ORIGINAL ARTICLE

Tooth Loss, Sociodemographic Conditions and Oral Health-Related Quality of Life in the Elderly

Adriana Drummond de Aguiar[1], Elizabeth Regina Araújo de Oliveira[1], Maria Helena Monteiro de Barros Miotto[1]

[1]Graduate Program in Public Health, Federal University of Espírito Santo, Vitória, ES, Brazil.

Correspondence: Adriana Drummond de Aguiar, Avenida Marechal Campos, 1468, Bonfim,Vitória, ES, Brazil. 29047-105.
E-mail: dridrummond@hotmail.com

ABSTRACT

Objective: To verify the association between impacts produced by tooth loss and sociodemographic variables in the oral health-related quality of life (OHRQoL) in the elderly. **Material and Methods:** This is an analytical cross-sectional study carried out in the municipality of Vitória/ES, Brazil, which sample was composed of 402 older adults. The Oral Health Impact Profile (OHIP-14) was used to measure the individuals' OHRQoL. For data analysis, descriptive and bivariate analyses were performed using the Fisher's exact test and the Mantel-Haenzsel test to assess the effects of combined dimensions. The significance level adopted was 5%. To assess the strength of association between independent variables and dimensions, Odds-Ratio (OR) with 95% confidence interval (CI) was calculated. **Results:** The prevalence of negative impact on OHRQoL in the elderly was 32.6%. The greatest impact perception was found in individuals with up to 10 years of schooling (p=0.021 and OR=1.602), with need for removable partial dentures (p=0.000 and OR=2.873) and those who did not accept the loss of dental elements (p=0.000 and OR=3.064). **Conclusion:** Older female adults with socioeconomic class C/D-E, with up to 10 years of schooling, who lost 11 or more teeth, who declared the need for removable partial dentures, suffered greater impacts caused by tooth loss on OHRQoL.

Keywords: Quality of Life; Oral Health; Aged; Health Status Indicators; Sickness Impact Profile.

Introduction

A broader view of health includes objective aspects based on the professional's clinical assessment and subjective aspects, such as quality of life. Thus, with the expansion of the health concept, Dentistry started to consider the absence or cure of oral diseases and the effect of these problems on people's quality of life [1].

The Oral Health Impact Profile (OHIP) is a subjective indicator developed and tested by Australian researchers to complement traditional epidemiological indicators, as it provides a comprehensive measure of self-perception of oral disorders that may or may not affect quality of life [2]. In addition, a Brazilian study emphasized the importance of using subjective indicators to assess the population's oral health needs as a complement to normative clinical needs [3].

Providing the elderly population longevity with quality of life has become a major challenge for the Brazilian public health system, mainly because Brazil is experiencing a period of accelerated demographic aging, with important implications for individuals and society [4]. For example, projections indicate that by 2030, approximately 19% of the Brazilian population will be composed of individuals aged 60 years and over [5].

Thus, successful and healthy aging emerges in different contexts and raises concerns about how to maintain general and oral health in the elderly [6]. Benefits are generated by social groups for older individuals who seek life with more autonomy and quality, as the encouragement of some changes in habits and attitudes intensifies the search for results of healthy and active aging [7].

Senior Citizens' Care Centers (CCTIs) belong to the Companionship and Bond Strengthening Service to offer spaces through their activities that favor healthy aging, quality of life and strengthening of social bonds [8]. In Brazil, the offer of public dental services to this population is still incipient, so it is believed that knowing the perception of these people about their oral condition should be the first step to planning programs and services that can prioritize this age group.

Given the scarce literature in the national context addressing this issue, this study aimed to verify the association between impacts produced by tooth loss and sociodemographic variables on the oral health-related quality of life (OHRQoL) in the elderly. The hypothesis of this study was to detect the negative impact on the OHRQoL in the elderly population.

Material and Methods

Study Type and Site

This is an analytical study with a cross-sectional design carried out in the four CCTIs of the municipality of Vitória, capital of the state of Espírito Santo, Brazil. According to data from the IBGE Census, the municipality has 327,801 inhabitants, with 39,505 people over 60 years of age [9].

Sample Size and Selection

The sample universe was composed of all older adults attending CCTIs. The sampling unit was composed of 2,416 individuals. Sample size calculation was performed using the formula of the Epi Info statistical software, which considered 50% prevalence, 95% confidence interval, and 5% sampling error. This calculation generated the amount of 332 users that, with an increase of 20% for probable losses, resulted in a minimum sample of 398 individuals. Researchers visited CCTIs every day of the week and in all shifts so that users had the same opportunity to participate in the research. Therefore, the number of respondents by CCTI was proportional to the number of users attending each unit.

Selection Criteria

Inclusion criteria were individuals of both sexes aged 60 years or over, registered and attending activities offered by CCTIs during the collection period. Exclusion criteria were individuals who did not understand or, for some health reason, were unable to answer the interview questions.

Study Variables and Data Collection

• Dependent Variable

The dependent variable in this study was OHRQoL assessed using the OHIP instrument. A previous study performed the cross-cultural translation to adapt to the Brazilian reality. It was found that the instrument has psychometric properties similar to the original instrument, demonstrating validation for the Brazilian Portuguese language [10]. The "Oral Health Impact Profile" script was used in the OHIP 14 - short version for oral health self-perception questions, addressing the seven dimensions: functional limitation, physical pain, psychological discomfort, physical disability, psychological disability and social disability. Participants answered the questions on a frequency scale (Lickert) with five options: never, rarely, sometimes, often and always. The expression of OHIP results was given in a dichotomous way: impact on the quality of life for answers "always and often" and no impact on the quality of life for answers "sometimes, rarely and never".

• Independent Variables

For independent variables, scripts that collected information on sociodemographic characteristics such as gender, age and socioeconomic class were used. The latter was categorized according to the possession of consumer goods and respondent's schooling - class A, B1, B2, C1, C2, D-E - using the Brazil Economic Classification Criteria [11]. Another independent variable was oral condition – dentate and edentate. Characteristics related to perceived need were also identified. Tooth loss was assessed using a script in which individuals had the opportunity to declare the number of missing teeth, region (anterior and posterior), type of extracted dental elements (incisors, canines, premolars and molars), expectation for replacement treatment, probable causes that led to tooth extractions, feelings regarding extraction, acceptance or not regarding tooth loss and factors that contributed to dental losses. A participant with at least one missing tooth was considered tooth loss. Data collection was carried out from February to April 2019 by three duly calibrated researchers through training to apply the questionnaires used.

Statistical Analysis

Statistical analysis was performed using the IBM Social Package Statistical Science (SPSS) Version 20 statistical package. Descriptive data analysis was organized in tables. Association between impact, sociodemographic variables and oral health was tested by the Fisher's Exact Test. Significance level adopted in tests was 5%.

To assess the strength of association between independent variables and dimensions, the Odds-Ratio (OR) with 95% confidence interval (CI) was calculated. To analyze the effect of combined dimensions, the Mantel-Haenszel test was used.

Ethical Clearance

The study was approved by the Research Ethics Committee of the Municipal Social Welfare Secretariat of Vitória/ES, on September 26, 2018, and by the Research Ethics Committee of the Health Sciences Center, Federal University of Espírito Santo, on October 30, 2018, according to Resolution No. 466/12 of the National Health Council. All research participants signed the Free and Informed Consent Form (FICF).

Results

The final sample consisted of 402 older adults, and there was no loss. The prevalence of general impact observed was 32.6%, where 131 individuals reported a negative impact on OHRQoL caused by tooth loss. The demographic profile of the population under study shows a predominance of women, with the participation of 83.8% and predominance of the age group of 70 – 79 years (41.3%). As for socioeconomic class, classes D-E had the highest representation in the study (29.4%). Regarding the schooling declared by participants, the majority (63.3%) reported having complete high school/incomplete higher education (over 10 years of study).

Regarding gender (Table 1), statistical significance was observed for the following dimensions: physical pain (95%CI= 1.229 - 10,000 and OR= 3.506), psychological discomfort (95%CI= 1.089 - 6.326 and OR= 2.625), physical disability (95%CI= 1.031 - 56.856 and OR=7.654) and psychological disability (95%CI= 1.114 - 12.191 and OR=3.685).

Table 1. Analysis of the impact, by dimension, according to the gender of individuals attending Senior Citizens' Care Centers.

Dimensions	Sex				p-value	OR (95% CI)
	Male		Female			
	N°	%	N°	%		
Functional limitation						
Impact	4	6.2	32	9.5	0.275	1.600 (0.546 − 4.689)
No impact	61	93.8	305	90.5		1.000
Physical pain						
Impact	4	6.2	63	18.7	0.007	3.506 (1.229 − 10.000)
No impact	61	93.8	274	81.3		1.000
Psychological discomfort						
Impact	6	9.2	71	21.1	0.016	2.625 (1.089 − 6.326)
No impact	59	90.8	266	78.9		1.000
Physical disability						
Impact	1	1.5	36	10.7	0.009	7.654 (1.031 − 56.856)
No impact	64	98.5	301	89.3		1.000
Psychological disability						
Impact	3	4.6	51	15.1	0.013	3.685 (1.114 − 12.191)
No impact	62	95.4	286	84.9		1.000
Social disability						
Impact	0	0.0	9	2.7	0.201	-
No impact	65	100.0	328	97.3		
Disability						
Impact	4	6.2	22	6.5	0.586	1.065 (0.355 − 3.200)
No impact	61	93.8	315	93.5		1.000
Mantel-Haenszel					0.074	1.750 (0.942 − 3.250)

p-value = Fischer's exact test; OR = Odd Ratio; CI = Confidence Interval OR.

When analyzing schooling (Table 2), considering the impact dimensions, statistical significance was observed for functional limitation (95%CI=1.206−4.81 and OR=2.410), physical disability (95%CI=1.015−3.951 and OR=2.02) and psychological disability (95%CI=1.543−4.961 and OR=2.767).

Table 2. Analysis of the impact, by dimension, according to the schooling of individuals attending Senior Citizens' Care Centers.

Dimensions	Schooling				p-value	OR (95% CI)
	Up to 10 years of study		10 years or more			
	Nº	%	Nº	%		
Functional limitation						
Impact	20	13.8	16	6.2	0.010	$2.410\,(1.206-4.814)$
No impact	125	86.2	241	93.8		1.000
Physical pain						
Impact	29	20.0	38	14.8	0.114	$1.441\,(0.845-2.455)$
No impact	116	80.0	219	85.2		1.000
Psychological discomfort						
Impact	35	24.1	42	16.3	0.056	$1.629\,(0.984-2.696)$
No impact	110	75.9	215	83.7		1.000
Physical disability						
Impact	19	13.1	18	7.0	0.034	$2.002\,(1.015-3.951)$
No impact	126	86.9	239	93.0		1.000
Psychological disability						
Impact	31	21.4	23	8.9	0.000	$2.767\,(1.543-4.961)$
No impact	114	78.6	234	91.1		1.000
Social disability						
Impact	4	2.8	5	1.9	0.418	$1.430\,(0.378-5.411)$
No impact	141	97.2	252	98.1		1.000
Disability						
Impact	14	9.7	12	4.7	0.051	$2.182\,(0.981-4.855)$
No impact	131	90.3	245	95.3		1.000
Mantel-Haenszel					0.021	$1.602\,(1.043-2.460)$

p-value = Fischer's exact test; OR = Odd Ratio; CI = Confidence Interval OR.

Regarding the need for a removable partial denture (RPP), considering the general impact (Mantel-Haenszel), statistical significance was found between this variable and impact (95%CI= 1.861-4.438 and OR =2.873), that is, individuals who need RPP were 2.83 times more likely of being impacted on OHRQoL (Table 3).

Table 3. Analysis of the impact, by dimension, according to the need for the use of removable partial dentures (RPP) of individuals attending Senior Citizens' Care Centers.

Dimensions	Need for RPP Use				p-value	OR (95% CI)
	No Need		Need			
	Nº	%	Nº	%		
Functional limitation						
Impact	17	6.5	19	13.4	0.019	$2.208\,(1.108-4.399)$
No impact	243	93.5	123	86.6		1.000
Physical pain						
Impact	32	12.3	35	24.6	0.001	$2.331\,(1.370-3.966)$
No impact	228	87.7	107	75.4		1.000
Psychological discomfort						
Impact	33	12.7	44	31.0	0.000	$3.088\,(1.855-5.142)$
No impact	227	87.3	98	69.0		1.000
Physical disability						
Impact	16	6.2	21	14.8	0.004	$2.647\,(1.333-5.255)$
No impact	244	93.8	121	85.2		1.000
Psychological disability						
Impact	27	10.4	27	19.0	0.013	$2.026\,(1.136-3.613)$
No impact	233	89.6	115	81.0		1.000
Social disability						
Impact	9	3.5	0	0.0	0.019	–
No impact	251	96.5	142	100.0		

	Nº	%	Nº	%		
Disability						
Impact	17	6.5	9	6.3	0.560	$1.034 (0.448 - 2.383)$
No impact	243	93.5	133	93.7		1.000
Mantel-Haenszel					0.000	$2.873 (1.861 - 4.438)$

p-value = Fischer's exact test; OR = Odd Ratio; CI = Confidence Interval OR.

In the analysis of the socioeconomic condition (Table 4), considering the impact dimensions alone, statistical significance was found for functional limitation (95%CI=1.156–12.864 and OR=3.856), physical disability (95%CI=1.474–26.462 and OR=6.245) and psychological disability (95%CI=1.037–5.448 and OR=2.377).

Table 4. Analysis of the impact, by dimension, according to the socioeconomic status of individuals attending Senior Citizens' Care Centers.

Dimensions	Socioeconomic Status				p-value	OR (95% CI)
	A/B		C/D-E			
	Nº	%	Nº	%		
Functional limitation						
Impact	3	3.1	33	10.9	0.011	$3.856 (1.156 - 12.864)$
No impact	95	96.9	271	89.1		1.000
Physical pain						
Impact	13	13.3	54	17.8	0.190	$1.412 (0.735 - 2.715)$
No impact	85	86.7	250	82.2		1.00
Psychological discomfort						
Impact	14	14.3	63	20.7	0.102	$1.568 (0.835 - 2.945)$
No impact	84	85.7	241	79.3		1.000
Physical disability						
Impact	2	2.0	35	11.5	0.002	$6.245 (1.474 - 26.462)$
No impact	96	98.0	269	88.5		1.000
Psychological disability						
Impact	7	7.1	47	15.5	0.022	$2.377 (1.037 - 5.448)$
No impact	91	92.9	257	84.5		1.000
Social disability						
Impact	2	2.0	7	2.3	0.618	$1.131 (0.231 - 5.538)$
No impact	96	98.0	297	97.7		1.000
Disability						
Impact	5	5.1	21	6.9	0.358	$1.380 (0.506 - 3.763)$
No impact	93	94.9	283	93.1		1.000
Mantel-Haenszel					0.054	$1.563 (0.937 - 2.608)$

p-value = Fischer's exact test; OR = Odd Ratio; CI = Confidence Interval OR.

In Table 5, it is possible to observe, considering the total score (Mantel-Haenszel), statistical significance between acceptance of tooth loss and impact (95%CI=1.851–5.071 and OR=3.064), as individuals who did not accept tooth loss were 3.06 more likely of being impacted on OHRQoL.

Table 5. Analysis of the impact, by dimension, according to acceptance of tooth loss among individuals attending Senior Citizens' Care Centers.

Dimensions	Tooth Loss Acceptance				p-value	OR (95% CI)
	Acceptance		No Acceptance			
	Nº	%	Nº	%		
Functional limitation						
Impact	23	7.6	13	16.0	0.021	$2.336 (1.126 - 4.846)$
No impact	281	92.4	68	84.0		1.000
Physical pain						
Impact	38	12.5	29	35.8	0.000	$3.904 (2.214 - 6.885)$
No impact	266	87.5	52	64.2		1.000
Psychological discomfort						

Impact	44	14.5	32	39.5	0.000	3.859 (2.230 − 6.677)
No impact	260	85.5	49	60.5		1.000
Physical disability						
Impact	19	6.3	18	22.2	0.000	4.286 (2.128 − 8.631)
No impact	285	93.8	63	77.8		1.000
Psychological disability						
Impact	26	8.6	26	32.1	0.000	5.055 (2.731 − 9.356)
No impact	278	91.4	55	67.9		1.000
Social disability						
Impact	4	1.3	4	4.9	0.064	3.896 (0.953 − 15.932)
No impact	300	98.7	77	95.1		1.000
Disability						
Impact	13	4.3	12	14.8	0.002	3.893 (1.702 − 8.904)
No impact	291	95.7	69	85.2		1.000
Mantel-Haenszel					0.000	3.064 (1.851 − 5.071)

p-value = Fischer's exact test; OR = Odd Ratio; CI = Confidence Interval OR.

Discussion

Dentistry today seeks to achieve health in a broader way, where objective and subjective aspects must be considered, focusing on the relationship between oral conditions and quality of life [1]. In this context, this study found an association between impacts produced by tooth loss and sociodemographic variables on the OHRQoL of older adults attending CCTIs in the municipality of Vitória, Brazil.

The greatest perception of impact on OHRQoL in this research was found in individuals with up to 10 years of schooling, belonging to socioeconomic class C/DE, who had lost 11 teeth or more, needed RPP and did not accept the loss of dental elements. These factors lead to reflections and critical analyses with regard to aspects related to the physical, mental and social well-being of the most disadvantaged individuals.

The prevalence of general impact observed was 32.6%, where 131 individuals reported a negative impact on OHRQoL caused by tooth loss. This finding is similar to that found in research carried out in the adult and older adult population of a municipality in the state of Espírito Santo, in which prevalence of 35% was identified, in which 83 participants suffered impact caused by oral problems [12]. Furthermore, the result of this study is similar to that found in research developed in Fortaleza, Brazil, where 30.5% of subjects had a negative impact on oral health in their daily lives [13].

On the other hand, the impact frequency of 7.8% observed in the study developed with workers of a mixed-economy company in the capital of Espírito Santo can be considered low [14]. It is believed that the high schooling and purchasing power of these individuals provided access to private and free choice dental services agreed upon by the company, which were preponderant for the result obtained.

An even lower impact frequency was verified in workers from a Brazilian public university who had completed high school [15]. It is suggested that the participants' schooling is the cause of the percentage found in this study, as higher schooling would likely generate more information and self-care.

The demographic profile of the population surveyed shows a predominance of women, with 83.8% of the 402 participants. This result is similar to the study carried out at the Reference Center for Elderly Care in João Pessoa, Brazil, in which the sample consisted of 84.9% of women [16]. A similar situation was found in other studies [13,17]. This higher prevalence of females can be attributed to the phenomenon called in studies of the feminization of old age, which is the predominance of women in the elderly population [18]. In addition, women are proactive and participate more in group activities; in the case of the present work, they attend Senior Citizens' Care Centers.

Also, regarding the sociodemographic variables under study, in the analysis between gender and impact on OHRQoL, it was observed that women were more likely to be impacted on some isolated dimensions. The finding of this research corroborates another Brazilian study, which reports women suffering a greater impact on the performance of their daily activities when compared to men [19]. This characteristic may be associated with women showing greater concern with aesthetics and social interaction [20]. In addition, some authors emphasize the more critical oral health self-perception among women [21]. This may be related to the fact that they take more care of themselves, seek more for health services and often do not have their expectations met, as they find it difficult to access public health services, which can result in worse self-assessment for females regarding the impact on OHRQoL.

Regarding schooling, in this study, considering the general impact and the psychological disability dimension, it was found that individuals with up to 10 years of schooling were more likely of suffering impact on OHRQoL. Other studies have also reported low schooling related to a negative impact on oral health [22,23]. These data show that the level of knowledge influences the oral health perception, considering that less educated individuals had a greater impact on OHRQoL. Thus, it is believed that the greater the access to information, the greater the adherence to prevention measures, resulting in better oral conditions. Thus, it is understood that high schooling would be a protective factor for oral diseases.

In the analysis of the socioeconomic condition variable of the present research, considering the physical disability dimension, it was observed that individuals from socioeconomic classes C/D-E were much more likely of suffering impact on OHRQoL. Similar results were reported in previous studies, where less favored economic classes suffered greater impact of oral health on daily activities [19,23-25]. In a study carried out in Porto Alegre/RS, the authors identified that older adults whose family income was sufficient exhibited prevalence of positive oral health self-perception 31% higher than those without sufficient income, allowing for health expenses, choice of type of service (public or private) and access to health care, considering that socioeconomic status interferes with treatment options [25].

Regarding the variable need to use RPP, not considering dimensions in isolation, individuals who declared need for this type of prosthesis were more likely of suffering impact on OHRQoL. The SB Brasil 2010 project, the last national epidemiological survey, shows that 68% of adults who were interviewed claimed need for some type of prosthesis, and the partial prosthesis in a dental arch was the main claim [26]. Previous studies have demonstrated that individuals in need of prostheses have greater negative impacts on OHRQoL [3,14,16,27]. Thus, the relevance of these findings is understood, considering that deficiencies in the stomatognathic system can cause chewing, speech and aesthetics problems [28], leading to negative oral health self-perception.

The analysis of the impact caused by tooth loss according to the number of lost teeth, considering the functional limitation dimension, showed that individuals who lost 11 teeth or more were more likely of suffering impact on OHRQoL. This finding may be related to the fact that this population has the greatest accumulated needs throughout life, resulting in numerous tooth losses. Through the OHIP-14 indicator, a study showed that among people with a greater number of missing teeth, most manifested influence of oral health on daily life [29]. Furthermore, research carried out in the southern region of Brazil found that the presence of 1 to 19 teeth can reduce the prevalence of favorable oral health self-perception [25]. These data reflect the precariousness of the oral condition of the Brazilian population, which is a legacy of curative and mutilating dentistry.

When evaluating the impact caused by tooth loss according to the acceptance of tooth loss, statistical significance was found in all dimensions, both for the general impact and for isolated dimensions, except for the social disability dimension. For the psychological disability dimension, individuals who did not accept tooth loss were more likely of suffering impact in this dimension. Other studies with the elderly population showed a greater impact of tooth loss in the psychological discomfort dimension and was associated with a greater chance of compromised quality of life in its physical and mental domains [30]. Psychological disability was a point highlighted in research carried out with older adults in northeastern Brazil, as it emphasized that tooth loss is directly conditioned to the feeling of humiliation and embarrassment [16].

The cross-sectional design is considered a study limitation, as it does not allow inference of causal relationships. The interview covers past experiences, a fact that may have caused memory bias. As information on tooth loss was self-reported, the amount and type of tooth loss may have been a bias, as some individuals may not know the name of the lost tooth element. The population surveyed is part of a group with specific characteristics (users of Senior Citizens' Care Centers), and it is not possible to infer results for the elderly population in the municipality of Vitória; for this, a study with a population-based sample design is necessary.

Conclusion

The greatest impact on OHRQoL produced by tooth loss was found in females belonging to socioeconomic class C/DE, with up to 10 years of schooling, who had a loss of 11 teeth or more, who declared the need for removable partial dentures and who did not accept the loss of dental elements. Therefore, the highest prevalence of problems related to tooth loss affects the most disadvantaged individuals, highlighting the lack of public policies to reduce social disparities.

Authors' Contributions

ADA	https://orcid.org/0000-0002-2305-4218	Conceptualization, Methodology, Formal Analysis, Investigation, Data Curation, Writing - Original Draft and Writing - Review and Editing.
ERAO	https://orcid.org/0000-0002-6616-4273	Formal Analysis, Writing - Review and Editing and Visualization.
MHMM	https://orcid.org/0000-0002-3227-7608	Conceptualization, Methodology, Validation, Formal Analysis, Data Curation, Writing - Review and Editing and Supervision.

All authors declare that they contributed to critical review of intellectual content and approval of the final version to be published.

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Conflict of Interest

The authors declare no conflicts of interest.

Data Availability

The data used to support the findings of this study can be made available upon request to the corresponding author.

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