

UNIVERSIDADE FEDERAL DO RIO GRANDE DO SUL
FACULDADE DE ODONTOLOGIA

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ESTUDO LONGITUDINAL DOS FATORES RELACIONADOS COM O
EDENTULISMO EM IDOSOS DE CARLOS BARBOSA - RS: ABORDAGEM
QUANTITATIVA

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À minha família, pelo esforço e apoio, para que eu concluísse essa etapa.

Ao Maurício, que paciente e compreensivamente, esteve presente em todos os momentos.

– Não quero mais saber do lirismo que não é libertação.

Manuel Bandeira

RESUMO

MARQUES, Fernanda Pasquetti. **Estudo longitudinal dos fatores relacionados com o edentulismo em idosos de Carlos Barbosa - RS:** abordagem quantitativa. 2015. 33f. Trabalho de Conclusão de Curso (Graduação) - Faculdade de Odontologia, Universidade Federal do Rio Grande do Sul, Porto Alegre, 2015.

No Brasil há um grande contingente de idosos com precárias condições de saúde bucal, apresentando alta prevalência de perda dentária e edentulismo. Evidências de estudos populacionais demonstram que o edentulismo tem relação com diversos desfechos de saúde geral. Embora alguns estudos tenham incluído elementos contextuais e psicossociais em seus modelos explicativos, muitos restringem a causabilidade da perda total de dentes a elementos biológicos. O objetivo deste trabalho foi avaliar as associações entre elementos socioeconômicos, demográficos, comportamentais e clínicos, com a incidência de edentulismo em uma amostra representativa dos idosos de Carlos Barbosa, RS. O Estudo Longitudinal de Saúde Bucal de Idosos de Carlos Barbosa é um estudo de coorte de base populacional, iniciado em 2004 com seguimento em 2012. Em 2004, de 2167 pessoas com 60 anos ou mais que residiam no município, 872 foram avaliadas. Para a presente análise foram considerados apenas os idosos dentados (392) que concluíram o protocolo de exames e entrevistas. Aqueles que possuíam ao menos um elemento dentário foram considerados dentados. Em 2012 foram avaliados 199 dos 392 idosos dentados examinados em 2004; destes, 11,5% dos indivíduos tornaram-se edêntulos. As variáveis utilizadas neste estudo incluíram fatores sociais, demográficos e econômicos; fatores comportamentais; e fatores clínicos. Para avaliar associações univariadas e multivariadas foram utilizados Modelos de Regressão de Poisson com variância robusta. Os dados foram analisados usando o software SPSS. Nas análises bivariada ($p \leq 0,20$) e multivariada ($p \leq 0,05$) os fatores: alta renda pessoal; uso de prótese parcial removível (PPR); elevado Índice de Sangramento Gengival (ISG); e menor fluxo salivar, estiveram significativamente associados ao desfecho. Nesse estudo, maior renda pessoal foi preditor de edentulismo, enquanto a maioria dos estudos aponta baixa renda pessoal como fator de risco para este desfecho. No Brasil, a exodontia é umas das práticas que compõem os procedimentos oferecidos no Sistema Único de Saúde (SUS). Dessa forma, muitos usuários poderiam optar pela exodontia de todos os elementos dentários objetivando eliminar a dor, buscando soluções protéticas com a finalidade de devolver estética e função. Com base nestes resultados, sugerimos que aqueles que não possuem condições financeiras de arcar com reabilitação protética, podem optar por manter os dentes. O uso de PPR também foi um preditor de edentulismo; o uso de PPR pode ser responsável por maior retenção de placa, a qual é um causador de doença periodontal e cárie. Além disso, supomos que o usuário desse tipo de prótese ao perder um dente pilar, opte pela exodontia de todos os elementos dentários e busque uma reabilitação com prótese total convencional ou implanto-suportada. Maior fluxo salivar representou proteção para o edentulismo. Fluxo salivar reduzido é um fator de risco para a cárie, a qual é apontada como a principal causa de perdas dentárias. Alto ISG representou risco para o edentulismo, o que tem sentido, uma vez que é um marcador de higiene bucal. Compreender os fatores causais do processo da perda total dos dentes é relevante no que tange a prevenção da perda dentária e, conseqüentemente, promoção de saúde.

Palavras-chave: Saúde do idoso. Arcada Edêntula. Estudo longitudinal.

ABSTRACT

MARQUES, Fernanda Pasquetti. **Estudo longitudinal dos fatores relacionados com o dentulismo em idosos de Carlos Barbosa - RS: abordagem quantitativa.** 2015. 33p. Final Paper (Graduation in Dentistry) - Faculdade de Odontologia, Universidade Federal do Rio Grande do Sul, Porto Alegre, 2015.

In Brazil there is a large contingent of elderly people with poor oral health conditions, showing high prevalence of tooth loss and edentulous. Evidence from population studies show edentulism has been related to several general health outcomes. Although some studies have included psychosocial and contextual elements in their explanatory models, many restrict the causability of total tooth loss to biological elements. The aim of this study was to evaluate the associations between social and economic elements, demographic, behavioral and clinical trials, with the incidence of edentulism in a representative sample of the elderly of Carlos Barbosa, RS. The Longitudinal study of oral health in elderly people in Carlos Barbosa is a population-based cohort study, initiated in 2004 with segments in 2012. In 2004, 2167 people with 60 years or older living in the municipality, 872 were evaluated. For the present analysis were considered only the elderly with teeth (392) that concluded the protocol of tests and interviews. Those who had at least one dental element were considered toothed. In 2012 have been assessed 199 of 392 elderly toothed examined in 2004; of these, 11.5% of individuals became edentulous. The variables used in this study included social, demographic, economic, behavioral and clinical factors. To evaluate univariate and multivariate associations were used Poisson regression models with robust variance. Data were analyzed using SPSS software. In the bivariate analysis ($p \leq 0.20$) and multivariate analysis ($p \leq 0.05$) the factors: high personal income; use of removable partial denture; high rate of Gingival Bleeding Index; and smaller salivary flow, were significantly associated with the outcome. In this study, the higher personal income was a predictor of edentulous, while most studies points lower personal income as a risk factor for this outcome. In Brazil, the dental extraction is one of the practices that make up the procedures offered in the UHS. Thus, many users could opt for dental extraction of all the dental elements aiming to eliminate pain, seeking prosthetic solutions with the purpose of restoring aesthetics and function. Based on these results, we suggest that those who do not have financial conditions afford prosthetic rehabilitation, can choose to keep your teeth. The use of removable partial denture (RPD) was also a predictor of edentulous; the use of RPD may be responsible for greater retention of plaque, which is a cause of periodontal disease and caries. In addition, we assume that the user of this type of prosthesis to lose a tooth, opts for the abutment tooth extraction of all the dental elements and seek a rehabilitation with conventional total prosthesis or implant-supported. Increased salivary flow represented protection for the edentulous. Reduced salivary flow is a risk factor for tooth decay, which is cited as the main cause of tooth loss. GBI represented high risk for edentulous, which makes sense, since it is a marker of oral hygiene. To understand the causal factors of the process of total loss of teeth is relevant with respect to prevention of tooth loss and, consequently, health promotion.

Keywords: Health of the elderly. Edentulous. Longitudinal study.

LISTA DE SIGLAS

CPO-D	Dentes Cariados, Perdidos e Obturados
ISG	Índice de Sangramento Gengival
PPR	Prótese Parcial Removível
SUS	Sistema Único de Saúde

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1 INTRODUÇÃO

O envelhecimento populacional nos países em desenvolvimento é tema de diversos estudos e discussões na literatura. No Brasil, o crescimento da população de idosos tem como principal característica a rapidez com que esse processo vem ocorrendo (RAMOS; VERAS; KALECHE, 1987). Segundo o Instituto Brasileiro de Geografia e Estatística (2004) o contingente de idosos aumentou de 4% em 1940 para 9% em 2000; em 2050, a projeção é de 18% de idosos sobre o total da população.

As políticas públicas destinadas aos idosos devem ser planejadas na perspectiva de uma melhor qualidade de vida para esta parcela da população. Percebem-se avanços no Brasil, como os exemplos das políticas de saúde, dos direitos sociais e da assistência; ainda é necessária, no entanto, uma melhora na efetivação dessas políticas e na descentralização de responsabilidades (OLIVEIRA et al., 2014).

Segundo Medaglia e De Mello (2012), é possível realizar intervenções baseadas na construção compartilhada do conhecimento, estimulando e reorientando práticas de saúde bucal em direção ao cuidado humanizado, integral, inclusivo e participativo da pessoa idosa, tanto nos níveis individual como coletivo. Valorizar as especificidades das condições de vida e saúde, bem como incluir a saúde bucal nas atividades de promoção de saúde do idoso é fundamental, partindo-se do pressuposto que esta última influencia no seu bem-estar e faz parte do seu cotidiano.

Nos dois grandes levantamentos epidemiológicos de saúde bucal no Brasil, o SB-Brasil 2003 e SB-Brasil 2010, não se observou mudança significativa no CPO-D da população idosa, que compreende a faixa etária dos 65 aos 74 anos. Em 2003, o CPO-D era de 27,8 em que o componente perdido representava 92%. Comparativamente em 2010 se obteve 27,5 no CPO-D e o componente perdido representava 93% (BRASIL, 2011). Segundo Peres et al. (2013) mais que a metade da população idosa brasileira é edêntula; sendo que resultados similares foram encontrados em outros países (HAND; HUNT; KOHOUT, 1991; ESAN et al., 2004; MUSACCHIO et al., 2007; SAMSON; STRAND; HAUGEJORDEN, 2008; STARSS et al., 2008; ZITZMANN et al., 2008; URZUA et al., 2012).

A causabilidade da perda total dos dentes é interpretada de forma diferente na literatura, sendo associada a fatores biológicos, como a cárie e a doença periodontal

(WYATT et al., 2013). Jorge et al. (2012), em seu estudo analisa a influência de fatores clínicos, especificamente do uso de próteses parciais removíveis, no processo de edentulismo; há estudos, também, que associam a fatores não biológicos, como sócio-demográficos e econômicos (ESAN et al., 2004; URZUA et al., 2012).

Sabe-se que há poucos estudos que abordam a incidência de edentulismo e os fatores predisponentes para esse fato (HAND; HUNT; KOHOUT, 1991; COLUSSI; FREITAS, 2002; STARSS et al., 2008; ZITZMANN et al., 2008; DE MARCHI et al., 2012; URZUA et al., 2012; PERES et al., 2013). Embora alguns tenham incluído elementos contextuais (HAND; HUNT; KOHOUT, 1991; ESAN et al., 2004; STARSS et al., 2008; ZITZMANN et al., 2008; URZUA et al., 2012) e psicossociais (ESAN et al., 2004; STARSS et al., 2008; ZITZMANN et al., 2008; URZUA et al., 2012), muitos restringem tal processo a elementos biológicos (ESAN et al., 2004; STARSS et al., 2008; JORGE et al., 2012; URZUA et al., 2012), e comportamentais (ESAN et al., 2004; STARSS et al., 2008; ZITZMANN et al., 2008; URZUA et al., 2012), sendo necessário um maior número de evidências científicas.

Dessa forma, o presente trabalho de conclusão de curso avaliou a incidência de edentulismo em uma população idosa de uma cidade do sul do Brasil durante um período de oito anos; bem como a associação entre fatores socioeconômicos, demográficos, comportamentais e clínicos com o desfecho.

2 ARTIGO CIENTÍFICO

Esse manuscrito será submetido para o periódico Community Dentistry and Oral Epidemiology.

TITLE: Incidence and predictors of edentulism among South Brazilian older adults

RUNNING HEAD: Predictors of edentulism in Brazilian elderly

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ABSTRACT

Objective: to evaluate associations between socioeconomic, demographic, behavioral and clinical variables with the eight-year incidence of edentulism in south-Brazilian elderly.

Methods: A longitudinal study of general and oral health was conducted with a representative sample of the elderly from Carlos Barbosa, a south Brazilian city. The baseline was carried out in 2004, with follow-ups in 2008 and 2012. To evaluate the predictors of edentulism, Poisson regression models with robust variance were used. The outcome was modeled through the use of a hierarchical approach based on the conceptual framework proposed by Andersen and Davidson. *Results:* At the eight-year follow-up it was observed that 11.5% of the participants became edentulous. Personal income, use of partial removable dentures; gingival bleeding index and salivary flow were associated with the outcome. *Conclusions:* The use of partial removable dentures was a predictor of edentulism, possibly as a result of plaque retention, and clinical decisions based on the number of remaining teeth and oral rehabilitation issues. Higher salivary flow was a protective factor for the incidence of edentulism, which can be considered as a result of buffering capacity that prevents tooth decay. Gingival bleeding index represented high risk for the outcome, and was considered as a marker of oral hygiene. Higher personal income was a predictor of edentulism, whereas most studies show lower personal income as a risk factor for this outcome. Oral health policies addressing the prevention of edentulism should consider socioeconomic and behavioral factors, along with clinical decision-making.

INTRODUCTION

The aging process in developing countries is happening quickly and health care services cannot keep up with the pace of its growing demands ¹. Older people's oral health has caught considerable research attention in the last two to three decades ². Prevalence of edentulism in the population is a usual measure of oral health, and evidence from studies around the world have shown that it has not changed recently ³⁻⁵.

The prevalence of edentulism in the elderly population worldwide is considerably high ^{4,5}. Comparing the last two national epidemiological studies of oral health in Brazil, *SB-Brasil 2003* and *2010*, the DMFT in the 65-74 age group was 27.5 and the missing component accounted for 92% in 2010, whereas in 2003 the DMFT was 27.8 and the missing component represented 93% ⁶. Based on that, it is observed that more than half of the Brazilian elderly are edentulous ⁷. Similar results were found in other places, such as the percentage of edentulous subjects found in the Edinburgh Study ⁸, in the Northern Italy Study ⁹, and in United States according to the National Health and Nutrition Examination Survey (NHANES I/ II) ¹⁰.

Edentulism has consequences for overall health and it has been evaluated in some studies that aim to estimate its incidence and predictors in the elderly ¹¹⁻¹³. Evidence shows that the process of tooth loss is very complex, indicating that both biological and social factors are involved ^{14,15}. Some studies demonstrate a significant relationship between edentulism and sociodemographic variables such as age, educational level and socio-economic status ^{16,17}. Also, it is a consequence of chronic oral disease, like periodontal disease and dental caries ^{18,19}. The influence of partial removable dentures (PRD) on total tooth loss, however, remains controversial ²⁰.

When not rehabilitated with dentures, it has significant impact on daily activities such as eating and social interaction ²¹. There is a known interdependence between diet, nutrition and edentulism ^{21,22}. Studies have shown that edentulism is associated with an increased risk of obesity ^{22,23}, underweight ²⁴, and insufficient intake of fruits and vegetables ²⁵.

Nonetheless, there are few studies evaluating the incidence of edentulism and its predisposing factors. More evidence is also needed to further understand this process, in order to create health policies and help guiding clinical decision-making. Thus, the aim of this study was to evaluate the incidence of edentulism and its predictors, in a sample of community-dwelling South Brazilian elderly.

METHODS

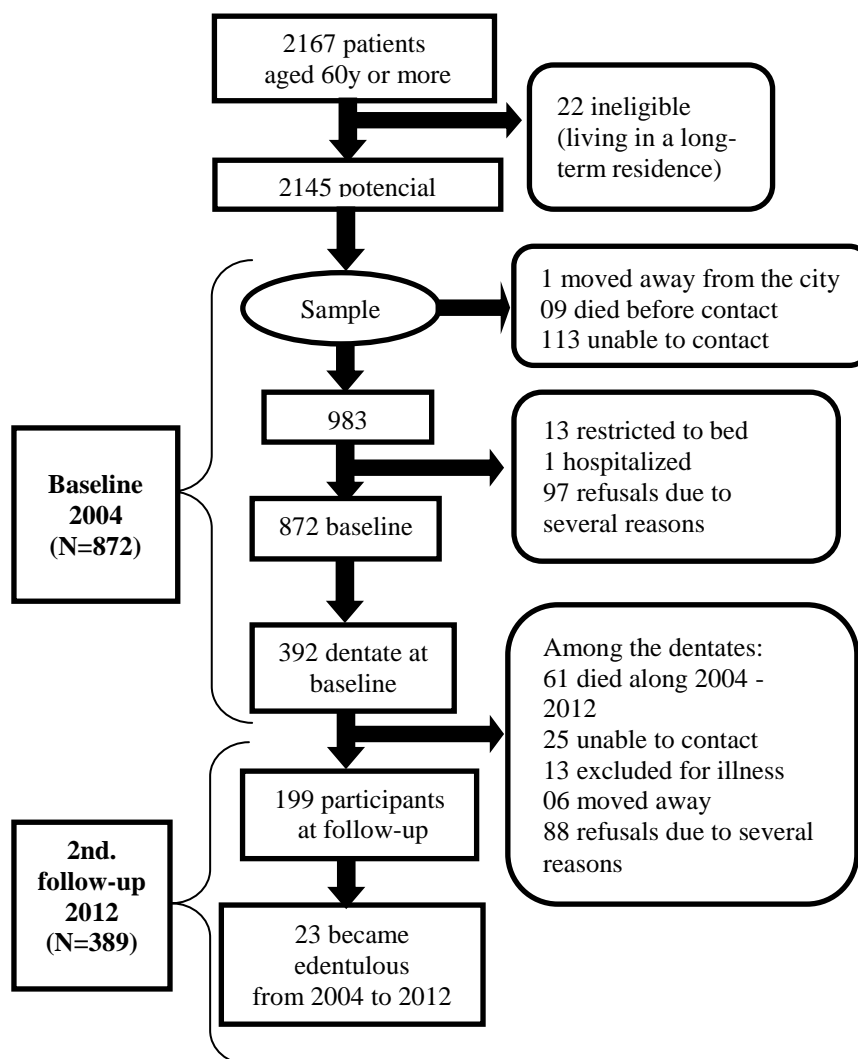
This study is part of the Carlos Barbosa Cohort Study (CBCS). The CBCS consists of a cohort of community dwelling older adults from Carlos Barbosa, a small city in southern Brazil²⁶. Baseline data collection took place in 2004²⁷ with a follow-up eight years later. Participants who had at least one tooth at baseline were included in the present study.

Population and sample

Baseline

According to the Brazilian census the city had 20519 inhabitants in 2000. A demographic poll for people aged 60 or older was conducted by the City Hall, showing there were 2167 elderly residing in the City at the time. The participants were randomly selected from this registry in 2004. From these potential participants, 983 older persons were contacted, with 13 subjects bed-ridden, one hospitalized and 97 refusals. In total, 872 participants took part in the study, despite only 783 having completed the protocol, from which 392 had at least one tooth (Fig. 1). Participants were informed about the study's objectives and procedures, providing written informed consent before data collection. The study was performed according to the Brazilian resolution for standards of ethics in research involving human participants^{28,29}. The study protocol was approved by the Committee of Ethics in Research of the Federal University of Rio Grande do Sul, by the Committee of Ethics in Research of the Piracicaba Dental School – UNICAMP, and by the Municipality's Health Council.

Figure 1: Flow chart of the sample procedure from the baseline to the second follow-up.



Baseline data collection

Data collection was performed through interviews and oral examinations. The interviews were conducted by the researchers in the participants' homes or in community clubhouses. In order to assess the status of teeth and periodontal tissues, mirrors and probes were used under standardized illumination. To assess dental status we used the DMFT index, the Visible Plaque Index (VPI), the Gingival Bleeding Index (GBI), and the use of dental prostheses, according to the criteria of the World Health Organization (WHO, 1997). With the objective of stimulating and collecting saliva, participants chewed on a piece of Parafilm (0.3 g of Parafilm M laboratory film; American National Can, Greenwich, CT, USA). Saliva was then expectorated into graded containers at 30-s intervals, and after five minutes the amount of stimulated saliva could be determined volumetrically.

Before the start of data collection, two experienced dentists were trained in order to perform dental examinations. Test-retest reliability measures were applied in 10% of the study sample. Cohen kappa coefficient showed a high inter and intra-examiner level of reproducibility. Two dentists were trained before the study to perform oral examinations. Duplicate dental inspections were conducted on 10% of the participants for reliability. Cohen kappa coefficients for intra and inter examiner reproducibility were (0.93/ 0.98)³⁰.

Evaluation of self-reported sociodemographic, behavioral and health information.

To collect sociodemographic, behavioral and health information, a standard questionnaire was used. Some variables were dichotomized for analysis purposes. Sex was dichotomized as female and male; age as 69 years or fewer versus 70 years or more; personal income as earning up to one minimum wage or earning more than one minimum wage (one minimum wage corresponds, approximately, 120 dollar); schooling as 3 years or fewer versus 4 years or more; marital status as married or not-married; zone of residence as urban or rural; for smoking status as smoker or not-smoker; frequency of tooth brushing as daily or more versus less than daily; frequency of visits to the dentist as regularly versus never or problem-oriented; use of PRD as using PRD versus not using PRD; caries as presence or not-presence. To analyze the salivary flow, we used the data from the five-minute stimulated salivary flow test. It was used the GBI, an indicator of oral hygiene, where 0 score applies to the absence of bleeding and 1 for the presence.

Eight-years follow-up data collection

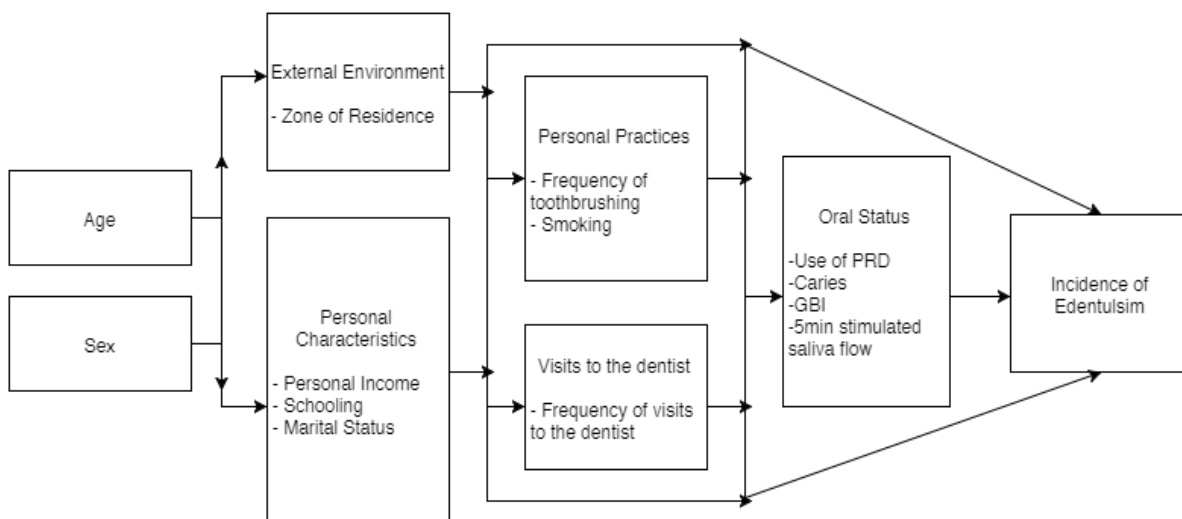
Baseline volunteers were re-contacted in 2008 and 2012. For this study we used data collected at baseline and at the second follow-up. From the 392 dentate individuals who participated in the baseline, 61 died and 25 were not found. Thus, 306 participants were contacted, of whom 13 have been unable to participate due to health issues, six had moved away from Carlos Barbosa and 88 refused to participate. In total, 199 older adults were included in this study. These examinations were conducted by two dentists that were calibrated and trained by the previous examiners.

Incidence of edentulism.

Participants were examined at baseline and follow-up, with tooth loss recorded when an intact tooth or retained root recorded as present at baseline was absent at follow-up. The

results of this paper were defined as the absence of teeth in the follow-up. Baseline variables were considered as potential predictors in the analysis. The outcome was modeled through the use of a hierarchical approach based on the conceptual framework proposed by Andersen and Davidson³¹, with its structure shown in Fig. 2.

Figure 2: Hierarchical model



Statistical analysis

Chi-square tests were used to evaluate the associations between variables and the outcome, and for the identification of independent variables to be included in the regression models. Differences in characteristics between people retained and those lost to follow-up are published elsewhere¹⁴. The frequency and distribution of categorical variables were checked, as well as the mean of the quantitative variables.

The hierarchical approach consisted of Poisson Regression with Robust Variance, performed in order to estimate Risk Ratios³². Variables were adjusted inside their own blocks of analysis, and subsequently included in the next blocks if their p-values remained <0.20 after adjustment³³.

The final, fully adjusted model consisted of the variables that remained with $p < 0.20$ throughout the whole hierarchical analysis. At this point, $p < 0.05$ was used as the threshold for statistical significance. The association measures used in this study are risk ratios (RR) and their respective 95% confidence intervals (CI). Analysis was performed by means of the SPSS v. 18 statistical package (SPSS, Chicago, IL).

RESULTS

During the eight-year follow-up, data were available for 199 of the 392 people who were eligible and participated at oral clinical examination. Among them, 23 became edentulous (Fig. 1).

Considering social and economical aspects observed in the groups, for patients with no incidence of edentulism, 47.2% were male, 57.4% patients were living in urban areas, and 70.1% studied three years or less. Among people with incidence of edentulism, 34.8% had income of a minimum wage or less; 73.9% were 70 years old or younger, and 7.4% were current smokers.

In terms of clinical factors, most participants had a brushing frequency of at least once a day (90.3% on the group of non-edentulous and 91.3% on the group of edentulous). The majority of people had not visited the dentist during that period or had visited in a problem-oriented manner (85.1% on the group of non-edentulous and 82.5% on the group of edentulous). Most of the examined had no caries activity (76.7% on the group of non-edentulous and 88.9% on the group of edentulous). The characteristics above are presented in Table 1.

In the second block of the multivariate model, the only variable significantly associated with the outcome was personal income. In the fourth block, use of PRD, GBI and five-minutes stimulated saliva flow were significant (Table 2). The four factors above were significantly associated ($p < 0.05$) with the outcome in the bivariate analysis.

In the final, fully-adjusted model, personal income (RR=2.16; CI95% 1.10 – 4.23); use of PRD (RR=3.15; CI95% 1.30 – 7.61); GBI (RR=1.03; CI95% 1.01 – 1.05); five-minutes stimulated saliva flow (RR=0.86; CI95% 0.75 – 0.98); were significantly associated ($p < 0.05$) with the outcome (Table 3).

DISCUSSION

In this study, personal income, behavioral and clinical oral factors were predictors of the incidence of edentulism, in older Brazilians. These results are meaningful because of the known detrimental effects of total tooth loss on general health and the estimated expenses associated with rehabilitation of edentulous patients¹⁸.

Although cross-sectional studies have shown associations among a number of factors with edentulism^{18,19,27}, evidence from studies addressing the incidence of tooth loss and more specifically the incidence of total dental loss in the elderly is lacking. Cooper (2009) indicates that the pathway to edentulism may represent interventions in a lifelong process of managing chronic oral diseases³⁴. Literature also shows that total tooth loss can be the result of iatrogenic, traumatic, or therapeutic causes^{11–13,34}.

In the context of our study, higher income was a predictor of incidence of edentulism. Yet, there is evidence in the literature showing that lower income is associated with it^{17, 35,36}, possibly because of less access to dental treatment³⁷. As it has been discussed by De Marchi and coworkers (2012), oral health might not be a first concern for low income families, and restorative dental treatment may be avoided due to financial hardship²⁶.

In the primary health care of the Brazilian Unified Health System (UHS)³⁸, tooth extraction still constitutes the treatment of choice in cases where endodontic, periodontal, and prosthetic treatment is mandatory. Recently, though, those types of dental procedures may be offered in some cities which have Center for Dental Specialties (CDS) within the UHS. However, this is not the case for smaller municipalities without a proper CDS. Thus, individuals living in these areas have more difficulties accessing oral health services^{39,40}.

Besides, many of these elderly might have preferred tooth extraction, believing that complete dentures give esthetics and function, even preventing the pain associated with dental diseases²⁶; such thought may have been reinforced with the rise in the use of dental implants³⁴. Thus, it could be hypothesized that those who do not have financial conditions to afford prosthetic rehabilitation may maintain their teeth for longer.

The second level of analysis in this study referred to the users of PRD as having higher risk of becoming edentulous. The use of PRD increases the formation of biofilm and, consequently, it can contribute to the occurrence of caries and periodontal disease. It can also generate forces that work on the anchor teeth ⁴¹.

In a study that examined dental profile change over a 10-year period in Switzerland, prosthetic restorations became more common with increasing age ³⁶. As discussed by Jorge et al. (2012) the PRD itself appeared to affect caries status and presented a higher failure rate ²⁰. Hence, we hypothesize that the use of PRD contributes with the process of total tooth loss through plaque accumulation on the surfaces of the PRDs ^{41,42} and probably the teeth as well, which results in caries. We also suggest that the person who loses the anchor tooth, either by clinical or personal decision, might choose extracting all teeth ^{42,43}.

Individuals who have low salivary flow are more prone to the risk of developing tooth caries because of their compromised buffering capacity ⁴³. It can also be explained by the fact that some patients eat candy to alleviate the symptoms of low salivary flow, which may result in cavitation ². Although it was not statistically significant in our study, caries ^{2,15,17} is the main cause of tooth loss. Furthermore, the frequent consumption of medication affects salivary flow in the elderly population ¹⁷.

Higher GBI was a predictor for edentulism and it is characterized by being a marker of oral hygiene. Greater accumulation of plaque increases the chance of developing caries and periodontal disease ^{3,12}. This interpretation supports our finding that the presence of a higher GBI is a predictor for total tooth loss.

Some potential limitations of this study should be acknowledged. One is that we considered people with as few as one tooth as being dentate, which makes it much easier for them to become edentulous compared to those people with more natural teeth; and we measured the GBI positive with only one point of bleeding. Another limitation of our study is the dropouts, which are inevitable in cohort studies. However, the strength of this study was that a high percentage of participants was maintained through the 8-years follow-up.

Edentulism is a public health problem in Brazil ^{6,7} and should be thought out and managed within the premises of the UHS ⁴⁰. It is known that edentulism is related to obesity, malnutrition, circulatory diseases, among other general diseases ²¹⁻²⁵. Therefore, emphasizing the importance of preventing this outcome might be relevant to reduce healthcare expenditures not only with oral rehabilitation but also with general health recovery.

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Table 1: Sample characteristics, according to Incidence of Edentulism (2004 - 2012)

	Did not become edentulous N (%)	Became edentulous N (%)	p-value
Sex			
Female	93 (52.8)	13 (56.5)	0.74
Male	83 (47.2)	10 (43.5)	
Age (years)			
≤ 69	139 (79.4)	17 (73.9)	0.54
≥ 70	36 (20.6)	6 (26.1)	
Personal income (minimum wage)			
≤ 1	86 (49.4)	8 (34.8)	0.19
> 1	88 (50.6)	15 (65.2)	
Schooling (in years of study)			
≤ 3	122 (70.1)	16 (69.6)	0.96
≥ 4	52 (29.9)	7 (30.4)	
Marital Status			
Not-married	37 (21.0)	6 (26.1)	0.58
Married	139 (79.0)	17 (73.9)	
Zone			
Rural	75 (42.6)	11 (47.8)	0.63
Urban	101 (57.4)	12 (52.2)	
Smoking			
Yes	1 (4.3)	13 (7.4)	0.59
No	22 (95.7)	162 (92.6)	
Frequency of tooth brushing			
Daily or +	159 (90.3)	21 (91.3)	0.88
Less than daily	17 (9.7)	2 (8.7)	
Frequency of visits to the dentist			
Regularly	26 (14.9)	4 (17.4)	0.75
Never or problem-oriented	149 (85.1)	19 (82.6)	
Partial removable denture use			
Yes	75 (42.9)	18 (78.3)	0.001
No	100 (57.1)	5 (21.7)	
Caries			
Yes	33 (19.6)	2 (11.1)	0.38
No	135 (76.7)	16 (88.9)	
Gingival bleeding index – mean (±SD)	50,2 (±26.3)	79,4 (±30.9)	0.04
Five-minute stimulated saliva flow – mean (±SD)	4,0 (±2.8)	3,1 (±1.9)	<0.001

Table 2: Association between variables and incidence of edentulism risk ratio

		Risk Ratio (95% Confidence Interval)		
		Crude	Adjusted *	Adjusted ‡
<i>First block (exogenous variables)</i>				
Sex	Female	1.14 (0.52-2.48)	1.17 (0.53 – 2.56)	-
Age (years)	≥ 70	1.31 (0.55-3.12)	1.32 (0.55 – 3.17)	-
<i>Second block (sociodemographic variables)</i>				
Personal Income (minimum wage)	> 1	1.71 (0.76-3.85)	1.93 (0.80 – 4.67)	-
Schooling (in years of study)	≥ 4	0.98 (0.42-2.25)	1.05 (0.45 – 2.46)	-
Marital status	Not-married	1.28 (0.54-3.05)	1.26 (0.54 – 2.97)	-
Zone	Rural	1.20 (0.56-2.60)	1.51 (0.66 – 3.45)	-
<i>Third block (behavioral variables)</i>				
Smoking	Yes	0.60 (0.87-4.11)	0.61 (0.09 – 4.25)	0.55 (0.07 – 4.19)
Frequency of toothbrushing	Daily or +	0.9 (0.23-3.5)	0.98 (0.25 – 3.84)	0.85 (0.21 – 3.53)
Visits to the dentist	Regular	0.85 (0.31-2.32)	0.88 (0.32 – 2.42)	1.09 (0.40 – 3.02)
<i>Fourth block (clinical variables)</i>				
Use of Partial Removable Denture	Yes	4.06 (1.57-10.51)	3.40 (1.25 – 9.27)	3.35 (1.24 – 9.03)
Caries	Yes	1.85 (0.45-7.70)	1.37 (0.42 – 4.51)	1.19 (0.39 – 3.66)
Gingival Bleeding Index		1.04 (1.01-1.06)	1.04 (1.01 – 1.06)	1.04 (1.01 – 1.06)
Five min. stimulated saliva flow		0.87 (0.75-1.01)	0.86 (0.75 – 1.00)	0.84 (0.73 – 0.97)

*Adjusted within block of analysis

‡ Adjusted within and for preceding blocks of analysis

Table 3: Final, fully adjusted model

<i>Variables</i>		Incidence Odds Ratio	p-value
Personal Income (minimum wage)	>1	2.16 (1.10 – 4.23)	0.02
Use of Partial Removable Denture	Yes	3.15 (1.30 – 7.61)	0.01
Gingival Bleeding Index		1.03 (1.01 – 1.05)	0.002
Five-minute stimulated saliva flow		0.86 (0.75 – 0.98)	0.03

3 CONCLUSÃO

Nesse estudo, fatores sociais, demográficos, comportamentais e clínicos estiveram associados com a incidência de edentulismo nesta amostra de idosos. Um resultado inédito, no que tange a avaliação de incidência de edentulismo. Estes resultados são relevantes diante das evidências de que indivíduos edêntulos, apresentam maior risco de desenvolverem diferentes condições de comorbidade, incluindo diabetes, problemas cardiovasculares, demência, câncer, asma, entre outras. (FELTON, 2009).

Segundo Colussi e Freitas (2002), quando se discutiam as situações de saúde da população idosa, a condição da saúde bucal era relegada ao esquecimento. Entretanto, a partir dos resultados do SB Brasil 2003, foi implementada em 2004 a *Política Nacional de Saúde Bucal - Brasil Sorridente*, que estabeleceu uma rede de serviços de atenção em saúde bucal no SUS (BRASIL, 2010). Procedimentos mais complexos foram inseridos na Atenção Básica, entre esses o protocolo de reabilitação protética. A fim de reduzir os impactos do edentulismo, tais medidas reabilitadoras, bem como a cobertura da Atenção Básica, devem ser ampliadas.

Neste contexto, a intersetorialidade é um processo político que envolve ações em prol da proteção social e do enfrentamento das desigualdades sociais. Percebe-se uma necessidade de políticas públicas para atender a demanda da crescente população idosa, não somente políticas de saúde, mas de outras que possam assegurar o Envelhecimento ativo (OLIVEIRA et al., 2014). Segundo Peres et al. (2013), apesar dos avanços obtidos, persistem as desigualdades sociais e regionais, sugerindo que, ao lado de medidas universais, populações mais vulneráveis devam receber cuidados prioritários.

Os sistemas de atenção à saúde são respostas sociais deliberadas às necessidades de saúde da população, assim tal estruturação implica objetivos comuns e planejamento conjunto. Condições crônicas de saúde, por conseguinte, não podem ser respondidas, com eficiência, efetividade e qualidade, por sistemas de saúde voltados, prioritariamente, para as condições agudas e para as agudizações de condições crônicas, e organizados de forma fragmentada (MENDES, 2010).

Sugere-se, dessa forma, que políticas públicas específicas sejam pensadas, com a finalidade de reduzir os impactos do edentulismo, atuando, portanto, na sua prevenção. Além de intervir em fatores clínicos, se deve trabalhar com fatores comportamentais, sociais e econômicos, de forma articulada e com a perspectiva do pensamento complexo,

compreendendo que edentulismo é uma situação complexa, resultante de diversos fatores, entre os quais os que este estudo se propõe a sugerir.

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APÊNDICE - TERMO DE CONSENTIMENTO LIVRE E ESCLARECIDO



Termo de Consentimento Livre e Esclarecido

Esclarecimentos

Este é um convite para você participar da pesquisa de “Estudo longitudinal dos fatores relacionados ao desenvolvimento de cáries e perdas dentárias em adultos e idosos de Carlos Barbosa”, realizada por um grupo de pesquisa da Faculdade de Odontologia da UFRGS.

Esse estudo pretende ouvir a opinião dos adultos e idosos sobre os postos de saúde, por isso serão entrevistadas pessoas do seu bairro, escolhidos por sorteio. A entrevista será feita na própria residência. Não existem respostas certas ou erradas, sinta-se a vontade para responder às questões, pois a entrevista será confidencial e os dados individuais não serão divulgados em nenhuma hipótese.

Sua participação é voluntária, o que significa que você poderá desistir a qualquer momento, retirando seu consentimento, sem que isso lhe traga nenhum prejuízo ou penalidade.

Todas as informações obtidas serão sigilosas e seu nome não será identificado em nenhum momento. Os dados serão guardados em local seguro e a divulgação dos resultados será feita de forma a não identificar os voluntários.

Caso seja detectado algum problema de saúde bucal que exija atendimento odontológico, você será orientado a procurar uma Unidade de Saúde.

Você ficará com uma cópia deste Termo e toda a dúvida que você tiver a respeito desta pesquisa, poderá perguntar diretamente para o Prof. Dr. Renato José De Marchi, ou para os pesquisadores (mestrandos ou

doutorandos), na Faculdade de Odontologia da UFRGS, Rua Ramiro Barcelos, 2154; pelo Tel: 33085204. Dúvidas a respeito da ética dessa pesquisa poderão ser questionadas ao Comitê de Ética em Pesquisa da Faculdade de Odontologia da UFRGS, Rua Ramiro Barcelos, 2154, no Tel: 33083629.

Consentimento Livre e Esclarecido

Eu, _____ declaro ter lido e discutido o conteúdo do presente Termo de Consentimento e concordo em **participar desse estudo de forma livre e esclarecida**. Também declaro ter **recebido cópia** deste termo.

Assinatura do participante

___/___/___

Nome do entrevistador

Assinatura do entrevistador

Data

Impressão
dactiloscópica