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# Factors associated with the use of dental services by elderly Brazilians

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## ABSTRACT

**OBJECTIVE:** To assess the association between recent use of dental services, socioeconomic factors and oral health measures among elderly Brazilians.

**METHODS:** The sample consisted of elderly individuals aged 65 to 74, who participated in the Brazilian Oral Health Survey in 2010 (Brazil SB-2010). The dependent variable was “recent use of dental services” (last dental visit  $\leq$  2 years). The independent variables were: 1) sociodemographic factors, clinical oral health measures, and subjective measure of oral health. Statistical analysis included descriptive analyses of frequency, bivariate and multiple analyses using Poisson regression.

**RESULTS:** About 46.5% of the elderly individuals had had a dental appointment in the last two years. In the multiple Poisson regression model, education, income and region were independently associated with the outcome. Individuals with 0-20 teeth and need for prosthesis had a lower prevalence of recent dental visit. A higher prevalence of recent dental visit was observed among individuals in need of dental treatment and among those with dental prosthesis.

**CONCLUSIONS:** Recent use of dental services was associated with socioeconomic factors (education, income, and region) and clinical oral health measures (number of teeth, use and need for dental prosthesis and need for dental treatment).

**DESCRIPTORS:** Aged. Dental Health Services, utilization. Socioeconomic Factors. Dental Health Surveys. Oral Health.

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## INTRODUCTION

The current generation of the elderly have inherited a care model centered on mutilating practices that resulted in a precarious oral health situation, with high levels of extractions, accumulated need for treatment and large demand for prosthetic services.<sup>17</sup> Despite the worldwide decrease in tooth loss,<sup>20</sup> the prevalence of edentulism is still high and significant in this age group,<sup>1,11,20,a</sup> due to the progressive and cumulative characteristic of oral diseases<sup>20</sup> and, among other factors, poor access to dental services,<sup>20,a</sup> which shows marked social inequalities.<sup>15,20</sup>

In addition to socioeconomic factors,<sup>5,18,24</sup> availability<sup>24</sup> and coverage of dental care,<sup>21</sup> recent use of dental services is related to self-perceived oral health<sup>23</sup> and to cultural issues.<sup>3,5</sup> According to Harford<sup>11</sup> (2009), lower rates of edentulism and an ageing population may reflect an increased likelihood of dental services being used by elderly individuals. On the other hand, although the provision and coverage of dental care has increased in Brazil, use of these services by the elderly is lower than among other age groups.<sup>a</sup> Moreover, comparison between the two most recent national oral health surveys reveals an increase in the percentage of elderly individuals (65 to 74 years old) who had never visited a dentist (5.8%<sup>b</sup> and 14.7%<sup>a</sup> in the first and second surveys, respectively).<sup>a</sup>

Braine<sup>4</sup> (2005) reported that, worldwide, a large number of the elderly do not receive appropriate treatment for oral health conditions as governments are not sufficiently informed of the problem. Thus, recent studies have suggested that the research agenda should be directed at investigating issues which contribute to the planning of services according changes in the structure of the population and the epidemiology of the diseases and disorders that affect oral health.<sup>11,20</sup>

Knowledge of this population's needs, as well as of the factors which determine the use of dental services, are important in formulating health care policies which aim to reduce the impact of oral health problems on the quality of life of the elderly. There are other studies which assess recent use of these services by the elderly in Brazil. However, continuous evaluation of population data, as in repeated national surveys, means that the profile of the service use at different times can be traced and changes in the factors associated with the outcome can be verified.

Therefore, the aim of this study was to assess the association between recent use of dental services, socio-economic factors and oral health conditions among elderly Brazilians.

## METHODS

Cross-sectional study using data from the Brazilian Oral health Survey (SBBrazil – *Pesquisa Nacional de Saúde Bucal*),<sup>a</sup> carried out in 2010.

The sample of elderly individuals (65 to 74 years old) was designed to be representative of the country as a whole; each macro region, all of the state capitals and cities in the interior of each macro region. The primary sampling units were: (a) municipality in the interior of the regions and (b) census tract in the state capitals.<sup>a</sup> The final sample was made up of 6,702 elderly individuals.

Data was collected by specially trained and calibrated dental surgeons. As well as a structured questionnaire containing questions on dental service use, self-perception of oral health and sociodemographic conditions, oral examinations were carried out, following the internationally standardized methodology set by the World Health Organization.<sup>25</sup>

The dependent variable was recent use of dental services, measured using the question “When was the last time you visited a dentist?” The questionnaire contained five response options (less than 1 year ago, 1 to 2 years ago, 3 or more years ago, non-applicable and don't know or did not respond), which were categorized into within the last 2 years and three or more years. The elderly individuals who responded “don't know/did not respond” and who did not undergo an oral exam were excluded from the study and considered as a sample loss. An interval of two years or less was considered recent use of dental service, as suggested in the literature.<sup>3</sup>

The independent variables were: 1) socio-demographic factors (age, sex, schooling, household income, skin color, place of residence and region of Brazil); 2) clinical measures of oral health: number of teeth (0-20 teeth, 21 or more teeth [functional teeth]<sup>12</sup>), need for dental treatment, dental caries (presence, of one or more teeth with untreated dental caries), use of dental prosthesis (upper jaw and/or lower jaw, total or partial, fixed or removable) and need for dental prosthesis (need for upper jaw and/or lower jaw, total or partial, fixed or removable prosthesis); 3) subjective measures of oral health: satisfaction with oral health.

The statistical analysis included calculating frequencies and bivariate analysis. The association between the categorical variables was verified using the chi squared test with the Rao-Scott correction.<sup>22</sup> The multiple

<sup>a</sup> Ministério da Saúde, Secretaria de Atenção à Saúde, Secretaria de Vigilância em Saúde. Projeto SB Brasil 2010: Pesquisa Nacional de Saúde Bucal: resultados principais. Brasília (DF); 2011.

<sup>b</sup> Ministério da Saúde, Secretaria de Atenção à Saúde, Departamento de Atenção Básica, Coordenação Nacional de Saúde Bucal. Projeto SB Brasil 2003: condições de saúde bucal da população brasileira 2002-2003: resultados principais. Brasília (DF); 2005.

analysis was carried out using Poisson regression. All of the variables which had  $p < 0.20$  were included in the multiple regression model. The variables were included in the multiple model, starting with the socio-demographic variables, followed by the measures of oral health. Analysis was carried out using the STATA 11.0 program, using the *survey* command which enables a complex sample structure to be handled, including attributing sampling weight. According to the SBBrazil 2010 report,<sup>a</sup> the sampling weights were calculated for each individual examined based on probabilities obtained from different stages of selection. Next, they underwent a smoothing out process and were then added to the final database for the study.

The SBBrazil 2010 Project followed the standards set by the Declaration of Helsinki and was approved by the *Conselho Nacional de Ética em Pesquisa*, record no. 15,498, 7<sup>th</sup> January 2010.

## RESULTS

Table 1 shows the description of the sample with regard to socioeconomic factors and oral health conditions. It was verified that the majority of individuals (56%) were female, had income between R\$ 501.00 and R\$ 1,500.00 and the majority reported low levels of schooling (zero to three years). With regard to oral health conditions, a high prevalence of elderly individuals with between zero and 20 teeth (88.5%) and in need of a prosthesis (69.2%) was found. It was observed that 46.5% of the elderly individuals reported recent use of dental services.

Table 2 shows the bivariate analysis between the time since the most recent visit to the dentist and the independent variables. The results show a significant association between the amount of time since the most recent visit to the dentist and four socio-demographic variables (schooling, income, skin color and macro region). An increase in the proportion of individuals having made recent use of dental services was observed as the level of schooling increased. Those elderly individuals who had recently seen a dentist were those with the highest number of teeth, those needing treatment, those with no need for dental prosthesis and those with dental caries.

The multiple logistic regression model (Table 3) showed three socio-demographic variables to be independently associated with the outcome. Elderly individuals with higher levels of schooling and income have a greater prevalence of having recently made use of dental services and this prevalence was lower among residents in the North and Central-West regions. Four oral health conditions variables remained associated with the outcome: number of teeth, need for dental prosthesis, need for dental treatment and use of dental prosthesis. The number of teeth was strongly related

**Table 1.** Description of the elderly individuals according to socio-demographic characteristics and oral health conditions. SBBrazil, 2010.

Sociodemographic characteristics	%
Age (years)	
65-69	56.0
70-74	44.0
Sex	
Female	61.5
Male	38.5
Schooling (years)	
0-3	40.4
4-7	37.0
≥8	22.6
Income (R\$)	
< 500.00	13.1
501.00-1,500.00	56.7
≥1,501.00	30.2
Place of residence	
State Capital	32.2
Interior	67.8
Region	
North	5.1
Northeast	10.0
Southeast	62.4
South	16.3
Central-West	6.2
Skin color	
White	54.7
Black	13.6
Dark skinned	29.8
Other	1.8
Oral health conditions	
Number of teeth	
0-20	88.5
≥21	11.5
Dental caries	
No	77.4
Yes	22.6
Use of dental prosthesis	
No	21.6
Yes	78.4
Need for dental prosthesis	
No	30.8
Yes	69.2
Need for dental treatment	
No	73.4
Yes	26.6
Satisfaction with oral health	
Satisfied	52.9
Neither satisfied nor dissatisfied	17.0
Dissatisfied	30.1
Last dental appointment	
≤2 years	46.5
≥3 years	53.5

**Table 2.** Association between use of dental services and socio-demographic characteristics and oral health conditions. SBBrazil, 2010.

Sociodemographic characteristics	Last dental appointment % (95%CI)		p
	65 years	75 years	
Age (years)			0.206
65-69	48.5 (43.6;53.5)	51.5 (46.5;56.4)	
70-74	43.9 (38.7;49.3)	56.1 (50.7;61.3)	
Sex			0.287
Female	45.1 (40.9;49.4)	54.9 (50.6;59.1)	
Male	48.7 (43.0;54.4)	51.3 (45.6;57.0)	
Schooling (years)			< 0.001
0-3	38.2 (33.4;43.2)	61.8 (56.8;66.6)	
4-7	45.7 (39.6;52.0)	54.3 (48.0;60.4)	
≥8	62.6 (55.9;68.9)	37.4 (31.1;44.1)	
Income (R\$)			< 0.001
< 500.00	35.5 (29.0;42.6)	64.5 (57.4;71.0)	
501.00-1,500.00	41.6 (36.9;46.3)	58.4 (53.7;63.1)	
≥1,501.00	60.5 (54.3;66.3)	39.5 (33.7;45.7)	
Place of residence			0.276
Capital	48.9(45.3;52.5)	51.1(47.5;54.7)	
Interior	45.3(40.2;50.6)	54.7(49.4;59.8)	
Region			< 0.001
North	27.8 (21.4;35.2)	72.2 (64.8;78.6)	
Northeast	42.1 (37.3;47.1)	57.9 (52.9;62.7)	
Southeast	49.7 (44.5;54.9)	50.3 (45.1;55.5)	
South	46.4 (40.7;52.3)	53.6 (47.7;59.3)	
Central-West	36.7 (32.0;41.7)	63.3 (58.3;68.0)	
Skin color			0.018
White	50.2(45.1;55.3)	49.8 (44.7;54.9)	
Black	34.8(25.2;45.8)	65.2(54.2;74.8)	
Dark skinned	45.9(41.0;50.8)	54.1(49.2;59.0)	
Other	32.0(16.6;52.7)	68.0(47.3;83.4)	
<b>Oral health conditions</b>			
Number of teeth			< 0.001
0-20	42.2 (38.6;45.9)	57.8 (54.1;61.4)	
≥21	79.2 (71.0;85.6)	20.8 (14.4;29.0)	
Dental caries			< 0.001
No	43.0(38.9;47.2)	57.0(52.8;61.1)	
Yes	58.3(53.2;63.3)	41.7(36.7;46.8)	
Use of dental prosthesis			0.353
No	44.4(39.1;49.9)	55.6(50.1;60.9)	
Yes	47.0(43.1;51.0)	53.0(49.0;56.9)	
Need for dental prosthesis			< 0.001
No	56.4(50.8;61.8)	43.6(38.2;49.2)	
Yes	42.1(37.5;46.8)	57.9(53.2;62.5)	
Need for dental treatment			< 0.001
No	41.1(37.2;45.1)	58.9(54.9;62.8)	
Yes	61.3(55.6;66.7)	38.7(33.3;44.4)	
Satisfaction with oral health			0.585
Satisfied	46.1(41.2;51.1)	53.9(48.9;58.8)	
Neither satisfied nor dissatisfied	50.2(42.4;58.0)	49.8 (42.0;57.6)	
Dissatisfied	45.0(38.7;51.4)	55.0(48.6;61.3)	

to the outcome: elderly individuals with zero to 20 teeth had a lower prevalence of recent use of dental services compared with those with 21 or more teeth. It was seen that elderly individuals needing treatment or a prosthesis had higher prevalence of having recently visited the dentist and this association remained after adjusting for sociodemographic variables.

## DISCUSSION

This study shows that 46.5% of elderly individuals had used dental services in the two years preceding the study, and that 27.8% of the sample had used the service within the preceding year. The proportion of use in the year preceding the study was higher than that found in other studies in Brazil, with prevalence varying between 13% and 20%<sup>3,15,18</sup> and lower than the prevalence found in other countries.<sup>10,19</sup> The prevalence of having used dental services in the two years preceding this study was also superior to the proportions of 32.9% and 39% found by Baldani et al<sup>3</sup> (2010) and Gibilini et al<sup>8</sup> (2010), respectively. However, use of dental services by the elderly is still low when considering the accumulated demand for treatment and the high prevalence of tooth loss without prosthetic rehabilitation which are the result of a history of an individualistic oral health model of low complexity and a lack of programs specific to this age group.<sup>18</sup>

With regard to sociodemographic factors associated with recent use of dental services, the results corroborate those of other studies, reinforcing the perception of marked social inequalities in use of these services.<sup>2,3,5</sup> Although differences in the methodology used to classify “recent use of dental services” should be borne in mind, other authors<sup>3,5,14</sup> have noted that elderly individuals on higher income and with higher levels of schooling have a higher prevalence of recent use of dental services. Higher income may facilitate paying for such services and higher levels of education may lead to the individual being better informed of the importance of regular use of dental services. According to the literature,<sup>24</sup> with the family budget often committed to other family members, income may be a factor limiting the use of dental services by the elderly. However, removing the obstacle of financial resources does not necessarily equalize the rates of health care service use between individuals with different socioeconomic levels<sup>9</sup> as this is a multi-faceted issue.

The link between self-perception of oral health and use of dental services has been contradictory and both poor<sup>2,8,15</sup> and good<sup>5,8,15</sup> self-perceived oral health have been associated with an increased likelihood of using dental services. In contrast, in this study, self-evaluated satisfaction with oral health was not associated with the outcome. Ekanayke & Perera<sup>6</sup> (2005) reported that the lack of association between self-perceived oral health and time elapsed since last visit to the dentist could

**Table 3.** Final Poisson regression model for last dental appointment [2] years. SBBrazil, 2010.

Sociodemographic characteristics	Dental appointment [2] years <sup>a</sup>	
	Unadjusted PR (95%CI)	Adjusted PR (95%CI)
Schooling (years)		
0-3	1	1
4-7	1.20 (1.00;1.43)*	1.08 (0.93;1.26)
≥8	1.64 (1.38;1.95)***	1.30 (1.10;1.55)**
Income (R\$)		
≤500.00	1	1
501.00-1,500.00	1.17 (0.94;1.46)	1.14 (0.93;1.41)
≥1,501.00	1.70 (1.36;2.13)***	1.37 (1.11;1.69)**
Region		
Southeast	1	1
North	0.56 (0.43;0.73)***	0.58 (0.43;0.79)**
Northeast	0.85 (0.72;0.99)*	0.90 (0.79;1.03)
South	0.93 (0.79;1.10)	0.88 (0.76;1.02)
Central-West	0.74 (0.62;0.87)***	0.81 (0.69;0.95)**
Age (years)		
60-69	1	1
70-74	0.90 (0.77;1.06)	0.94 (0.81;1.10)
Oral health conditions		
Number of teeth		
≥21	1	1
0-20	0.53 (0.47;0.60)***	0.62 (0.52;0.74)***
Need for dental treatment		
No	1	1
Yes	1.49 (1.32;1.68)	1.46 (1.29;1.65)***
Need for dental prosthesis		
No	1	1
Yes	0.75 (0.64;0.86)***	0.80 (0.69;0.93)**
Use of dental prosthesis		
No	1	1
Yes	1.06(0.94;1.20)	1.30 (1.12;1.49)***

\*p < 0.05; \*\*p < 0.01; \*\*\*p < 0.001

<sup>a</sup>Reference category: last dental appointment three years ago or more (no recent use of dental services); p-value of the model < 0.001.

be explained by the fact that it is not related to having a regular check-up, but rather to alleviating symptoms related to oral health conditions. However, the contradictions observed between these studies cannot be resolved with cross-sectional studies, as the most recent visit to the dentist may indicate regular use of the services, but could just as easily have been provoked by suffering an oral health problem. In other words, a cross-sectional study cannot demonstrate whether service use was sporadic, albeit recent, caused by poor



oral health conditions or whether recent use is indicative of frequent use and good oral health conditions.

Tooth loss and using a prosthesis are generally deemed to be inevitable characteristics of the ageing process.<sup>13,16</sup> Thus, the belief that visiting the dentist is unnecessary for edentulous individuals constitutes an obstacle to access to services.<sup>7</sup> In line with other findings,<sup>15</sup> the results of this study show that elderly individuals with fewer than 21 teeth had a lower prevalence of recent use of dental services. Moreover, the clinical oral health measures associated with higher prevalence of recent use of dental services were those that could be related to the presence of signs and symptoms of discomfort, such as the use of dental prosthesis and the need for dental treatment.

Unlike this study, others<sup>3</sup> have shown that using a complete dental prosthesis was related to not having recently visited the dentist. One of the reasons for this difference between the studies may be the fact that in this study all types of prosthesis were included, not just complete dental prostheses, as in other studies, meaning that the elderly may have an association between prostheses and the presence of natural teeth. Thus, recent use of dental services may be related either to discomfort due to the prosthesis, or to symptoms and need for treatment from the remaining teeth. On the other hand, elderly individuals with a need for dental prosthesis had a lower prevalence of recent use of dental services. This may be explained by the fact that this measure depends on a dental surgeon assessing the quality (e.g., adaptation and retention) of the prosthesis, which generally differs from the patients' self-perception. Moreover, even when the need is perceived, lack of recent service use reflects

the difficulty in accessing services of rehabilitation, still not sufficiently available within the public system, and may also be related to the high cost of private services, accessible only to a small part of the population.<sup>17</sup>

The results of this study show that there are still inequalities in the recent use of services, reinforced by their greater use among the better off elderly individuals. This occurs despite widening coverage of oral health care in the country as a whole, directed by the National Oral Health Care Policy (*Brasil Sorridente – Smiling Brazil*) and despite the reorganization of primary health care through the Family Health Care Strategy.<sup>1</sup> Thus, considering that recent use may be considered a marker of use of and access to dental services, the results show that ensuring access to quality health services and encouraging the use of services among the elderly remains the challenge in the planning of oral health care.

The results shown reflect the factors associated with use of dental services by a representative sample of the elderly in Brazil. However, due to the cross-sectional nature of the study, it is not possible to determine in which direction the association between recent use of services and oral health conditions goes. Another limitation of this study concerns the use of the questionnaire, as it implies some inaccuracy in the responses, although it has been widely used as a methodological tool in collecting data in research on the population's health.

Therefore, based on these results, it can be concluded that a representative group of the elderly population have not made recent use of dental services, and that this use was independently associated with sociodemographic factors and clinical measures of oral health.

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