



Original article

Oral health-related quality of life of older people from three South American cities

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Oral health-related quality of life of older people from three South American cities

Objective: To describe subjective oral health status and its association with overall health conditions and socioeconomic factors in the elderly (60 years and older) living in the capital cities with the oldest average populations in South America.

Background: Oral diseases are a public health problem, frequently neglected in older adults. In recent years, the subjective assessment of psychological and social consequences of the problems related to oral health has been valued. One of the instruments used to estimate the Oral Health-Quality of Life is the Geriatric Oral Health Assessment (GOHAI).

Material and methods: Representative samples from SABE study (1999–2000) of Santiago ($n = 1301$), Buenos Aires ($n = 1043$), and Montevideo ($n = 1450$) aged 60 and over community-dwelling people. We assessed OH-QoL (GOHAI), self-reported missing teeth, denture use, and self-rated-health, among other indicators. Logistic regression models (GOHAI < 58) for each city, adjusted by sex and age, were applied.

Results: GOHAI average scores were higher in Montevideo (54.8 ± 6.1) than in Buenos Aires (53.1 ± 7.4) and Santiago (49.9 ± 8.6). A pronounced gradient of the oral condition and GOHAI scores were observed within the three-cities. Denture use -less prevalent in Santiago and more common among women- is a protective factor against a poor OH-QoL.

Conclusion: Socioeconomic inequalities in oral health status and OH-QoL are observed in the three cities. The increasing life expectancy emphasizes the need to integrate prevention and treatment efforts, as a way to improve OH-QoL over the course of a lifetime.

Keywords: oral health, quality of life, elderly, Geriatric Oral Health Assessment Index.

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Introduction

The World Health Organization has described oral disease as a public health problem, taking into account its high prevalence and incidence in every region of the world, particularly in the Americas¹. In the case of the adult population, oral morbidities are recurrent and frequently neglected. Because tooth loss is often believed to be inherent in old age, teeth are often not treated at this stage of life or are simply extracted to alleviate pain or discomfort¹. In Chile, 100% of adults between the ages of 65 and 74 have had a decayed tooth; approximately, a third of this group is edentulous and 70% are partially edentulous^{2,3}.

Most oral diseases have common risk factors for chronic diseases such as dietary practices, inade-

quate hygiene, smoking or excessive alcohol consumption^{4,5}. One example is that the deterioration of the immune system because of ageing and inadequate oral hygiene are risk factors for both cardiovascular and periodontal diseases⁶. In addition, oral conditions such as tooth decay, periodontal diseases, and the lack of teeth create as much as a 2% loss of Healthy Life Years (DALYs) at the level of the total population in Chile, Argentina and Uruguay⁷.

Traditionally, oral health has been understood as an autonomous anatomical structure of the organism limited to the oral cavity⁶. In recent decades, this restricted view has given way to a biopsychosocial perspective that understands oral health to be an integral part of a person's health, while it also values the subjective assessment of

psychological and social consequences of the problems related to oral health^{4,8}. The indicators used to assess the subjective perspective were originally called 'socio-dental' or 'oral health status' indicators. These terms have been replaced by the 'Oral Health-Related Quality of Life' (OH-QoL), which emphasises the impact of oral diseases and disorders on an individual's functioning and psychosocial well-being⁹. The OH-QoL has been studied in recent years using self-report instruments¹⁰.

One of the instruments used to estimate the OH-QoL¹¹ is the Geriatric Oral Health Assessment Index (GOHAI)^{8,12}, which was developed by Atchison and Dolan in 1990¹³ to assess three dimensions of oral health as follows: physical functioning, social functioning and pain and discomfort. It has subsequently been translated into various languages, including Spanish, and has been validated in different samples and age groups¹⁴. It has proven to have good psychometric properties, and as such it is a useful tool for detecting oral disorders¹⁰ and assessing their related psychosocial impacts¹⁵.

This study aims to describe subjective oral health status and its association with overall health conditions and socioeconomic factors in the elderly (60 years and older) living in Santiago, Chile; Montevideo, Uruguay; and Buenos Aires, Argentina, the capital cities with the oldest average populations in South America, each of which has an elderly population of close to 15%¹⁶. The current analysis seeks to obtain a characterisation of oral health problems in older adults and to identify differences and inequalities within and between countries. The key hypothesis to be tested in this study is that the self-reported oral health and GOHAI scores of older people have socioeconomic inequalities that portray similar patterns in each city studied. We postulate that there is a correlation between oral health and educational level and that men have a better oral health status than women.

Methods

Design and data

The data used came from the SABE study (1999–2000) (*Salud, Bienestar y Envejecimiento*; Health, Well-being and Ageing), whose objective was to evaluate health and welfare in probabilistic and representative samples of adults aged 60 and over living in the community in seven Latin American cities^{17–19}. Data were collected through household surveys conducted in 1999 and 2000.

The analysis presented in this article was based on SABE data from samples in Santiago ($n = 1301$), Buenos Aires ($n = 1043$) and Montevideo ($n = 1450$). These capitals were chosen for their similarity at the current stages of demographic and epidemiological transition and geographical proximity.

Measures

The SABE study incorporated GOHAI and a number of health and quality of life indicators. Information was gathered in all countries simultaneously using a common protocol to allow a comparative analysis. The study used a version of GOHAI validated in Spain with clinical dental variables in institutionalised adults aged 60 years and older¹⁴. The SABE pilot, conducted in each of the countries in which the study was developed, confirmed that the language used in the GOHAI scale was understood. This instrument consists of 12 items and uses a Likert-type scale²⁰ with five response categories (i) always, (ii) often, (iii) sometimes, (iv) seldom and (v) never to assess three dimensions of oral health: (1) physical function, including eating, talking and swallowing, (2) psychosocial function, including aspects of oral health concerns, dissatisfaction with appearance, oral health awareness and limited social contacts because of oral problems and (3) pain or discomfort, including the inability to eat desired foods, the presence of pain or discomfort in the teeth and the use of drugs to relieve pain associated with dental status¹³. Before calculating the GOHAI score, two of the items included in the scale (the ability to swallow comfortably and satisfaction with teeth) were reversed so that a higher score indicates better self-reported oral health^{14,15} for all items. The GOHAI score is determined by the final sum of each of the 12 items, ranging from 12 to 60 points.

The non-response rate was very low (1–3%) for all GOHAI items in the three cities, except 'happy with their teeth', where the non-response rate reached almost 9.9% in Buenos Aires, 5.3% in Montevideo and 6.5% in Santiago.

The GOHAI score was dichotomised using a cut-off point as defined by Pinzón-Pulido and Gil-Montoya (<58 points)¹⁴. The definition of these authors was based on a criterion-related validity of the degree of correspondence between this score and dental care needs, which were assessed through a complete clinical dental examination of the sample. This cut-off point yielded sensitivity = 74.4% and specificity = 90%, and the Cronbach's Alpha coefficient was 0.8639.

Proxy oral health measures were denture use and self-reported number of missing teeth with three response categories: 'none,' 'few,' and 'most.' In the case of Buenos Aires and Montevideo, the categories 'yes, few/up to 4' and 'yes, many/more than 4 (but not most)' were merged in the category 'few' to make them comparable with the existing categorisation of the Santiago database.

Other selected health conditions were self-reported health assessed by the question 'How is your health in general?' with five response categories dichotomised as follows: 'good' ('excellent', 'very good' and 'good') and 'not good' ('fair' and 'poor'). Depressive symptoms were determined using the Geriatric Depression Scale-15 grading ≥ 5 ²¹ and diabetes by self-report. The number of chronic diseases (with a maximum of nine and categorised as 0, 1 and 2 or more) was based on the participants' response to whether a medical doctor and/or nurse had diagnosed hypertension, diabetes, cancer, chronic lung disease, heart disease, stroke, rheumatic disease, osteoporosis and/or depression.

The sociodemographic factors included in the analysis were age, dichotomised as 60–69 and 70 years and older, gender and educational level, whose categories were no schooling (0 years), 1–8 years and 9 or more years of formal education.

Data analysis

No missing cases were imputed in the GOHAI analysis. The responses 'do not know' and 'no answer' were excluded. GOHAI internal consistency was estimated using Cronbach's Alpha (Santiago = 0.86, and Buenos Aires and Montevideo = 0.80), with an average covariance among items of 0.30 for the first two cities, and approximately 0.20 in the latter case.

To describe the sample of each city, we used descriptive statistics, including mean and standard deviation for continuous variables and percentage and median for discrete variables. Calculations of frequencies and means were weighted for the total sample in each city using the coefficients in the respective database. To compare the averages between cities, we used the non-parametric Kruskal–Wallis test, and to compare frequencies, we used the Pearson's chi-squared test. To test the statistical trend of the scores of each GOHAI item among cities, we used a Cuzick's test for trends across ordered groups²².

To examine the factors associated with OH-QoL (GOHAI < 58), we estimated logistic regression models for each city. All models were adjusted for

Table 1 Sociodemographic characteristics of the sample by city.

	Santiago (n = 1301)	Buenos Aires (n = 1043)	Montevideo (n = 1450)
Age			
$\bar{X} \pm SD$	70.3 \pm 7.8	70.7 \pm 7.1	70.9 \pm 7.2
60/69%	53.8	47.1	47.0
70 y + %	46.2	52.9	52.0
Women %	59.8	61.7	63.7
Years of education			
$\bar{X} \pm SD$	6.1 \pm 4.7 ^a	7.2 \pm 4.4 ^a	6.0 \pm 4.3 ^a
No schooling %	15.2	5.4	6.3
1–8 years %	55.2	65.7	71.6
9 and + years %	29.6	28.9	22.1
Self-rated health			
Good %	38.1 ^b	65.2 ^b	61.1 ^b
No-good %	61.9	34.8	38.9
Self-reported chronic diseases			
Depressive symptoms %	31.1 ^b	20.2 ^b	24.9 ^b
Diabetes %	13.3	12.4	13.7
Number of chronic disease			
0%	16.7 ^b	16.4 ^b	19.0 ^b
1%	28.4	29.2	26.2
2 or more %	54.9	54.4	54.8

Source: SABE study Santiago, Buenos Aires, Montevideo, 2000.

^aKruskal–Wallis test < 0.0001 (between cities).

^bChi-square test < 0.0001 (between cities).

gender and age (continuous). The results of the multivariate models are presented as odds ratios (OR).

The data were analysed using STATA 11.0 (Stata-Corp, College Station, TX, USA).

Results

Table 1 presents sociodemographic characteristics of the sample of the three cities. There are no differences in the average age. The average years of education is significantly higher in Buenos Aires than in the other two capitals ($p < 0.0001$). The self-rated health category 'not good' is much higher in Santiago (62%) than in Buenos Aires (35%) and Montevideo (40%).

Depression is significantly greater in Santiago, where it affects nearly a third of the population studied, unlike Buenos Aires and Montevideo where a fifth and a fourth are affected, respectively. The prevalence of diabetes was similar in the three cities at nearly 13%. Approximately, 55% of older adults in the three capitals reported at least two chronic diseases.

Table 2 Oral health characteristics of the sample by city and gender.

Gender	Santiago			Buenos Aires			Montevideo		
	Women (%)	Men (%)	Total (%)	Women (%)	Men (%)	Total (%)	Women (%)	Men (%)	Total (%)
Teeth lost									
Yes, majority	73.8 ^a	70.1 ^a	72.3 ^d	29.8 ^b	40.8 ^b	34.0 ^d	76.0 ^c	60.7 ^c	70.4 ^d
Yes, some	24.8	27.5	25.9	68.1	57.5	64.0	21.2	32.3	25.2
None	1.1	2.4	1.6	2.0	1.8	1.9	2.8	7.0	4.4
Use of dentures (along with teeth lost)									
Majority	81.4 ^c	61.1 ^c	73.4 ^d	88.5 ^c	82.9 ^c	86.6 ^d	89.0 ^c	75.8 ^c	84.9 ^d
Some	62.7	39.5	52.7	60.5	48.1	54.9	66.4	45.8	56.8
Non-use of dentures	23.3	45.0	32.0	20.0	31.5	24.4	15.9	34.6	22.5

Source: SABE study, Chile, Argentina, Uruguay, 2000.

^aDifference by gender intracity chi-square < 0.05.

^bDifference by gender intracity chi-square < 0.001.

^cDifference by gender intracity chi-square < 0.0001.

^dDifference between cities chi-square < 0.0001.

Table 2 summarises the characteristics of oral health by city and gender. The comparison between cities shows a better oral status in the sample corresponding to Buenos Aires, according to

remaining number of natural teeth in mouth. Only 34% of older adults in this capital lack most of their teeth, which differs significantly from the 70% obtained in the other two capitals. On the other

Table 3 Weighted average scores and standard deviation (SD) by total and for each GOHAI item, percentile distribution and cut-off by city.

	Santiago (n = 1268)	Buenos Aires (n = 1014)	Montevideo (n = 1435)
GOHAI Scores	$\bar{X} \pm SD$	$\bar{X} \pm SD$	$\bar{X} \pm SD$
Total	49.9 ± 8.6 ^a	53.1 ± 7.4 ^a	54.8 ± 6.1 ^a
Physical function			
1. Limit the kinds of food	4.3 ± 1.1 ^a	4.5 ± 0.9 ^a	4.7 ± 0.8 ^a
2. Trouble biting or chewing	3.8 ± 1.4 ^a	4.0 ± 1.3 ^a	4.3 ± 1.2 ^a
3. Able to swallow comfortably	4.3 ± 1.5 ^a	4.7 ± 0.8 ^a	4.7 ± 0.9 ^a
4. Unable to speak clearly	4.1 ± 1.4 ^a	4.6 ± 0.8 ^a	4.8 ± 0.7 ^a
Psychosocial			
6. Limit contacts with people	4.6 ± 0.8 ^a	4.8 ± 0.6 ^a	4.8 ± 0.6 ^a
7. Not pleased with appearance of teeth	3.5 ± 2.0 ^a	3.8 ± 1.5 ^a	3.7 ± 1.5 ^a
9. Worried about teeth, gums or dentures	3.7 ± 1.4 ^a	4.2 ± 1.2 ^a	4.3 ± 1.1 ^a
10. Self-conscious of teeth, gums or dentures	4.3 ± 1.1 ^a	4.5 ± 0.9 ^a	4.6 ± 0.8 ^a
11. Uncomfortable eating in front of others	4.3 ± 1.2 ^a	4.6 ± 0.9 ^a	4.8 ± 0.7 ^a
Pain/discomfort			
5. Discomfort when eating any kind of food	4.2 ± 1.2 ^a	4.3 ± 1.0 ^a	4.6 ± 0.9 ^a
8. Use of medication to relieve pain	4.6 ± 0.8 ^a	4.6 ± 0.8 ^a	4.7 ± 0.7 ^a
12. Sensitive to hot, cold or sweet foods	4.5 ± 0.9 ^a	4.5 ± 0.9 ^a	4.7 ± 0.7 ^a
Med (IQR)	52 (42–56)	55 (49–59)	56 (52–60)
Not acceptable oral health ^b	82.9%	63.3%	57.8%

Source: SABE study, Chile, Argentina, Uruguay, 2000.

^aDifferences according to test for trend across ordered groups (Cuzick) $p < 0.0001$.

^bAccording to Spanish criterion cut-off (<58).

GOHAI, Geriatric Oral Health Assessment Index.

hand, non-use of dentures is significantly higher in Santiago (32%) than in Buenos Aires and Montevideo (24 and 23%, respectively).

The comparison by gender within each city (Table 2) shows that a higher percentage of women have lost most of their teeth, although among those with missing teeth, men use dentures less frequently than women in the three capitals under analysis.

A pronounced gradient of the oral condition according to educational status is observed in every city analysed. As years of education increases, the percentage of older adults missing the majority of their teeth decreases from approximately 80% for those with no schooling to approximately 55% among those with 9 or more years of education

($p < 0.0001$), a constant observed within each of the three cities. This gradient is also observed in the use or non-use of dentures among those with missing teeth. Denture use is higher in subjects who have completed 9 or more years of formal education (approximately 90% in the three cities) than in those with no schooling (76% in Montevideo; 70% in Buenos Aires; and 61% in Santiago) ($p < 0.0001$). It is further observed that the disparity with respect to education and denture use is greater in Santiago than in the other two cities.

The distribution of the responses to each GOHAI item is described in Table 3, where they are classified according to the function measured (physical, psychosocial and pain/discomfort). Both the total average score and the averages for each GOHAI

Table 4 GOHAI average scores and standard deviation according to risk factors by city.

	<i>Santiago</i>	<i>Buenos Aires</i>	<i>Montevideo</i>
	$\bar{X} \pm SD$	$\bar{X} \pm SD$	$\bar{X} \pm SD$
Gender			
Women	49.8 \pm 8.6	52.9 \pm 7.6	54.4 \pm 6.3
Men	50.1 \pm 8.5	53.4 \pm 7.1	55.3 \pm 5.6
Age			
60/69	49.9 \pm 8.6	53.3 \pm 7.3	54.9 \pm 6.0
70 y más	49.9 \pm 8.6	52.9 \pm 7.4	54.6 \pm 6.1
Years of Education			
No schooling	47.1 \pm 10.1 ^a	47.3 \pm 9.9 ^b	54.1 \pm 7.0 ^a
1–8 years	49.4 \pm 8.6 ^a	53.1 \pm 7.3 ^b	54.4 \pm 6.3 ^a
9 and more years	52.1 \pm 7.1 ^a	54.1 \pm 6.4 ^b	56.0 \pm 4.8 ^a
Self-rated health			
Good	52.7 \pm 6.7 ^a	54.4 \pm 5.9 ^a	55.7 \pm 5.0 ^a
No-good	48.2 \pm 9.2 ^a	50.8 \pm 9.0 ^a	53.2 \pm 7.2 ^a
Self-reported chronic diseases			
Depressive symptoms	45.6 \pm 10.4 ^a	49.4 \pm 9.4 ^a	52.8 \pm 7.9 ^a
No depressive symptoms	52.0 \pm 6.8 ^a	54.1 \pm 6.5 ^a	55.4 \pm 5.2 ^a
Diabetes	48.5 \pm 9.1	51.6 \pm 8.5	54.5 \pm 5.7
No diabetes	50.1 \pm 8.5	53.3 \pm 7.1	54.8 \pm 6.1
Number of chronic diseases			
0	51.0 \pm 7.9 ^b	55.0 \pm 5.7 ^a	56.2 \pm 5.0 ^a
1	49.7 \pm 8.7 ^b	53.6 \pm 6.5 ^a	54.8 \pm 5.8 ^a
2 y más	49.6 \pm 8.7 ^b	52.2 \pm 8.1 ^a	42.0 \pm 6.5 ^a
Teeth lost			
Yes, majority	48.8 \pm 9.0 ^a	52.3 \pm 7.9 ^a	54.3 \pm 6.4 ^a
Yes, some	52.6 \pm 6.5 ^a	54.4 \pm 6.2 ^a	55.5 \pm 5.3 ^a
None	55.2 \pm 3.3 ^a	56.6 \pm 3.2 ^a	58.1 \pm 3.3 ^a
Use of dentures (along with teeth lost)			
Majority	50.4 \pm 8.0 ^a	53.2 \pm 7.5	55.0 \pm 5.8 ^a
Some	52.1 \pm 6.9 ^a	53.9 \pm 6.0	55.5 \pm 5.5 ^a
No use of dentures	47.8 \pm 9.8 ^a	52.0 \pm 8.2	52.9 \pm 7.0 ^a

Source: SABE study, Chile, Argentina, Uruguay, 2000.

^aDifferences within cities according to test for trend across ordered groups (Cuzick) $p < 0.0001$.

^bDifferences within cities according to test for trend across ordered groups (Cuzick) $p < 0.001$.

GOHAI, Geriatric Oral Health Assessment Index.

Table 5 Logistic regression for years of education, number of lost teeth and denture use, predicting a poor Oral health-related Quality of Life (GOHAI < 58).

	<i>Santiago</i> OR (IC 95%)	<i>Buenos Aires</i> OR (IC 95%)	<i>Montevideo</i> OR (IC 95%)
1–8 years of education ^a	1.24 (0.85–1.81)	0.91 (0.66–1.25)	1.4 (1.07–1.82)
0 years of education (No schooling) ^a	1.21 (0.70–2.11)	2.25 (1.07–4.77)	1.07 (0.63–1.79)
Majority teeth lost	1.82 (1.25–2.64)	1.81 (1.33–2.5)	1.72 (1.32–2.26)
Use of denture	0.57 (0.38–0.85)	0.67 (0.47–0.96)	0.46 (0.34–0.63)
Women	1.14 (0.79–1.62)	1.12 (0.84–1.51)	0.97 (0.76–1.24)
Age (Continuos)	0.99 (0.98–1.01)	0.99 (0.98–1.01)	1.01 (0.99–1.02)

GOHAI, Geriatric Oral Health Assessment Index; OR, odds ratios.

^aReference category: Nine and more years of education.

item are higher in Montevideo, followed by Buenos Aires. Santiago has the lowest average ($p < 0.0001$). These results are confirmed in the percentile distribution of the scores. Using the criteria validated in Spain that stipulates 58 points as the cut-off for an acceptable level of oral health¹⁴, 58% of the Montevideo sample, 63% of the Buenos Aires sample and 83% of the Santiago sample fail to meet said condition ($p < 0.0001$).

Geriatric Oral Health Assessment Index mean scores did not differ by gender or age in any of the three cities studied (Table 4), although the case is different with other variables. The average GOHAI score drops as the number of years of formal education increase, a trend observed in each of the three cities analysed (Santiago and Montevideo: $p < 0.0001$ and Buenos Aires: $p < 0.001$). Those who rate their health as good, as well as those with no depressive symptoms have higher average GOHAI scores than those who rate their health as good or have symptoms of depression, respectively, in each of the three cities. As the number of chronic diseases increase, the average GOHAI decreases in all three capitals, and those with the worst dental conditions, such as loss of teeth and non-use of dentures, have the lowest average GOHAI scores.

Statistical models with significant findings for every city are displayed in Table 5. The adjusted OR for poor OH-QoL by gender and age shows that the lack of formal education (OR = 1.07; OR = 1.21; and OR = 2.25 for Montevideo, Santiago and Buenos Aires, respectively) and numerous missing teeth (OR around 1.8 in each city) are major factors related to low GOHAI scores in each of the three cities examined. On the other hand, denture use is a protective factor (OR = 0.67, Buenos Aires; OR = 0.57, Santiago; and OR = 0.46, Montevideo) against a poor OH-QoL. No significant associations were observed between low GOHAI scores and the

number of chronic diseases or self-reported health in any of the cities.

Discussion

This article described the self-reported oral health characteristics of older adults in Santiago, Buenos Aires and Montevideo and attempts to analyse the OH-QoL as measured using the GOHAI. The primary findings showed that pronounced inequalities because of educational level are observed in both self-reported oral health status and GOHAI scores. In fact, older people living in the capital cities with the oldest average populations in South America have poor oral health, although the average GOHAI scores are lower in Santiago than they are in Buenos Aires and Montevideo in concordance with more older adults with no schooling in the Chilean capital than in the other two cities analysed. These gradients of socioeconomic inequalities are reproduced within the three cities, proving one of the key hypotheses formulated in this study. At the same time, tooth loss was found to be greater in women than men in the three cities, even though no gender-related differences were observed in average GOHAI scores. Likewise, the findings of this study highlight the importance of the use of dentures – more common among women than men – in the perception of functionality and OH-QoL in the three cities under analysis. In consequence, the relationship between self-reported oral health and gender is more complex than was stated in our hypothesis.

According to the self-reported health status, almost all older people were at least partially edentulous in all three cities studied, and most of the population considered in Santiago and Montevideo had lost the majority of their teeth. This is particularly worrisome considering that tooth loss

in the elderly appears to be caused by contextual factors such as poor oral hygiene during the life cycle or the lack of timely access to dental care services rather than by the inevitable ageing process, as was once believed²³ and also because oral diseases – including the lack of natural teeth – have a high cumulative impact on such age groups²⁴.

The self-reported oral health status is significantly associated with the average GOHAI score. In fact, based on the cut-off point of 58 used by Pinzón-Pulido and Gil-Montoya¹⁴, between 58% (Montevideo) and 83% (Santiago) of older adults have a non-acceptable level of oral health. However, the average GOHAI scores of the three South American capitals are higher than those reported in developing countries such as Malaysia (\bar{X} : 46.2, SD: 9.7) in a population of the same age group²⁵. And in relation to developed countries, the average scores of Buenos Aires and Montevideo are similar to those reported in Spain (\bar{X} : 52.1, SD: 7.2)¹⁰, which used a representative sample of 2860 Spaniards over 65 years of age, and the United States (\bar{X} : 53.1, SD: 7.6) with a sample of 1911 men and women over 65¹⁵.

In comparing average GOHAI scores among cities, a higher level of satisfaction with respect to the comfort and functionality of their oral health was observed in the elderly in Montevideo. Differences between Montevideo and the other two cities were consistent and appeared in the total average score of the instrument as well as in the answers to each item that compose it. Explanations for the disparities between the three cities may be related to structural factors such as educational disparities, legislative responses and institutional policies, which have a longer tradition in Uruguay than in Chile and Argentina²⁶.

The distribution of subjects with missing teeth is not uniform within the cities and decreases as the years of education increase. Therefore, considering educational level as a surrogate measure of socioeconomic status within these populations, the data suggest a clear socioeconomic gradient that corroborates the effect of sociocultural and economic factors on a person's oral health status. These results are consistent with those observed in studies conducted in developed countries such as Denmark²⁷ and Ireland²⁸ and confirm the educational gradient observed among older adults in London²⁹. In the same vein, these results confirm that GOHAI scores are sensitive to socioeconomic differences, as had been reported previously¹⁵, and provide information on the impact of educational level on average GOHAI scores, particularly in Santiago and Buenos Aires.

These results support the findings of the aforementioned studies and shows that tooth loss is more closely associated with women than with men^{30,31}. At the same time, in the three countries analysed in this article, less denture use is observed in men, which is similar to the findings reported by Pallegedara *et al*³¹ and McGrath and Bedi³². This suggests a potential pattern of more frequent use of dental services in women than in men – at least in terms of repair – which could be related to socio-cultural factors that influence a greater concern and appraisal of oral health by women, including terms of physical attractiveness. However, the evidence from previous studies conducted in the United States, Europe and Asia is inconsistent with the difference in gender-based tooth loss. While some studies conducted in the United States did not observe a gender-related effect^{33,34}, others – such as one in Jordania – showed a higher prevalence of tooth loss in men³⁵.

Even though the data collected in the SABE study did not determine whether the dentures used replaced some or all of the lost natural teeth – which limits the findings and these conclusions to a certain degree, our findings highlight the importance of denture use for the perception of functionality and OH-QoL in the three cities under analysis.

In previous studies, GOHAI was used to evaluate separate and independent dimensions of the quality of life of those concerned in the Short-Form 36 (SF-36), indicating that the oral health problems of older adults are significant burdens on their overall health and functionality³⁶. Along the same line, other research has shown that oral health problems have a significant influence on the well-being and life satisfaction of the elderly, even when they are affected by mental or physical chronic conditions³⁷. In this context, the high prevalence of edentulousness in the three capitals analysed, the high number of elderly people scoring a non-acceptable level of oral health and the association between OH-QoL and oral health conditions provide evidence that this population group urgently needs oral health interventions.

Conclusions

Historically, oral care has been excluded from public health services, although this trend has reversed in recent years because of the increasing incorporation of comprehensive dental health programmes to national health plans. Examples of this are the pioneering public 'Women Smile'

(*Sonrisa Mujer*) and the public-private 'Chile Smiles' (*ChileSonríe*) programmes in Chile³⁸ and the 'National Oral Health Programme' in Uruguay³⁹. In the case of the elderly, a good example is the recent introduction of comprehensive dental care at the age of 60 as a health guarantee established by law in the Chilean health reform⁴⁰.

Given the increasing life expectancy and the life cycle contexts of the current cohort of older adults, it is recommendable to extend these programmes to other critical moments of old age and integrate into primary care efforts to prevent and/or treat existing chronic diseases because of their common risk factors. Thus, on one side, promotional activities, treatment and rehabilitation of oral health for older adults would provide a better quality of life for current elderly cohorts, and on the other, increasing efforts to promote oral health over the course of a lifetime, beginning in childhood, would ensure better conditions for new generations of older adults.

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