Functional dependency and oral health-related quality of life in a 15-year cohort of older adults: a case-control study

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Abstract

Objective: to investigate the relationship between the increase in functional dependence and the deterioration of oral health-related quality of life (OHRQoL) in older people after 15 years. *Method:* This is a case-control study nested in a cohort of elderly people followed for 15 years from the SABE Study (Health, Wellbeing and Aging). OHRQoL was measured using the Geriatric Oral Health Assessment Index (GOHAI) in the years 2000 and 2015. The outcome was determined by participants who began to report unsatisfactory OHRQOL, defined by a score ≤50, after 15 years. Exposures were sociodemographic conditions, general living conditions and clinical variables. Logistic regression was used in data analysis. *Results:* Out of cohort participants who assessed their OHRQOL as satisfactory/regular in the year 2000, 53 individuals that assessed as unsatisfactory were considered cases and 194 that maintained their OHRQOL were controls in the year 2015. The average age of the cohort in 2015 was 82.6 years; 68.1% were women. Negative changes in functional dependence on instrumental activities (OR=2.50 CI95% 1.05-6.01; p=0.039), number of teeth (OR=3.96 CI95% 0.99-15.83; p=0.052) and insufficient income (OR=3.52 CI95% 0.94-13,18; p=0.061) showed an association with the outcome. *Conclusion:* It was concluded that worsening of functional dependence on instrumental activities was an important risk indicator for deterioration of OHRQoL in elderly people even in the presence of increase of both lost teeth and insufficient income, showing the importance of considering other factors, in addition to clinical and socioeconomic variables, for a better understanding of OHRQoL.

Keywords: Older adults. Oral health. Quality of life. Functional status. Income.

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INTRODUCTION

With the increasing life expectancy of the population, it is essential to provide older adults with better health conditions to ensure they experience active, healthy, and functional aging[1]. This requires the formulation and implementation of public policies that adequately address the healthcare needs and subjective perspectives of quality of life. This scenario presents significant challenges in ensuring quality during the additional years of life and involves various sectors, including the Brazilian social protection system[2,3].

The aging process entails a group of changes at functional and structural levels, which can lead to motor impairment and difficulties of a psychological and social nature, resulting in negative influences on the individual's relationship with society[4]. In this multidimensional context, quality of life is an important construct for measuring perceived physical, mental, and social well-being by the individual. It gauges their expectations, subjective feelings of satisfaction, happiness, worry, and disillusionment with life[5].

In older population, the occurrence of two or more chronic diseases simultaneously, defined as multimorbidity, is common. This elevates the risk of complications, the onset of disabilities, and the development of dependency, which compromise the quality of life for both older adults and their families. Additionally, it poses a challenge for public health policies[6].

Regarding oral health, there is a projected trend of reduction in the proportion of edentulous individuals compared to dentate individuals, along with an increase in the number of retained teeth and those in need of treatment. The presence of multimorbidity is associated with severe tooth loss and a lower likelihood of having functional dentition[7]. However, the assessment of oral health through clinical indices and indicators, when considered in isolation, is limited to standards based on oral deficits and may be biased by tooth loss, thereby compromising the accuracy of these indices[8,9]. Subjective indicators of health, such as Oral Health-Related Quality of Life (OHRQoL), have been adopted to measure the extent of the impact of oral health problems on the physical and psychological functioning, as well as the social well-being of older population[10].

In addition to oral clinical characteristics, other conditions such as low educational level, marital status, depression, and smoking have been associated with unsatisfactory OHRQoL in older adults[11].

Understanding changes in health conditions and behaviors of older adults is of fundamental importance for comprehending the aging process. There is a scarcity of longitudinal studies on OHRQoL capable of detecting these changes and contributing to the implementation of actions, policies, and guidelines in this age group of the population. A six-year longitudinal study showed that improvement in OHRQoL was related to having 16 or more teeth and eight or more years of education, while worsening OHRQoL was associated with the presence of multimorbidity at the beginning of the follow-up. However, eventual changes in exposures were not controlled[12]. Therefore, the objective of this study was to investigate the relationship between increased functional dependency and deterioration of Oral Health-Related Quality of Life (OHRQoL) in older adults over a period of 15 years.

METHOD

A nested case-control study was conducted within a cohort using data from the Health, Well-being, and Aging (SABE) survey, a multicenter population-based study planned and organized by the Pan American Health Organization (PAHO) in seven major cities across Latin America and the Caribbean in the year 2000[13]. The cohort in São Paulo (Brazil) was further followed through a longitudinal study involving multiple cohorts. Thus, in the years 2006, 2010, and 2015, observation instruments were applied to participants from the previous year, as well as to a random sample of the population aged 60 to 64 who became part of the study.

In the year 2000, 2,143 individuals were interviewed in the city of São Paulo (SP, Brazil). In 2015, a new cycle of observations was carried out. Among the individuals interviewed in the year 2000,

1,155 had passed away, 69 did not have information on OHRQoL, and 54 had unsatisfactory OHRQoL. The remaining individuals were not located (183), moved to other municipalities (119), left their residence and were institutionalized (29), or refused to participate (287). The study population consisted of 247 older adults who assessed their quality of life due to oral health conditions as satisfactory/regular in the year 2000, with cases being those who transitioned to an unsatisfactory assessment and controls being those who maintained their quality of life over a period of 15 years.

The outcome was determined by the Geriatric Oral Health Assessment Index (GOHAI), which measures quality of life related to oral health conditions through a standardized questionnaire composed of 12 items, assessing three dimensions: functional (eating, speaking, and swallowing), psychosocial (concerns, relational discomfort, and appearance), and pain and discomfort symptoms (medications, gum sensitivity, discomfort when chewing certain foods). This questionnaire employs a five-point Likert scale. For each question, a score ranging from 1 to 5 is assigned (always=1, frequently=2, sometimes=3, rarely=4, and never=5). Unlike the other items, items 3 and 7 address positive questions that required recoding of the values used in the original version of the questionnaire (always=5, frequently=4, sometimes=3, rarely=2, and never=1). The maximum score varies from 12 to 60, and the values were categorized according to the standards established by Atchison and Dolan[14]: 12 to 50 corresponds to low/unsatisfactory OHRQoL; 51 to 56 moderate; and 57 to 60 equates to high OHRQoL values.

The demographic characteristics of sex and age, along with the variable education which remained unchanged during the follow-up, were used to describe and compare the cases and controls of the study population. For the analysis, exposures related to changes in variables such as income, marital status, multimorbidity, functional capacity, self-rated health, health-related behaviors, edentulism, and prosthetic use were included.

Income was assessed through a question in which the respondent declared whether their income was sufficient for expenses (yes or no). Marital status was classified into two categories: with conjugal life (married/cohabiting/common-law marriage) or without conjugal life (single/divorced/separated or widowed).

The presence of multimorbidity was assessed through self-reporting of two or more of the following conditions: hypertension, diabetes, cancer, pulmonary disease, heart disease, joint disease, embolism, and osteoporosis.

The main independent variable was functional capacity, measured through the performance of Activities of Daily Living (ADLs) and Instrumental Activities of Daily Living (IADLs). The ADLs were assessed using the Katz Scale[15], which includes self-care activities such as feeding, bathing, dressing, grooming, mobilizing, walking, and controlling physiological needs. The IADLs were assessed using the Lawton Scale[16], which includes activities necessary for an individual to manage their living environment, such as: shopping, meal preparation, household chores, laundry, handling money, using the telephone, taking medications, and using transportation. Due to the low proportion of older adults with one or more disabilities in the study population at the beginning of the follow-up, both variables were categorized into absence of disabilities or presence of one or more disabilities.

Self-rated health was measured through the question "how does the older adult consider their current health status?" Responses were divided into two categories: excellent/good/very good or fair/poor/very poor. Cognition was assessed using the Mini-Mental State Examination (MMSE), a modified and validated version in Chile by Icaza and Albala[17], due to the low level of education among the Brazilian older population. This version comprises 13 items that do not depend on education level. The maximum score is 19 points. Participants with a score of 12 points or less are considered to have cognitive impairment, while those with 13 points or more are considered to have good cognition.

Health-related behaviors included smoking and alcohol consumption. Smoking was classified into two categories: currently smokes or no longer smokes/never smoked. Alcohol consumption in the last 3

months, by days per week, was also separated into two categories: no days per week or one day or more.

Variables related to edentulism and the use of dental prostheses were obtained through oral examinations performed by trained and calibrated dentists, according to the standards outlined in the World Health Organization (WHO) manual. It's worth noting that the oral clinical examinations were conducted in the years 2006 and 2015. Edentulism was assessed based on the number of teeth present, categorized into two groups: 0 to 15 teeth; 16 or more teeth. The variable "use of dental prosthesis" was evaluated across three categories: 1- Use of two complete prosthesis (CP) (upper and lower); 2- Use of any removable partial prosthesis (RPP); 3- No use of prosthesis /Use of any fixed prosthesis (FP)/ Use of one CP.

The exposures were categorized into three groups, adopting the most favorable category for OHRQoL according to the scientific literature as a reference. For instance, concerning marital status, those who were married in the year 2000 and remained so 15 years later were included in the reference category; those who were not married either in 2000 or in both years were placed in the intermediate category; and those who were married in 2000 but had started living alone were included in the category representing negative change (from a favorable to an unfavorable condition). An exception was made for smoking, which was divided into two categories. The reference category comprised non-smokers in both years, compared to those who smoked in 2000 or started smoking fifteen years later (negative change). This was done due to the small number (n=2) of non-smokers who started smoking.

Data analysis included tabulation of GOHAI index categories at baseline and after 15 years, description of exposures in cases and controls, utilization of the McNemar test[18] to assess differences between the two time points, and logistic regression to investigate whether increased functional dependence was associated with cases compared to controls, even in the presence of worsening insufficient income and the number of missing teeth. For multiple logistic regression, independent variables were incorporated into the model based on their statistical significance obtained in the simple analysis ($p<0.20$). The significance level in the final model was set at 5% ($p<0.05$). As the main variable of interest was functional capacity, independent variables that modified its effect on the outcome were removed from the final model. Thus, association measures (Odds Ratio) above 1.0 indicated the effect on cases due to unfavorable change in exposure. The number of observations varied in the simple analyses.

In multiple analysis, only observations with no missing data for the included variables were considered. The calculation of study power was performed post hoc. For this calculation, the proportion of incident cases of unsatisfactory quality of life and the sample size used in the final model (n=214) were employed. Exposure frequencies ranging from 10% to 50% were employed, and the minimum values necessary to detect differences between the groups were calculated, with a power of 80% and a significance level of 95%. With exposure frequencies ranging from 10% to 50%, the minimum odds ratio values to detect differences ranged from 1.5 to 1.9. The Hosmer and Lemeshow test was conducted to assess the model fit, and a Receiver Operating Characteristic (ROC) curve was obtained to examine sensitivity versus specificity values using a cutoff point of 0.5[19].

The participants signed an Informed Consent Form, and the SABE Study was approved by the Research Ethics Committee of the School of Public Health of the University of São Paulo (Research Protocol number 118) and by the National Committee of Ethics in Research (CONEP) under substantiated opinion number 315/99 and opinion number 3,600,782, with the process initiated in 2015 and finalized in 2019. The research is in accordance with Resolution number 466/2012 and Resolution number 510/2016, both issued by the National Health Council of the Ministry of Health.

DATA AVAILABILITY

The entire anonymized dataset supporting the findings of this study has been made available on the Figshare repository and can be accessed at: https://doi.org/10.6084/m9.figshare.25517536.v1

RESULTS

Among the individuals in the cohort who rated their quality of life due to oral health conditions as satisfactory/regular in the year 2000, 53 (21.5%) cases were identified as having shifted to unsatisfactory evaluation, while 194 (78.5%) controls maintained their quality of life after 15 years. The mean age of the cohort was 82.8 years (standard deviation=0.3), with the majority being female (67.2%), and 40.9% having 0 to 3 years of education.

Table 1 presents the sociodemographic characteristics of cases and controls. No statistically significant differences were observed between the groups regarding sex, age, and education (p>0.05).

Table 2 presents the percentages of participants according to exposure characteristics. The proportion of older adults without marital life increased from 37.3% to 68.0%. The presence of multimorbidity had the highest proportional increase, from 38.8 to 97.1%. Regarding functional dependence, there was an increase of 30 percentage points (pp.) in basic activities and 34.3 pp. in instrumental activities. Regarding other general life conditions, there was an increase in cognitive impairment, from 2.4% to 23.1%; negative self-rated general health, from 41.3% to 53.3%; and the number of missing teeth, from 71.2% to 78.3%.

In the analysis through simple regression, the odds ratio for unsatisfactory OHRQoL was significant (p<0.05) for older adults who experienced, over 15 years, negative changes in instrumental activities of daily living (OR=2.46), missing teeth (OR=4.10), insufficient income (OR=3.44), and cognitive capacity (OR=1.99) (Table 3). Negative change in self-rated health and in basic activities of daily living dependence were non-significant risk factors (p<0.20). Initiating alcohol consumption was a non-significant protective factor (OR=0.17, p<0.20) for satisfactory OHRQoL (Table 3).

Table 1. Description of the sociodemographic characteristics of cases and controls nested within the cohort of older adults between 2000 and 2015. São Paulo, SP, 2000-2015.

Variables	Satisfactory OHRQoL (Controls n=194) N (%)	Unsatisfactory OHRQoL (Cases n=53) N (%)	*p*-value
Sex			0.593*
Male	62(76.5)	19(23.5)	
Female	132(79.5)	34(22.5)	
Age (years)			0.439*
75 to 79	77(78.5)	21(21.4)	
80 to 89	93(80.9)	22(19.1)	
90 or more	24(70.6)	10(29.4)	
Education (years of study)			0.110*
0 to 3	76(75.2)	25(24.8)	
4 to 7	70(76.1)	22(23.9)	
8 or more	48(88.9)	6(11.1)	

Cases: Older adults from the cohort who reported satisfactory OHRQoL in the year 2000 and unsatisfactory OHRQoL in the year 2015. Controls: Older adults from the cohort who reported satisfactory OHRQoL in both years, *p-valor χ^2

Table 2. Description of exposure characteristics of older adults in the years 2000 and 2015. São Paulo, SP, 2000-2015.

Variables	2000 N(%)	2015 N(%)	*p*-value
Marital Status (N=247)			<0.001
With marital life	155(62.7)	79(32)	
Without marital life	92(37.3)	168(68)	
Income (n=243)			<0.001
Sufficient	84(34.6)	140(57.6)	
Insufficient	159(65.4)	103(42.4)	
Presence of Multimorbidity (n=240)			<0.001
No	147(61.2)	7(2.9)	
Yes	93(38.8)	235(97.1)	
ADL (n=247).			<0.001
No disability	224(90.7)	150(60.7)	
1 or more disabilities	23(9.3)	97(39.3)	
IADL (n=245)			<0.001
No disability	192(78.4)	108(44.1)	
1 or more disabilities	53(21.6)	137(55.9)	
Cognitive Capacity (n=247)			<0.001
Good cognition	241(97.6)	190(76.9)	
Cognitive impairment	6(2.4)	57(23.1)	
Self-rated Health (n=242)			0.002
Positive	142(58.7)	113(46.7)	
Negative	100(41.3)	129(53.3)	
Behaviors (n=247)			
Alcohol consumption			0.002
Non-drinker	160(64.8)	185(74.9)	
Drinker	87(35.2)	62(25.1)	
Smoking (n=247)			0.013
Non-smoker	227(91.9)	237(96)	
Smoker	20(8.1)	10(4)	
Clinical Variables	2006	2015	
Present Teeth (n=226)			<0.001
16 or more teeth	65(28.8)	49(21.7)	
0 to 15 teeth	161(71.2)	177(78.3)	
Prosthesis Use (n=228)			0.481
Uses 2 complete prosthesis	90(39.5)	94(41.2)	
Uses a RPP in any arch	90(39.5)	86(37.7)	
Does not use prosthesis/Uses a fixed prosthesis/ Uses 1 complete prosthesis	48(21.0)	48(21.1)	

**p-value: McNemar Test;* *p<0.05; RPP: removable partial prosthesis

Table 3. Unadjusted Odds Ratio values and respective 95% confidence intervals for unsatisfactory OHRQoL between nested cases and controls in a cohort of older adults. São Paulo, SP, 2000-2015.

Exposures	N	OR (95% CI)	*p*-value b
Income			
Maintained sufficient income	63	1.00	-
Insufficient in 2000 or in both	159	2.01 (0.88-4.61)	0.098
Sufficient → Insufficient	21	3.44 (1.06-11.10)	0.039*
Marital status			
Maintained marital life	76	1.00	-
Without marital life in 2000 or in both	92	1.15 (0.53-2.48)	0.717
With → Without Marital Life	79	1.50 (0.69-3.24)	0.301
Multimorbidity			
Maintained without multimorbidity	6	1.00	-
With in 2000 or in both	93	1.84 (0.20-16.51)	0.587
Without → with	141	1.13 (0.13-10.10)	0.913
ADL			
Maintained without	141	1.00	-
With 1 or + in 2000 or in both	23	1.22(0.42-3.61)	0.708
Without → 1 or +	83	1.44(0.87-2.37)	0.155
IADL			
Maintained without	96	1.00	-
With 1 or + in 2000 or in both	53	3.03(1.30-7.02)	0.010*
Without → 1 or +	96	2.46(1.16-5.26)	0.020*
Self-rated health			
Maintained positive	86	1.00	-
Negative in 2000 or in both	100	1.21(0.56-2.58)	0.628
Positive → negative	56	2.06(0.91-4.65)	0.083
Cognition			
Maintained good	188	1.00	-
Impairment in 2000 or in both	6	1.00	-
Good → Impairment	53	1.99(1.01-3.94)	0.047*
Alcohol consumption			
Maintained non-drinker	142	1.00	-
Drinker in 2000 or in both	87	0.66(0.34-1.29)	0.224
Non → drinker	18	0.17(0.02-1.35)	0.094
Smoking*			
Maintained non-smoker	225	1.00	-
Smoker in some / non → smoker	22	0.79(0.26-2.47)	0.659
Teeth present			
Maintained 16 or +	48	1.00	-
0 to 15 in some year	154	1.59(0.66 - 3.89)	0.302
16 or + → 0 to 15	17	4.10(1.17-14.38)	0.028*
Prosthesis use			
Maintained use of 2 CP	83	1.00	-
Uses RPP/FP/1 CP	130	0.69(0.36-1.33)	0.269
2 CP/RPP → no use	10	0.31(0.04-2.57)	0.277

OR - Odds Ratio, CI - Confidence Interval, *p<0.05; CP: complete prosthesis; RPP: removable partial prosthesis; FP: Fixed prosthesis.

In Table 4, the results of the multiple analysis are indicated, confirming the study's hypothesis. Negative change in instrumental activities of daily living dependence (OR=2.51, 95% CI 1.05-6.01; p=0.039) had a higher chance of developing unsatisfactory OHRQoL adjusted for the increase in the number of missing teeth (OR=3.96, 95% CI 0.99-15.83; p=0.052) and the increase in insufficient income (OR=3.52, 95% CI 0.94-13.18; p=0.061), which lost significance in the presence of functional dependence. The exposures related to cognitive capacity, alcohol consumption, self-rated health, and cognitive status modified the effects of increased functional dependence and insufficient income on the outcome. The Hosmer and Lemeshow test to assess model fit yielded a $\chi 2$ value of 14.27 with a p-value of 0.6481, indicating a good model fit. The area under the ROC curve (AUC) had a value of 0.6567, which is compatible with an acceptable value.

Table 4. Adjusted Odds Ratio values and respective 95% confidence intervals for unsatisfactory OHRQoL between nested cases and controls in a cohort of older adults (n=214). São Paulo, SP, 2000-2015.

Exposures	Model	
	Adjusted OR (IC 95%)	p-value (β)
IADL		
Maintained without disability	1	
With 1 or + in 2000 or both	2.51 (0.96-6.59)	0.061
Without disability ➔ 1 or +	2.50 (1.05-6.01)	0.039*
Number of teeth		
Maintained with 16 or +	1	-
0 to 15 in 2000 or both	1.21 (0.48-3.08)	0.682
16 or + ➔ 0 to 15	3.96 (0.99-15.83)	0.052
Income		
Maintained sufficient income	1	-
Insufficient in 2000 or both	1.97 (0.77-3.08)	0.155
Sufficient ➔ Insufficient	3.52 (0.94-13.18)	0.061

Cases: Older adults from the cohort who reported satisfactory OHRQoL in the year 2000 and unsatisfactory OHRQoL in the year 2015. Controls: Older adults from the cohort who reported satisfactory OHRQoL in both years; CI= Confidence Interval, *p<0.05

DISCUSSION

In this longitudinal study, among the participants followed for 15 years, 21.5% transitioned to evaluating their quality of life as unsatisfactory, while the remainder maintained their quality of life. The main finding was to verify the positive association between worsening functional dependency in instrumental activities and the deterioration of OHRQoL in older individuals, adjusted for the increase in missing teeth and worsening insufficient income. The main contribution was to demonstrate that functional limitation related to the performance of instrumental activities, regardless of income and clinical variables, was an important risk indicator for unsatisfactory OHRQoL.

The studied sample revealed a predominance of females (67.2%), which can be explained by the higher life expectancy in women compared to men, even in the presence of multimorbidity[20]. This phenomenon is complex and multifaceted because, when compared to men, women may expect to live longer with poor health, regardless of the indicator used to measure health[21]. The increase in unsatisfactory OHRQoL did not differ between women and men. The same result

was observed in a six-year follow-up using a cohort obtained from the same reference population[12].

Despite the importance of following cohorts of older adults, there are few longitudinal studies that have analyzed OHRQoL. Most studies have compared the results of clinical interventions involving the installation of dentures and dental implants.

The association between functional disability and health-related quality of life (HRQOL) is widely consolidated in the literature, indicating that higher numbers of disabilities correlate with poorer quality of life scores[22,23]. However, its relationship with OHRQoL has not been thoroughly explored. Although they often appear as covariates, few studies have directly linked these factors. Two cross-sectional studies with older individuals— one involving 238 Brazilians[24] and the other 1600 Taiwanese[25] —showed contrasting results. While the former demonstrated that higher values of functional disability had a lesser impact on OHRQoL, the latter found a positive correlation between disability in IADLs and indicators of poor OHRQoL. The findings of the present study, derived from a 15-year follow-up, revealed that the increase in functional dependency in instrumental activities occurred earlier, was more frequent than in ADLs, and elevated the chance of transitioning to unsatisfactory OHRQoL by two and a half times. As the worsening of functional dependency is related to the deterioration of HRQOL[22,23], the results reflect the connection between the latter and OHRQoL[26], showing that the increase in functional dependency in instrumental activities is an important risk indicator for worsening OHRQoL.

Among the conditions studied, the number of teeth is the oral condition most consistently associated with OHRQoL, as reported in the literature. A systematic review demonstrated that tooth loss was associated with unfavorable OHRQoL scores, regardless of the study location or instrument used[27]. Similarly to the present study, edentulous individuals have shown poor OHRQoL compared to those with a greater number of teeth[28,29].

The literature shows an association between socioeconomic conditions and OHRQoL, mainly linked to education and income. In the present study, education was used for sample characterization, and changes in marital status showed no association with the outcome, contrary to previous findings in cross-sectional studies[30,31]. Nonetheless, a negative change in self-reported insufficient income was associated with unsatisfactory OHRQoL, consistent with another study that also correlated low income with poor OHRQoL[32]. This result differs from the six-year follow-up mentioned earlier, which found no association between insufficient income and changes in OHRQoL[12].

In the simple analysis, the findings showed that participants who experienced cognitive impairment reported a deterioration in OHRQoL. Some cross-sectional studies have shown that older adults' perception of their OHRQoL is affected by cognitive function decline[33]. In a six-year follow-up study using cases and controls obtained from the same reference population as the present study, cognitive decline was an important risk indicator for reduced chewing capacity[34].

This study has some limitations due to the fact that cohorts of older adults are commonly affected by losses due to deaths. Thus, the reduced number of individuals remaining from the beginning of the cohort reduces the ability to detect effects. Variables related to cognitive capacity, alcohol consumption, self-rated health, and cognitive status modified the effects of increased functional dependence, and more robust studies could explore these relationships. Despite this, it is important to highlight the long-term follow-up of the study and the fact that it is a sample obtained from a population-based study comprising individuals who survived fifteen years of follow-up. There was no strict temporal control, so it was not possible to establish the exact moment when changes in exposures occurred, as only data collected at two time points (2000 and 2015) were used. Another limitation of the study was that changes in oral conditions regarding edentulism and prosthesis use could have been slightly higher if the follow-up time spanned 15 years instead of 2/3 of the period used for other variables. Considering the scarcity of information on changes in the living and health conditions of older adults, this study is relevant for expanding understanding of the impacts on OHRQoL beyond income and known dental clinical conditions, showing the need to consider the context in which

the older population is inserted, as well as functional, cognitive, and behavioral aspects. Encouraging and providing means for older adults to maintain their functional capacity may have positive consequences not only for HRQOL but also for OHRQoL.

CONCLUSION

The worsening of functional dependence in instrumental activities was an important risk indicator for the deterioration of OHRQoL in older population, even in the presence of increased missing teeth and insufficient income. This shows that factors other than clinical and socioeconomic variables are important for a better understanding of OHRQoL. Future longitudinal studies capable of detecting points of change over time may help elucidate other aspects associated with the worsening of OHRQoL.

AUTHORSHIP

- Reyce Santos Koga - data analysis and interpretation, manuscript writing, approval of the version to be published.
- Doralice Severo da Cruz Teixeira - data acquisition, critical review, and approval of the version to be published.
- Yeda Aparecida de Oliveira Duarte - data acquisition, critical review, and approval of the version to be published.
- Paulo Frazão - participated in the conception and design of the study, data analysis and interpretation, critical review, and approval of the version to be published.

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