of oral health, are still necessary[45], because dentists play a fundamental role in the sharing of preventive measures[32]. Health services, especially governmental services, have to contribute to achieving the desired principles of equitable and universal care, utilizing the clinical environment to offer more opportunities for learning and seeking to assure that all citizens have access to the necessary resources to ensure that dental care is treated as a human right in Brazil[46]. It is important to point out that the vast diversity of circumstances should be considered in the development of strategies that aim to improve health literacy rates, especially with regard to the *per capita* income.

The odds of accessing information on how to prevent oral cancer was greater among elders with a higher *per capita* income, this association may reveal inequality in access to such information. Among patients in one Brazilian teaching hospital, oral cancer was associated with worse social conditions, such as low-income levels and less formal education[11]. In one case control study in Kerala in India, a lower chance of pre-cancerous lesions was found among those with better socioeconomic conditions[47]. The results presented in that study[47] may be related to greater access to information regarding oral cancer prevention, as well as, a greater possibility of putting into practice such information among those with a greater *per capita* income. However, previous studies show that dentists are mostly concerned with ensuring that socio-economically disadvantaged individuals have access to health information because they assume that poor people are less informed[11,47]. Our findings suggest that, in Montes Claros, most of dentists do not consider low socioeconomic status to be a prerequisite for the provision of health-related information. In the context of health promotion, health education strategies that consider the socioeconomic conditions of the people are important in planning how the population will be approached regarding the prevention of oral cancer[10], considering that disadvantaged citizens, many of whom are elders, may have difficulty understanding,

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evaluating and applying the information provided[20]. In summary, a greater prevalence of access to information about the prevention of oral cancer among elders in Montes Claros is called for, especially considering that a majority of study participants presented unfavorable socioeconomic conditions that have been associated with the development of oral cancer[11,47].

Among the information that should be shared in efforts that aim to improve health literacy rates, the impact of habitual tobacco use stands out. Tobacco use is an important risk factor related to the occurrence of oral cancer[7,39], however, the evaluation of the association between access to information regarding oral cancer prevention and this risk factor in cross-sectional studies is complex. If on one hand it is expected that the dentist is motivated to pass on this information, especially among those with risk behavior (greater access to information among tobacco users). On the other hand it is expected that the person who has access to information about risky behavior for their health behavior change by adopting healthier habits (access leads to a quit attempt, greater access to information among no tobacco users). Among elders in Montes Claros, access to information regarding oral cancer prevention was greater among those that were non-smokers, noting once again that for the purposes of this study, ex-smokers were included in the group of tobacco users, and, thus, the possibility that these individuals may have abandoned this habit, as a result of greater access to preventive information, cannot be disregarded. Additionally, current tobacco users may report a lack of access to preventive information as a defense mechanism, since changing habits is difficult and information alone may not be capable of changing habitual behaviors. Tobacco and alcohol users who have removable dental prostheses may present injuries in the oral mucosa or precancerous lesions. This observation is in accordance with the hypothesis that the recurring physical irritation of the oral mucosa contributes to the topical carcinogenic effect of tobacco in the mouth, which should be taken into consideration in the planning of strategies for the promotion of health and health education, especially in promoting preventive and curative dental services[11]. Tobacco users may tend to be less concerned with their health as exhibited by not abandoning a harmful habit and this may suggest that they may be less concerned with obtaining an early diagnosis of oral cancer. On the other hand, tobacco users with high levels of health literacy that are not able to abandon this harmful habit, may be more concerned with early diagnosis of tobacco-related diseases. One study found that delays in the early diagnosis of this type of cancer were greater among those that did not use tobacco[48], observing therefore association between tobacco use and early diagnosis of oral cancer, which may be preceded by oral self-examination.

Despite the lack of studies that prove an association between oral self-examination and a reduction in rates of mortality and fatality due to oral cancer, in one randomized trial, it was found that these rates decrease when there is screening by health professionals trained in identifying suspect lesions for oral cancer, timely confirmation of such suspicions by pathological examinations and follow-up through immediate treatment[14]. The early diagnosis of oral cancer may occur during a regularly scheduled dental appointment or as a result of screenings and appointments sought out after the identification of suspect lesions during an oral self-examination. There are places where screening is not carried out and there are other places where such procedures are carried out periodically in various intervals of time. If everyone learned and carried out oral self-examinations, especially in between regularly scheduled dental appointments or screenings, the possibility of early diagnosis and treatment would be maximized. Furthermore, in places where screening is not a regular policy, or where this policy has not been deployed, and even when screening is part of regularly scheduled treatment, the practice of appropriate self-examination can minimize morbidity and mortality related to oral cancer. This situation is full of importance, as access to information regarding the prevention of oral cancer is associated with oral self-examination and follow-up through an oral examination by a health professional, and, thus, increases the odds of early diagnosis of oral cancer. The odds of having access to information regarding the prevention of oral cancer among those who carry out self-examinations was six times greater than that of those who do not carry out self-examinations, even after controlling for other variables. Among elders who carry out oral examinations, more than 70% confirm having access to information regarding oral cancer prevention. This suggests that the directions given were effective and may have generated changes in habits of self-care or reinforced healthy behaviors if healthy behaviors were adopted after gaining access to information on preventive practices. One should also consider the possibility of feed-

back in this association, since the identification of changes in the oral cavity during self-examination may lead people to seek information related to oral health.

Research carried out in Germany[49]and the United States[50] shows that a majority of dentists agree that preventive exams for oral cancer are important, but less than half discuss this information about these issues with their patients. In Montes Claros, especially among dentists that don't work in the FHS, there is a need for improvements in the continuing education of health professionals, especially with respect to the importance of oral health literacy. There is also a need to increase health promotion and education actions related to the prevention and early diagnosis of oral cancer. Governmental dental care, particularly the care of seniors, needs to be reevaluated. There is a need to develop health policies that include actions of health promotion and education geared towards self-diagnosis and self-care, as well as preventive actions, maintenance and rehabilitation[37]. Furthermore, lack of insatisfaction with dental services may be associated with problems accessing preventive information on how to avoid dental problems[51]. Contrary to our findings among elders in Montes Claros, in a prospective intervention study with people above the age of 40 in Italy, there was more knowledge in the group that was instructed on the prevention of oral cancer than in the control group, however, this knowledge did not lead to a significant increase in self-examination in the instructed group[52]. This suggests that the intervention applied in Italy may not have considered issues beyond access to information that are posed by the health literacy approach[20,30], or perhaps that for those participants other issues are more important than changing habits in order to prevent diseases. Cross-sectional studies on Brazil also demonstrate that, despite having knowledge about oral cancer and about risk factors, many people continue to practice habits harmful to health and do not conduct self-examinations[35,53]. As such, there is a need for the use and evaluation of diverse strategies, that consider the issues proposed in the theoretical model of health literacy[20], among these is the need to empowerment patients[30], promoting the acquisition of knowledge and practices that are aimed at controlling health problems.

The odds of access to preventive information regarding oral cancer were greater among those that did not report discomfort in the mouth, head or neck. There is a possibility for feedback in this association, as discomfort might lead a person to seek out information. Likewise, such information might increase the level of health literacy of individuals who can then identify a non-symptomatic lesion as a discomfort. Longitudinal studies may better elucidate this association, as the presence of discomfort should stimulate a greater concern on the part of health professionals to provide preventive information. An association between recurring oral ulcers due to poorly adjusted dentures and oral cancer has been proven[11,54], further suggesting the importance of access to information related to oral discomfort and oral cancer.

It is probable that additional unfavorable conditions are present among those that have less access to health-related information, as access to this information was less among those with less income, among those that presented worse health behaviors and among those that reported the presence of discomfort. A previous study confirmed that individuals with less socioeconomic status were less likely to use dental services, and, when they did use such services, they were less likely to receive more conservative treatment, less information was received and they reported less understanding of treatments that could prevent the loss of teeth[55]. These results suggest a paradox related to inequality in the oral health care of the elderly. On one hand, this indicates inequality, as less access was found to be associated with lower income. On the other hand, greater access was observed among residents of homes registered with the FHS, that are possibly those with less income, since the publicly funded services provided by the FHS should be a priority among those most in need of free health care.

Increasing health literacy may be a promising approach to educational programs and strategies developed and applied by health professionals to prevent disease and promote health by encouraging people to adapt healthy practices and routine preventive self-care. However, the adoption of the theories proposed in the model of Sørensen et al.[20] presents challenges that have not yet been explored. In the context of health literacy, the specific cognitive qualities that are attained depend on both the quality of the information provided[20] and the individual motivation and conscience of each individual[30].

Some variables considered in the theoretical model proposed by Sorensen et al.[20] were not evaluated among elders in Montes Claros. On the other hand, this study followed the methodological rigor required in a cross-sectional study:

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planning sample, calibration and statistical analysis with correction for design effect.

Conclusions

A majority of the elders had access to information on how to prevent oral cancer, the prevalence was greater among residents registered with the FHS. There is a need to increase the provision of this preventive information by oral healthcare professionals, especially among those that did not live in registered residences, among those that are socially disadvantaged, among tobacco users, among those who do not conduct self-examinations and among those that report discomfort in the mouth, head and neck. Practical implementation of acquired knowledge is recommended, in the context of the adopted theoretical model of health literacy, regarding the use of tobacco, the importance of oral self-examination and the existence of a possible association between oral cancer and the presence of discomfort in the mouth. It is also important to note associations between access to information regarding oral cancer prevention and the use of tobacco, the implementation of oral self-examinations and reports of discomfort in the mouth, all of which should be evaluated considering the possibility of feedback mechanisms.

Collaborations

AMEBL Martins, IA Pordeus, EF Ferreira e SM Barreto participated in the conception and design, analysis, interpretation of data and writing of the manuscript. DS Haikal, PE Santos-Neto, MAB Sá and JGS Souza participated in the collection, analysis and interpretation of the data, as well as in the writing of the manuscript.

Acknowledgements

The Project was funded by FAPEMIG and the Mayor's Office of Montes Claros and received logistical support from the State University of Montes Claros – Unimontes, the Dental School of UFMG and the Unified Colleges of Northern Minas Gerais – FUNORTE. AMEBL Martins is a post-doctorate fellow with funding from the CNPQ; IA Pordeus, EF Ferreira and SM Barreto are productivity fellows with funding from the CNPQ. The authors would like to acknowledge the contributions of Dr. Kimberly Marie Jones (SOEBRAS) in her translation of this manuscript from the original version in Portuguese.

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Article submitted 08/03/2014
Approved 13/11/2014
Final version submitted 15/11/2014