LOW CONCERN RATE WITH ORAL HEALTH AND ASSOCIATED FACTORS AMONG OLDER PERSONS: A CROSS-SECTIONAL STUDY

Baixas taxas de preocupação com a saúde bucal e fatores associados em idosos: um estudo transversal

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ABSTRACT

OBJECTIVE: This study aimed to assess the prevalence of concern with oral health and associated factors among older adults. **METHODS:** Individuals aged ≥ 60 years were included from the cities Cruz Alta and Veranópolis, Brazil. Oral health examination and a structured questionnaire were applied in 569 individuals. The main outcome was concern with oral health (yes or no), which was determined by a validated questionnaire. Uni- and multivariate analyses were conducted by Poisson regression with robust variance to assess the association between outcome and independent variables. **RESULTS:** The prevalence of concern with oral health was 30.58% ($n = 174$). Non-white individuals presented significantly higher prevalence ratio (PR) of being concerned about their oral health (PR = 1.28; 95% confidence interval [CI] 1.01–1.62). Individuals with medium or high level of education, not retired and without any health problems presented higher PR of being concerned with their oral health when compared to their controls ($p < 0.05$). Moreover, those that reported toothbrushing frequency ≥ 2 times/day (PR = 1.58; 95%CI 1.01 – 2.48) and non-edentulous (PR = 1.50; 95%CI 1.12 – 2.01) also presented higher PR of being concern with their oral health. Older adults that were not concerned with tooth alignment (PR = 0.57; 95%CI 0.44 – 0.74) or tooth color (PR = 0.41; 95%CI 0.31 – 0.54) demonstrated lower concern with their oral health. **CONCLUSION:** Prevalence of concern with oral health among the older adults was low and associated with non-white individuals, medium and high level of education, individuals not retired, absence of health problems, higher toothbrushing frequency, mild temporomandibular disorder (TMD) and non-edentulism. Additionally, concern with esthetical aspects may be related with this outcome. **KEYWORDS:** body image; epidemiology; oral health; self concept.

RESUMO

OBJETIVO: Esse estudo objetivou verificar a prevalência de preocupação com a saúde bucal e fatores associados em idosos. **METODOLOGIA:** Idosos com idade ≥ 60 anos foram incluídos das cidades de Cruz Alta e Veranópolis, Brasil. Exame de saúde bucal e um questionário estruturado foram aplicados em 569 indivíduos. O desfecho primário foi preocupação com saúde bucal (sim ou não), a qual foi determinada por um questionário validado. Análises uni- e multivariadas foram realizadas por meio de regressão de Poisson com variância robusta para verificar a associação entre o desfecho e as variáveis independentes. **RESULTADOS:** A prevalência de preocupação com a saúde bucal foi de 30,58% ($n = 174$). Indivíduos não brancos apresentaram razão de prevalência (RP) significativamente maior de serem preocupados com a sua saúde bucal (RP = 1,28 – intervalo de confiança [IC] de 95% 1,01 – 1,62). Indivíduos com nível educacional médio ou alto, não aposentados e sem qualquer problema de saúde apresentaram maior RP de serem preocupados com sua saúde bucal quando comparados com seus controles ($p < 0,05$). Além disso, idosos que reportaram escovar os dentes ≥ 2 vezes/dia (RP = 1,58; IC95% 1,01 – 2,48) e não edêntulos (RP = 1,50; IC95% 1,12 – 2,01) também apresentaram maior RP de serem preocupados com sua saúde bucal. Idosos não preocupados com alinhamento dentário (RP = 0,57; IC95% 0,44 – 0,74) ou com a cor dos dentes (RP = 0,41; IC95% 0,31 – 0,54) demonstraram menor preocupação com a saúde bucal. **CONCLUSÃO:** Prevalência de preocupação com a saúde bucal em idosos foi baixa e associada com indivíduos não brancos, com nível educacional médio ou alto, indivíduos não aposentados, ausência de problemas de saúde, alta frequência de escovação, desordem temporomandibular (DTM) leve e não edêntulos. Além disso, preocupação com aspectos estéticos pode estar relacionada com isso. **PALAVRAS-CHAVE:** imagem corporal; epidemiologia; saúde bucal; autoimagem.

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INTRODUCTION

The human aging is considered a global phenomenon that is happening in most of the countries, including the developing ones.¹ The older adults present several particularities, such as higher non communicable chronic diseases, less resources to fund their own health care, and more daily expenses.² Additionally, it is expected some functional loss along with aging. Regarding overall quality of life, several factors, such as physical, social, psychological, and spiritual aspects, are included.³ According to the World Health Organization (WHO), quality of life is the individuals' perception about their own life, considering their culture context, their main values, expectations and concerns with their lives.⁴ Quality of life also changes as aging occurs, as younger individuals give more importance about their jobs and finances. Meanwhile, the older adults consider their health and mobility the most important aspects of their lives.⁵ In this context, the self-perception of oral health is very important, mainly among the older adults, because it is possible to understand their needs, which may lead to a proper health care.⁶

Regarding oral health, higher prevalence of oral diseases are observed in the older adults, such as higher rates of tooth loss, gingivitis, and periodontitis.⁷ Moreover, pain and temporomandibular disorder (TMD), higher need of oral rehabilitation and dental wear are detected in these individuals.⁷ The literature also established that the access to oral health services is significantly lower among the older persons.³ Despite of that, 70%⁸ of the older adults report their own oral health as good or healthy. Conversely, worst perception of self-care was associated with non-use of dental care services among older adults.⁹

It is important to consider that oral health is a constituent part of the overall health, which may represent an important part of the quality of life. Additionally, understand which factors are related to a higher concern with the oral health, among the older adults, is very important in order to guide health policies. Therefore, the present study aimed to evaluate the prevalence of concern with oral health and associated factors. The null hypothesis of the present study is that sociodemographic, behavioral, medical and oral health variables are not significantly associated with concern with oral health among the older adults.

METHODS

Location, study design and ethical aspects

The present study was conducted in two southern Brazilian cities, Veranópolis and Cruz Alta. Veranópolis is located in

the northeast of the Rio Grande do Sul (RS) State, approximately 160 km from the capital, Porto Alegre. The city has 22,810 inhabitants, of which 3,554 were aged ≥ 60 years old, 42.91% were male and 57.09% were female.¹⁰ Cruz Alta is located in the north of the RS State, 350 km from Porto Alegre. In 2010, the city had 62,821 inhabitants, of which 3,730 were aged 65 to 74 years old, 42.12% were male and 57.88% were female.¹⁰ For both cities, different study protocols were approved by the Ethical Committee of the University of Passo Fundo under, respectively, the following protocols #1.531.862 and #2.990.088. All the individuals read and signed an informed consent prior to their participation in the study.

Sample strategy

In order to be representative of both cities, two distinct sampling strategies were performed in the cities. The participants were selected by a per conglomerate probabilistic sampling strategy. The cities' areas were divided, and each was chosen randomly through a website (www.random.org). In the city of Cruz Alta, only individuals aged 65 to 74 years old were included. Since more than 95% of the individuals live in the urban area, only individuals living in this area were included. Seventeen urban areas were randomly selected, respecting the proportion of older persons living in each area. In the city of Veranópolis, older adults aged at least 60 years old from both urban and rural areas were included. The inclusion of the rural area was based on the data that 87% of individuals live in the urban area. Eighty-two urban areas (20% of the total areas of the city) and three rural areas (of the total 21 rural communities) were randomly selected.

For both cities, using the map of the city, each selected area were divided in blocks. The block were also randomly selected. Additionally, we numbered the corners in order to randomly selected the point of star of each corner. After that, the interviews were performed in a clockwise manner. In each selected area, the households were visited until sufficient number of individuals were included. When it was necessary, a new block was randomly chosen until the sufficient number of individuals were included.

Inclusion and exclusion criteria

To both cities, the inclusion criteria were as follows: non-institutionalized older persons; individuals that presented physical, medical and mental conditions that allowed answering all the questions performed by the researchers and receiving the examinations. In a household, if more than one older adult fulfilled the inclusion criteria, all of them were

invited to participate. Only one apartment building was included in the present study. A household was excluded after two attempts of data collection. Moreover, it was also excluded visitors, home for the aged, commercial homes, and uninhabited households.

Clinical examination and interview

The same structured questionnaire was applied in both cities. This questionnaire included sociodemographic, behavioral, medical and dental history variables obtained by a block of questions from the Primary Care Assessment Tool (PCA-Tool-Brazil).¹¹ For each city, two teams of researchers were involved, and all of them were supervised by the same researcher coordinator.

Prior to the study begin, all the researchers were trained and, when applicable, calibrated. The training consisted of lectures about the subject of the study, discussion of all questionnaire items and explanation about the oral health examinations. Before the study, training was performed with questionnaire application and oral health examination of the older adults under treatment at the clinics of the School of Dentistry of the Universidade de Passo Fundo, Rio Grande do Sul, Brazil. The calibration was performed with these patients, but none of them were included in the present study. Approximately, 5% of the total number of included individuals were examined twice within at least two-days of interval. Taken into consideration all the examiners, inter and intraexaminer reproducibility showed a kappa index > 0.70 to all assessed variables.

The oral health variables collected were number of present teeth, use of and need for dental prosthesis. The oral examination was performed with a wooden spatula, and all teeth were counted, except for the third molars. Teeth that could somehow be restored were counted, meanwhile roots were considered absent. Use of and need for dental prosthesis were determined according to the WHO criteria.¹²

Outcome assessment

The primary outcome of the present study is concern with oral health, which was obtained by the answer to the following sentence: "I am concerned about the health of my teeth." The possible answers were "yes" or "no". This question was extracted by a previously validated questionnaire that assesses teeth appearance.¹³

Statistical analysis

The independent variables of the present study were: age (in years), sex (male or female), ethnicity/skin color (white or non-white), level of education (low, medium or

high), retirement (yes or no), marital status (married or not married), health problems (yes or no), smoking exposure (current smokers, former smokers and non-smokers), access to the dentist in the last 12 months (yes or no), toothbrush frequency (< 2 times/day or ≥ 2 times/day), use of dental floss (yes or no), use of (yes or no) and need for (yes or no) dental prosthesis, concern with teeth alignment (yes or no), concern with teeth color (yes or no), halitosis (yes or no), symptoms of TMD (none, mild or moderate/severe), edentulism (no teeth present [yes], at least one tooth present [no]).

Concern with teeth alignment and teeth color were also assessed by the same questionnaire of teeth appearance,¹³ and symptoms of TMD were assessed by a validated questionnaire.¹⁴ All data analyses were performed using the software SPSS, version 21.0, for Windows (SPSS Inc., Chicago, United States). Associations between the dependent and independent variables were assessed by the chi-square or Mann-Whitney tests. Furthermore, uni- and multivariate analyses were performed, using Poisson regression with robust variance. The initial multivariate model was performed with all independent variables that presented a p-value < 0.20 in the univariate analysis. The maintenance of these variables in the final multivariate model was determined by a combination of p-value < 0.05 and analysis of modification. Multicollinearity analyses were performed, but none was observed.

RESULTS

Overall, 287 and 282 individuals were included in Cruz Alta and Veranópolis, respectively, totaling 569 older adults. From these individuals, 67.84% (n = 386) were female and 32.16% (n = 183) were male. Low level of education was reported in 72.93% (n = 415), and most of them were married (55.36%, n = 315). In contrast, only 46.75% (n = 266) of them had access to oral care in the past 12 months.

Considering both cities, the prevalence of concern with oral health was 30.58% (n = 174). As demonstrated in Table 1, the older adults that were concerned about their oral health were significantly older in comparison to those that do not (p < 0.01). It may be noted that the following independent variables were also significantly associated with concern with their oral health: ethnicity/skin color, level of education, smoking exposure, toothbrush frequency, need of dental prosthesis, concern with teeth alignment and with teeth color, halitosis, symptoms of TMD and edentulism.

Table 2 shows univariate analysis for the association between concern with oral health and independent variables.

Table 1 Association between concern with own oral health and demographical, socioeconomical, behavioral, and medical and oral history among older adults.

Variables		No concern with oral health n = 395 (69.42%)	Concern with oral health n = 174 (30.58%)	p-value
Sex	Male – n (%)	123 (31.14)	60 (34.48)	0.43*
	Female – n (%)	272 (68.86)	114 (65.52)	
Age (in years)	Mean ± SD	71.14 ± 6.55	68.55 ± 4.79	< 0.01#
Skin color	White – n (%)	322 (82.14)	126 (73.26)	0.02*
	Non-white – n (%)	70 (17.86)	46 (26.74)	
Level of education	Low – n (%)	306 (77.47)	109 (62.64)	< 0.01*
	Medium – n (%)	54 (13.67)	33 (18.97)	
	High – n (%)	35 (8.86)	32 (18.39)	
Retirement	Yes – n (%)	331 (83.80)	137 (78.74)	0.15*
	No – n (%)	64 (16.20)	37 (21.26)	
Marital status	Married – n (%)	212 (53.67)	103 (59.20)	0.22*
	Not married – n (%)	183 (46.33)	71 (40.80)	
Health problem	Yes – n (%)	351 (88.86)	145 (83.33)	0.07*
	No – n (%)	44 (11.14)	29 (16.77)	
Smoking exposure	Smokers – n (%)	30 (7.59)	25 (14.37)	0.01*
	Former smokers – n (%)	101 (25.56)	53 (30.46)	
	Never smokers – n (%)	264 (66.85)	96 (55.17)	
Access to the dentist	Yes – n (%)	175 (44.30)	91 (52.30)	0.08*
	No – n (%)	220 (55.70)	83 (47.70)	
Toothbrush frequency	< 2 times/day – n (%)	46 (11.65)	10 (5.74)	0.03*
	≥ 2 times/day – n (%)	349 (88.35)	164 (94.26)	
Use of dental floss	Yes – n (%)	110 (27.85)	56 (32.18)	0.29*
	No – n (%)	285 (72.15)	118 (67.72)	
Need of dental prosthesis	Yes – n (%)	119 (30.13)	79 (45.40)	< 0.01*
	No – n (%)	276 (69.87)	95 (54.60)	
Use of dental prosthesis	Yes – n (%)	345 (87.34)	141 (81.03)	0.05*
	No – n (%)	50 (12.66)	33 (18.97)	
Concern with tooth alignment	Yes – n (%)	27 (6.84)	74 (42.53)	< 0.01*
	No – n (%)	368 (93.16)	100 (57.47)	
Concern with tooth color	Yes – n (%)	44 (11.14)	91 (52.30)	< 0.01*
	No – n (%)	351 (88.86)	83 (47.70)	
Self-reported halitosis	Yes – n (%)	269 (68.10)	98 (56.32)	0.01*
	No – n (%)	126 (31.90)	76 (43.69)	
Symptom of TMD	No TMD – n (%)	252 (63.80)	73 (41.95)	< 0.01*
	Mild TMD – n (%)	113 (28.61)	77 (44.25)	
	Moderate/Severe TMD – n (%)	30 (7.59)	24 (13.80)	
Edentulism	Yes – n (%)	181 (45.82)	42 (24.14)	< 0.01*
	No – n (%)	214 (54.18)	132 (75.86)	

*Chi-square; #Mann-Whitney; TMD: temporomandibular disorder.

Table 2 Univariate analysis of the association between concern with oral health and the independent variables.

Variables		Prevalence ratio (95%CI)	p-value
Sex	Male	1	0.43
	Female	0.90 (0.70–1.17)	
Age (in years)		0.95 (0.92–0.97)	< 0.01
Skin color	White	1	0.01
	Non-white	1.41 (1.08–1.85)	
Level of education	Low	1	0.02
	Medium	1.44 (1.06–1.98)	
	High	1.82 (1.35–2.45)	
Retirement	Yes	1	0.13
	No	1.25 (0.93–1.68)	
Marital status	Married	1	0.23
	Not married	0.86 (0.66–1.10)	
Health problem	Yes	1	0.06
	No	1.36 (0.99–1.86)	
Smoking exposure	Smokers	1	0.13
	Former smokers	0.76 (0.53–1.09)	
	Never smokers	0.59 (0.42–0.82)	
Access to the dentist	Yes	1	0.08
	No	0.80 (0.63–1.03)	
Toothbrush frequency	< 2 times/day	1	0.04
	≥ 2 times/day	1.79 (1.01–3.18)	
Use of dental floss	Yes	1	0.29
	No	0.87 (0.67–1.13)	
Need of dental prosthesis	Yes	1	< 0.01
	No	0.64 (0.50–0.82)	
Use of dental prosthesis	Yes	1	0.04
	No	1.37 (1.02–1.85)	
Concern with tooth alignment	Yes	1	< 0.01
	No	0.29 (0.24–0.36)	
Concern with tooth color	Yes	1	< 0.01
	No	0.28 (0.23–0.36)	
Self-reported halitosis	Yes	1	< 0.01
	No	0.71 (0.56–0.91)	
Symptom of TMD	No TMD	1	< 0.01
	Mild TMD	1.80 (1.38–2.35)	
	Moderate/ Severe TMD	1.98 (1.38–2.84)	
Edentulism	Yes	1	< 0.01
	No	2.03 (1.50–2.74)	

TMD: temporomandibular disorder; 95%CI: 95% confidence interval.

Sex, retirement, marital status, health problems, access to the dentist and use of dental floss were not significantly associated with concern with oral health. All the other variables presented a statistically significant association, and were included in the initial multivariate model. Additionally, it was also included retirement, health problems and access to the dentist.

The final multivariate model is demonstrated in Table 3. In this analysis, it was showed that non-white individuals present 28.10% higher PR of being concerned with their oral health in comparison to the white ones. Regarding the

Table 3 Multivariate analysis of the association between concern with oral health and the independent variables.

Variables		Prevalence ratio (95%CI)	p-value
Skin color	White	1	0.04
	Non-white	1.28 (1.01–1.62)	
Level of education	Low	1	0.02
	Medium	1.41 (1.05–1.90)	
	High	1.69 (1.24–2.30)	
Retirement	Yes	1	0.04
	No	1.30 (1.02–1.67)	
Health problem	Yes	1	< 0.01
	No	1.55 (1.18–2.04)	
Toothbrush frequency	< 2 times/day	1	0.04
	≥ 2 times/day	1.58 (1.01–2.48)	
Concern with tooth alignment	Yes	1	< 0.01
	No	0.57 (0.44–0.74)	
Concern with tooth color	Yes	1	< 0.01
	No	0.41 (0.31–0.54)	
Self-reported halitosis	Yes	1	0.05
	No	0.80 (0.64–1.00)	
Symptom of TMD	No TMD	1	< 0.01
	Mild TMD	1.42 (1.10–1.82)	
	Moderate/ Severe TMD	1.29 (0.93–1.77)	
Edentulism	Yes	1	< 0.01
	No	1.50 (1.12–2.01)	

TMD: temporomandibular disorder; 95%CI: 95% confidence interval.

level of education, those with medium or high level of education presented, respectively, 41.20 and 69.00% significantly higher PR of concern with oral health when compared to those with low level of education. Retired and those with at least one health problem also presented significantly higher PR of concern about their oral health.

Regarding the other questions of the teeth appearance questionnaire, those that are not concerned about teeth alignment and teeth color presented, respectively, 43.10 and 58.90% significantly lower PR of concern with oral health when compared to their controls. Conversely, self-reported halitosis was not associated with concern with oral health. Higher toothbrush frequency was also associated with concern about oral health (PR = 1.58; 95%CI 1.01 – 2.48). Only mild symptom of TMD was also associated with higher concern about oral health. Additionally, those that were not edentulous presented 49.60% significantly higher concern about oral health.

DISCUSSION

The present study aimed to evaluate the older adults' concern with their oral health and associated factors. The prevalence of concern with oral health was 30.58% (n = 174). In the final multivariate analysis, it was demonstrated that several sociodemographic variables were significantly associated with higher concern with oral health. These variables were skin color, level of education, retirement, health problem, toothbrush frequency, concern with tooth alignment and with tooth color, symptom of TMD and edentulism.

Historically, the oral health services were not at great priority for these individuals, which lead to higher level of dental caries, periodontal diseases, edentulism and need for oral rehabilitation.^{3,15} In this sense, studies that assess how they deal with their oral health is of the utmost importance, as the literature also report these oral disease may present an important impact in their quality of life.¹⁶

In the present study, 30.58% of the older adults presented concern with oral health, which was considered a low prevalence. In the literature, higher prevalence of concern with oral health is reported when adolescents (52.85%)¹⁷ or adults (52.48%)¹⁸ are involved. Studies that assess concern with oral health are scarce among older adults, but the prevalence of self-reported good and poor oral health was 59.90 and 12.30%, respectively, among Portuguese older adults.¹⁹

It must be highlighted that the self-perception about oral health may be determined by several factors, such as

cultural variables and the individual preferences, which may change throughout the years. The literature reports that understand these aspects is very important in order to provide a better treatment planning, which will be better accepted by the patients²⁰ and, consequently, may lead to a higher satisfaction.

The literature reports that the aging process is happening worldwide¹. Therefore, it is important to maintain adequate oral health as part of the general health of these individuals, since oral diseases may present a direct impact in their daily basis.²¹ However, the availability of oral health services is unequal among the population, which is applicable even to developed countries.²² It is also reported that older adults do not use oral health services regularly.²³

Ethnicity may be a proxy of socioeconomic status, and the literature reports that ethnical minorities present lower access to health services when compared to the general population,²⁴ which may cause a higher deterioration of their general and oral health. One study demonstrated that the chance to have never visit a dentist was twice higher for black individuals when compared to white ones.²⁵ Moreover, the lack of income to finance their own expenses may explain the lower use of oral health services. These findings may partially explain why non-white and not retired individuals presented higher PR of being concern with their oral health when compared to their counterparts.

Despite of that finding, the present study also demonstrated that older adults with medium and higher level of education presented higher concern with their oral health. These results may seem contradictory, as lower access to oral health services is expected for individuals with lower level of education.²⁶ However, the literature also reports that higher level of education is associated with higher knowledge about oral health.²⁷ It may be hypothesized this higher knowledge may also influence in their concern with oral health, but without leading to higher occurrence of oral diseases *per se*.

With aging, it is noticed an accumulation of several health problems. As these conditions may receive much attention by these individuals, a lower attention to the oral health problems may be expected.²⁸ Therefore, it is possible to explain why the individuals that reported no health problem also had higher concern with their oral health. However, it must be emphasized that poor oral health may be related to other health-related outcomes.²⁹

The present study also detected that individuals that brush their teeth ≥ 2 times per day presented 56.50% higher PR of being concern about their oral health. A systematic

review demonstrated that higher frequency of toothbrushing is associated with poor oral health.³⁰ For this reason, it may be expected that the older persons that brush more regularly may present a better oral health, but their concern with their own oral health is still high. Conversely, similar results are not observed for self-perception halitosis, as no significant association was reported in the present study.

In order to adjust the concern with oral health of the present study, two variables were considered in the statistical analysis: concern with tooth alignment and with tooth color. More importantly, the literature reports that dissatisfaction with tooth appearance was significantly associated with higher impact in the oral health-related quality of life.³¹ In the present study, it was demonstrated significantly lower PR of concern with oral health in the older adults that do not concern about their teeth alignment or color. Therefore, it is possible to hypothesize that the association between those variables are connected by esthetical aspects, and not directly to health aspects.

Due to the high prevalence of poor oral health, the prevalence of TMD symptom among the older people is considered very high.³² The most frequently observed signs and symptoms are pain in the masticatory muscles or in the temporomandibular articulation, joint noise, headache, restricted capacity for jaw movements, and difference in movement patterns.³³ Those characteristics may impact directly in the older adults' concern about their oral health. However, in the present study, only those individuals with mild symptom of TMD presented significantly higher concern with own oral health. The interpretation of these results are challenging, as a dose response for this association would be expected. However, it must not be ruled out these individuals would have accommodated their concerns with own oral health, as untreated TMD persist for long period.³⁴

The absence of edentulism was also associated with higher concern with oral health in the present study. The direct impact of the oral diseases, such as caries and periodontitis, in this outcome may be expected. Moreover, it must be highlighted that use of and need for dental prosthesis were not significantly associated with concern with oral health in the present study.

The present study has some limitation, as its cross-sectional design. In this sense, it is not possible to determine the causality between concern with oral health and the associated variables. Furthermore, some variables were self-reported, including halitosis and symptoms of TMD, which may not represent the proper diagnosis of these oral conditions. However, several advantages are related to this study, including the training and calibration of the researchers. Furthermore, both the main outcome and the independent

variables were obtained by previously validated questionnaire.¹³ This standardized instrument was used in order to estimate the self-perception of dental esthetics among the population. The present study used a per conglomerate sampling strategy to include the older people, being a representative study from both cities. In this sense, high external validity may be expected.

CONCLUSION

It was concluded that just a third of older adults had a concern with oral health, which was considered a low prevalence. Concern with oral health was associated with the following characteristics: non-white individuals, medium and high level of education, not retired individuals, absence of health problems, higher toothbrushing frequency, mild TMD and non-edentulism. Moreover, this outcome may be related with esthetical aspects, such as concern with tooth alignment and tooth color, among the older adults.

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CONFLICT OF INTERESTS

No potential conflicts of interest were disclosed.

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AUTHORS' CONTRIBUTION

AFLP: data curation, visualization, writing — original draft. JSF: data curation, visualization, writing — original draft. NPR: investigation, methodology, writing — review & editing. NRS: investigation, resources, writing — review & editing. PRGC: conceptualization, funding acquisition, methodology, project administration, resources, supervision, writing — review & editing. FWMGM: conceptualization, formal analysis, methodology, validation, writing — review & editing.

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