

## Regular use of dental services and dental loss among the elderly

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**Abstract** *This study aimed to investigate the association between regular use of dental services and tooth loss by elderly linked to eleven Family Health Facilities in southern Brazil. This cross-sectional study evaluated 438 elderly. A standard questionnaire was used and oral health clinical variables were obtained by a trained dentist. The main study outcome, namely, the regular use of dental services, was obtained through a single question. Descriptive analyses and Poisson regression using Stata 12.0 were performed. The analysis of the exposure variables and the outcome in the unadjusted regression analysis revealed a positive association between regular use of oral health services for the elderly with 9-11 years of schooling (PR = 3.89; 95%CI 1.77-8.58) compared to individuals with 4 years of schooling, up to 9 teeth (PR = 2.50; 95%CI 1.0-5.72) and 10 or more teeth (PR = 3.89; 95%CI 1.58-9.57) compared to individuals who do not have teeth. When considering the primary exposure, tooth loss, through adjusted analysis, individuals with 10 or more teeth (PR = 3.51; 95%CI 1.37-8.99) have a higher prevalence of regular use of oral health services compared to individuals without teeth. The study identified that having teeth is positively associated with regular use of oral health services among the elderly.*

**Key words** *Elderly, Oral health, Dental care, Epidemiology, Family health*

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## Introduction

Increased life expectancy has resulted in the growth of the elderly population in the last decade<sup>1</sup>. According to the World Health Organization (WHO), the elderly are those 60 years of age or older in developing countries and sixty-five years of age or older in developed countries<sup>2</sup>. It is estimated that Brazil will have the sixth largest elderly population in the world by 2020, with about 32 million people. Besides the changes observed in the population pyramid, the epidemiological transition, characterized by the growing number of aging diseases, results in higher demand of this population for health services<sup>3</sup>.

Concerning Brazilian oral health services, in the last decades, there was a predominance of iatrogenic-mutilating actions in the care provided to this age group<sup>4,5</sup>. The implementation of the National Oral Health Policy in 2003 triggered a movement for the reorganization of oral health care, based on the principles and guidelines of the Unified Health System (SUS), with the development of practices with an emphasis on care, prevention and promotion of oral health<sup>6</sup>.

As a result, most of the elderly show a high prevalence of tooth loss<sup>5</sup>. Dental loss is one of the most common oral health problems in the elderly and is a public health problem that directly affects the quality of life of this age group. Its impact can be evidenced by declining functional chewing and phonation capacities, and nutritional, aesthetic and psychological losses, lower self-esteem and reduced social relationships<sup>7</sup>.

Despite the high prevalence of dental losses and the recognized relevance of oral health to overall health, the use of dental services by the elderly is low, and a substantial part of this age segment has no conditions to seek these services<sup>8,9</sup>. In the national epidemiological survey conducted in Brazil in 2010, when asked about seeking oral health services, 12.8% of the elderly reported using dental services routinely, showing that the prevalence of routine use of these services decreases with age<sup>10</sup>.

This fact is of concern since the use of dental services, with appropriate timing and frequency, contributes to the maintenance of oral health through early treatment and prevention of diseases. Also, the elderly population that maintains their natural dentition<sup>11</sup> is growing, and even among toothless individuals, the use of dental services is of the utmost importance due to the need to perform the early diagnosis of cancerous lesions and to assess the need or replacement of dentures<sup>5,9</sup>.

Given the above, and due to the few studies on the subject, this study aimed to verify the association between the report of the regular use of oral health services and dental loss of a population of older adults linked to eleven family health facilities of the city of Pelotas (RS).

## Methods

This is a cross-sectional study carried out with the Family Health facilities of the urban area of Pelotas (RS). The municipality of Pelotas (RS) has a population of 328,275 inhabitants. Concerning the elderly population living in the municipality, the number of inhabitants aged 60 and over stands at 49,005, equivalent to approximately 15% of the total population<sup>12</sup>.

The sample size of this study was calculated with an error of 5% and a test power of 80%. This work is part of a more extensive study that investigated several oral health-related outcomes (oral health-related quality of life, use of dental services, among others). The outcome that investigated the factors associated with the use of dental services required the largest sample ( $n=335$ ), for which 25% was added to allow the multivariate analysis ( $n=418$ ). Estimating that 10% of the respondents would not meet the inclusion criteria and assuming a 35% loss rate (including refusals), 700 seniors were randomly selected from a list provided by the community health workers of all the elderly registered in the eleven Family Health facilities. In the end, 438 individuals aged 60 years and over were evaluated. The number of individuals drawn and participating in the study was proportional to the number of people aged 60 years and over and the number of men and women registered in each family health establishment. In order to participate in the study, the elderly had to be independent, that is, to be able to perform daily living activities without the assistance of a relative or caregiver (bathing and feeding, among others), walking and cognitive ability to answer the questionnaire.

Data were collected from May 2009 to September 2010 through a standardized questionnaire and oral exams. A pilot study was performed to test the collection instrument before data collection.

The standardized questionnaire was administered at the elderly's homes by trained interviewers, from which the demographic, socio-economic, use of dental services, the perception of the need for treatment and self-perception of

oral health variables were obtained. Clinical oral health exams were conducted by a dentist trained and tuned according to the epidemiological survey standards proposed by the World Health Organization (WHO). The Research Ethics Committee of the Lutheran University of Brazil (ULBRA), Canoas Campus, approved this study under protocol 2009-193H. All the participants of the research signed the informed consent form.

The outcome of the study was the report of the regular use of oral health services obtained from a single question: "Which of the following describes your access to dental care? (0) I never go to the dentist; (1) I go to the dentist when I have a problem or when I know that I must have something fixed; (2) I go to the dentist occasionally, whether I have a problem or not; (3) I go to the dentist regularly"<sup>13</sup>. For statistical analysis, the outcome was categorized as: *non-regular use of dental services*, which included answers "0" and "1", or *regular use of dental services*, with answers "2" and "3".

The study's exposure variables were: gender (male and female); skin color according to IBGE - Brazilian Institute of Geography and Statistics, and categorized (white, black and brown); age in complete years (60 to 69 years, 70 to 79 years and 80 or more years); marital status collected in single, married or living together, divorced or widowed and categorized (without companion or with companion); schooling obtained in years of study (less than 4 years, between 4 and 7 years and 8 years or more); occupation (active and non-active); household income per capita in minimum wages (less than 1.5 and 1.5 or more); depressive symptoms assessed through the 15-item geriatric depression scale (GDS-15) (yes and no); chronic disease (no and yes); self-perception of oral health was obtained from a single question consisting of 5 options, in which the elderly chose only one option. It was divided into three categories (very good and good, adequate and poor and very poor); the need for denture (yes and no) and use of denture (yes and no). The main study exposure of dental loss was obtained by oral health examination and categorized in toothless, 1 to 9 teeth and 10 teeth or more.

The study data were analyzed using the Stata 12.0 program. Initially, descriptive analyses using absolute and relative frequencies were performed. Then, crude Poisson regression was performed with a significance level of 5% for the variables of study exposure and the report of the regular use of dental services. Next, a crude Poisson regression analysis was performed and

adjusted for the "report of the regular use of oral health services" and the main "dental loss" exposure. Dental loss was adjusted with the study outcome in model 1 for the variables gender, skin color, marital status, age, schooling, occupation, household income in minimum wages, depressive symptoms and chronic disease. In model 2, adjustments were made for the same variables of model 1 and the oral health-related variables: self-perception of oral health, place of last dental care, use of denture and need for a denture. All variables were maintained in both models, regardless of their p-value.

## Results

Of the 438 elderly people evaluated in this study, most were female (68%), white (69%), with a companion (52%), aged 60-69 years (57%), non-active (86%), had a household income higher than 1.5 minimum wages (57%) and up to 4 years of schooling (68%). As for overall health, 18% had depressive symptoms and 78% had some chronic illness. Regarding oral health, 73% perceived their oral health as good or adequate, 57% performed their last dental care in the private service, 85% used some type of dental prosthesis and 51% needed some dental prosthesis. Finally, analyzing the primary exposure of the study "dental loss", more than half of the elderly did not have teeth (51%), and concerning the "regular use of oral health services" outcome, most of the elderly (92.2%) reported not seeking dental services regularly (Table 1).

When analyzing the exposure variables and the report of the regular use of oral health services, considering the elderly who mentioned only the use of regular oral health service (reference category - non-regular use of oral health services), the study pointed out prevalence of oral health services on a regular basis for the elderly with 9-11 years of schooling (PR = 3.89 CI 95% 1.77-8.58) compared to those with up to 4 years of age study. On the other hand, there was an inverse association of the regular use of dental services among those who did not require a denture (PR = 0.44 95% CI 0.21-0.92) compared to those who required dentures. (Table 2).

When considering the primary exposure of the study, namely, dental loss, in the crude Poisson regression analysis, individuals with up to 9 teeth (PR = 2.50, 95% CI 1.12-5.58) and 10 or more teeth (PR = 3.89, 95% CI 1.65-9.17) had higher prevalence of seeking the dentist regularly

**Table 1.** Description of characteristics of the elderly enrolled in eleven Family Health Units. Pelotas (RS), Brazil. 2015.

	N (%)
Gender (n = 439)	
Male	279 (31.7)
Female	139 (68.3)
Skin color (n = 438)	
White	301 (68.7)
Black and brown	137 (31.3)
Marital status (n = 437)	
Without companion	208 (47.6)
With companion	229 (52.4)
Age (in years) (n = 438)	
60-69	251 (57.3)
70-79	138 (31.7)
80 and over	48 (11.0)
Schooling (n = 439)	
0-4 years	299 (68.1)
5-8 years	91 (20.7)
9-11 years	48 (11.2)
Occupation (n = 437)	
Active	60 (13.7)
Non-active	377 (86.3)
Household income (in minimum wages) (n = 436)	
< 1.5 MW	188 (43.1)
> 1.5 MW	248 (56.9)
Depressive symptoms (n = 438)	
Yes	80 (18.3)
No	358 (81.7)
Chronic disease (n = 436)	
Yes	340 (78.0)
No	96 (22.0)
Self-perceived oral health (n = 438)	
Very good	68 (15.5)
Good and adequate	321 (73.3)
Poor and very poor	49 (11.2)
Place of last dental service (n = 433)	
Public	188 (43.4)
Private	245 (56.6)
Need for denture (n = 438)	
Yes	225 (51.2)
No	213 (48.8)
Use of denture (n = 438)	
Yes	371 (84.7)
No	67 (15.3)
Dental loss (n = 437)	
Toothless	224 (51.4)
Up to 9 teeth	149 (34.0)
10 teeth and over	64 (14.6)
Regular use of oral health services (n = 438)	
Yes	34 (7.8)
No	404 (92.2)

compared to individuals who did not have teeth. When considering the Poisson analysis adjusted in model 1, individuals with up to 9 teeth (PR = 2.49, 95% CI 1.19-5.16) and 10 or more teeth (PR = 4.34, 95% CI 1.88-10.03) had a higher prevalence of reporting of the regular demand for dental services compared to those who did not have teeth. This effect remained in model 2, for individuals with up to 9 teeth (PR = 2.21, 95% CI 0.93-5.27) and 10 or more teeth (PR = 3.51, 95% CI 1.37-8.99) compared to those who do not have teeth. (Table 3).

## Discussion

This study observed that the elderly with teeth reported seeking dental services more regularly when compared to toothless elderly. Due to the scarce literature on the relationship between dental loss and the account of regular use of dental services in the elderly population, this study believes that it is contributing to new knowledge about the subject, mainly because dental loss is currently the leading oral health problem of the elderly population<sup>14</sup>, and estimates based on the Brazilian national oral health surveys conducted in 1986, 2003 and 2010 show a trend of increasing edentulism rates in the next 20 years for this age group<sup>15</sup>.

Income and schooling are pointed out as important factors in the higher demand for dental services by adults and the elderly<sup>16-18</sup>. Literature indicates that income shows the individual's ability to buy the dental service<sup>5</sup>, while schooling, the ability to understand and adopt healthy behaviors<sup>19</sup>. This tendency was observed for both variables in this study. However, only schooling was positively associated with the report of the regular use of oral health services, indicating that the more educated elderly reported seeking dental services more regularly. The lack of association of income was probably due to the homogeneous household income of the elderly, mainly from pensions.

This study observed a higher prevalence of the account of seeking oral health services regularly among those elderly requiring some denture. The authors believe that the presence of multi-professional family teams developing actions both at the health facility and the family's home to improve the health indicators of the population increases the odds of the elderly receiving information about the oral health services that are provided at the health facility and the relevance

**Table 2.** Gross prevalence ratios of sociodemographic, general health and oral health variables of the elderly enrolled in eleven Family Health facilities of Pelotas (RS) associated with the regular use of dental services. Pelotas (RS), Brazil, 2015.

	Dental care	
	Regular use of oral health services	p-value*
Gender (n = 439)		0.502
Female	1.0	
Male	0.77 (0.36-1.66)	
Skin color (n = 438)		0.813
White	1.0	
Black and brown	0.92 (0.44-1.91)	
Marital status (n = 437)		0.935
Without companion	1.0	
With companion	1.01 (0.83-1.23)	
Age (in years) (n = 438)		0.516
60-69	1.0	
70-79	0.83 (0.40-1.74)	
80 and over	0.47 (0.11-2.02)	
Schooling (n = 439)		0.007
0-4 years	1.0	
5-8years	1.64 (0.70-3.84)	
9-11 years	3.89(1.77-8.58)	
Occupation (n = 437)		0.522
Active	1.0	
Non-active	0.74 (0.31-1.80)	
Household income (in minimum wages) (n = 436)		0.099
< 1.5 MW	1.0	
> 1.5 MW	1.82 (0.87-3.80)	
Depressive symptoms (n = 438)		0.925
Yes	1.0	
No	0.96 (0.40-2.32)	
Chronic disease (n = 436)		0.540
Yes	1.0	
No	1.27 (0.59-2.73)	
Self-perceived oral health (n = 438)		0.931
Very good	1.0	
Good and adequate	0.84 (0.34-2.07)	
Poor and very poor	0.92 (0.26-3.28)	
Place of last dental service (n = 433)		0.092
Public	1.0	
Private	1.84 (0.88-3.85)	
Need for denture (n = 438)		0.027
Yes	1.0	
No	0.44 (0.21-0.92)	
Use of denture (n = 438)		0.923
Yes	1.0	
No	0.95 (0.37-2.47)	

\*Wald's test.

of visiting the dentist regularly, even in the total absence of teeth, but especially when these elderly have remaining teeth and use dentures. This

situation may have contributed to this result of the study and also meets the other finding of the study related to the higher number of teeth and

**Table 3.** Crude and adjusted Poisson regression analysis of the regular use of the dental services of the elderly enrolled in the Family Health Facilities by dental loss, Pelotas (RS), Brazil, 2015.

	Crude	Model 1 Adjusted <sup>*</sup>	Model 2 Adjusted <sup>**</sup>
	PR (IC95%)	PR (IC95%)	PR (IC95%)
<b>Dental loss</b>	p = 0.007	p = 0.002	p = 0.032
Toothless	1.0	1.0	1.0
Up to 9 teeth	2.50 (1.12-5.58)	2.49 (1.19-5.16)	2.21 (0.93-5.27)
10 teeth and over	3.89 (1.65-9.17)	4.34 (1.88-10.03)	3.51 (1.37-8.99)

\*Gender, skin color, marital status, age, schooling, occupation, household income in minimum wages, depressive symptoms and chronic disease. \*\*Model 1 plus self-perceived oral health, place of last service, denture use and need.

a higher frequency of reporting a regular visit to the dentist.

Regarding dental loss, the primary study exposure, the literature indicates a high prevalence of total dental loss in the elderly population, ranging from 41.5% to 60%<sup>16,20-23</sup>. These numbers found in the literature are similar to data from this study, in which 51% of the elderly population had no teeth. These high rates of edentulism can be explained by public policies that have not prioritized oral health actions for this population over the years. The Brazilian elderly carry the inheritance of a welfare model, in which curative and mutilating practices were predominant in the care provided to this age group<sup>5</sup>. Regarding the report of the regular use of dental services and dental loss, the toothless elderly reported a lower frequency of visits to dental services when compared to those with teeth, and this is probably because they believe that the lack of teeth is a reason for not visiting the dentist<sup>8</sup>. Another hypothesis that should be considered is that toothless elderly require prosthetic rehabilitative treatment. This service was initially provided in the Brazilian public health system based on the implementation of the National Oral Health Policy – *Brasil Sorridente* (Smiling Brazil)<sup>6,24</sup>. The Brazilian Ministry of Health provides municipalities with financial incentives for the accreditation of denture laboratories. However, the number of dentures provided is far below the real

needs of the population. It should be noted that when this study was conducted, the municipality evaluated did not provide public free prosthetic rehabilitation service. On the other hand, there is a great supply of dental services in the private sector; however, prosthetic rehabilitation treatment is costly, which decreases the probability of this group of elderly people seeking these services due to their low purchasing power.

Finally, some methodological limitations of the study should be discussed. The main one refers to that related to the study design, which hinders the establishment of cause and effect relationships between exposure and outcome.

## Conclusions

Most of the elderly participants in the study reported not visiting dental services regularly. The study also found that older adults with a higher number of teeth reported seeking dental care more regularly when compared to the toothless elderly. The results reinforce the need to organize oral health services to care for the elderly with the active participation of oral health teams and primary care multi-professional teams, developing actions that reinforce the relevance of visiting the dentist, even for the toothless elderly to make an early diagnosis of oral mucosal lesions and evaluation of dentures, when present.

## Collaborations

AER Silva contributed to the design and outline or the analysis and interpretation of data, drafting, review and approval of the version to be published. MS Echeverria, NB Custódio and MBJ Camargo contributed to the drafting, review and approval of the version to be published. AM Cascaes participated in the analysis of data, review and approval of the version to be published. CO Langlois contributed to the design, review and approval of the version to be published.



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