

Life expectancy with negative physical oral health impact on quality of life in older adults

Expectativa de vida com impacto negativo da saúde bucal física sobre a qualidade de vida em idosos

Esperanza de vida con impacto negativo físico de la salud bucodental en la calidad de vida de adultos mayores

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Abstract

Oral impairments can affect overall health and life expectancy in older adults. Our study evaluates the life expectancy with negative physical oral health impact on quality of life (POHIQoL) among older adults. Life expectancy with negative POHIQoL was estimated by the Sullivan method, using the prevalence of POHIQoL – obtained in the Health, Well-being and Ageing (SABE Study); and official mortality data for adults aged 60 years or older living in São Paulo, Brazil. Between 2000 and 2010, negative POHIQoL increased from 23.4% (95%CI: 20.2-26.9) to 30.4% (95%CI: 27.0-34.3) among older adults; total life expectancy increased from 22 and 17.5 to 23.7 and 19.4 years among 60-year-old women and men, respectively; and the proportion of remaining years to be lived with negative POHIQoL increased from 25.1% to 32.1% for the same age group. In both years, individuals aged 60 years with lower education level were expected to live more years with negative POHIQoL when compared with the most schooled ones (2000: 15.9 [95%CI: 15.0-16.8] vs. 14.3 [95%CI: 13.7-14.8]; 2010: 16.3 [95%CI: 15.1-17.4] vs. 14.1 [95%CI: 13.2-15.1]). Similarly, women were expected to live more years with negative POHIQoL than men. Within ten years, life expectancy with negative POHIQoL increased, as well as the existence of inequalities in sex and education level among Brazilian older adults. Expansion in coverage and focus on equity in dental care are still necessary to overcome persistent dental-related problems and inequalities and, therefore, contribute to healthy ageing.

Life Expectancy; Quality of Life; Aging; Oral Health

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Introduction

Oral health is related to overall health and mortality among older adults ^{1,2,3}. Dental caries in permanent teeth is the most prevalent disease; edentulism affects 10% of adults aged 50 years old and over worldwide ⁴. Such problems are associated with chewing ability – which harms 10% of Brazilian adults ⁵ – and physical oral function ^{6,7}. Oral disorders also affect the nutritional state ⁸, frailty ³, disabilities ¹, cognitive function ⁹, among other health outcomes, which are closely related to reduction in life and healthy life expectancy ^{7,10,11,12,13}.

Older Brazilian adults are living longer and the incidence of adverse outcomes have been progressively concentrated in later life ^{10,11,12,14}, with few years lived with morbidities among individuals with higher socioeconomic status ^{10,13}. Tooth loss has reduced among younger adults; however, discrete changes have been observed among the older ones ^{5,15,16}, with the distribution of oral diseases being disproportionately concentrated among the most vulnerable groups ^{5,16,17,18}. Those improvements arose the concern about the quality of the years added to life and the role of oral health in healthy ageing ^{4,7,19}.

Oral health has affected overall health and life expectancy ^{2,19,20,21}. Oral impairments predict adverse health outcomes, such as poor nutrition and low-grade chronic inflammation, which are closely related to shorter survival rates in old age ^{2,19}. Moreover, some authors ²⁰ have observed that having less than 20 teeth predicted higher disability-free life expectancy in Japanese older adults. Another study ²¹ found an association between oral problems (such as tooth loss, caries and periodontal disease) and lower quality-adjusted life expectancy among 60-year and older persons in United States.

Despite the consistent evidences about the role of oral health on quality of life ^{6,22,23,24}, general health conditions ^{1,3,7,8,9}, and longevity ^{2,19}, there is no study that directly assess life expectancy with or without oral impairments. Therefore, our study sought to evaluate life expectancy with negative physical oral health impacts on quality of life among older adults from the municipality of São Paulo, Brazil, in 2000 and 2010. We also evaluated the existence of inequalities in this unhealthy life expectancy.

Methods

We used data from the first (2000) and third (2010) waves of the *Health, Well-being and Ageing* study (SABE Study). This is a cohort study, performed in 5-year intervals, with a probabilistic representative sample of older urban residents aged 60 and over from the municipality of São Paulo, Brazil. Trained examiners collected data at the interviewees' households using an interviewer-administrated structured questionnaire including questions regarding living conditions, socioeconomic, general and oral health as well as anthropometric and clinical oral health measurements. SABE Study were approved by the Ethics in Research Committee from the School of Public Health of the University of São Paulo under protocol numbers 1,345/2006 and 2,044/2010. The volunteers signed an informed consent form at the time of each interview. Details about the design and sampling were previously published ^{12,23}. Our sample included 2,104 individuals (out of 2,143) in 2000 and 1,295 (out of 1,345) individuals in 2010 (representing 825,990 and 1,311,802 older adults from the city of São Paulo in 2000 and 2010, respectively). Those participants provided complete information for variables of interest: sex, age, schooling and negative physical oral health impact on quality of life.

The healthy life expectancy (HLE) outcome – or life expectancy without negative physical oral health impact on quality of life – was estimated based both on mortality data and the prevalence of negative physical oral health impact on quality of life (POHIQoL) for the older adults living in São Paulo in 2000 and 2010 ²⁵. Negative POHIQoL was evaluated by means of the physical function dimension of the Geriatric Oral Health Assessment Index (GOHAI) ⁶. The dimension included questions about frequency of problems due to teeth or dentures in the last twelve months regarding: chewing of any kind or amount of food, chewing of hard foods, speaking and swallowing. They were answered based on a 5-point Likert scale with the following options: “always”, “often”, “sometimes”, “seldom” and “never”. Individuals that report always/often in at least one question were considered with a negative POHIQoL. Participants answered GOHAI without any help and individuals with missing answers for any of the interested questions were discarded. Mortality data were obtained

from the São Paulo Data Analysis System (SEADE). SEADE is an official department that analyzes social, demographic, and economic data for the State of São Paulo. The estimates were generated for 2000 and 2010 using disaggregated abridged life tables for both sexes. Life expectancy without negative POHIQoL was stratified by sex, age group and schooling. The latter was categorized according to years of study, as follows: 0-3 years of formal education (which is considered insufficient in Brazil); 4-7 years (incomplete basic education) and 8 or over (complete basic education or over) ¹⁶.

Life expectancy without negative POHIQoL – or HLE – was estimated based on life tables combining: mortality data (from SEADE) and prevalence of negative POHIQoL (from SABE Study), using the Sullivan method ²⁵. This method is based on a standard life table with the status “alive” and “dead”. Alive corresponds to the total life expectancy (TLE). TLE at each age is estimated by dividing the total number of years lived beyond that age by the total number of individuals that have already survived to age x . It comprises two parts: the HLE – period without negative POHIQoL – and unhealthy life expectancy (ULE) – period with negative POHIQoL ^{26,27}.

The number of years in HLE and ULE were estimated by applying the specific prevalence of negative POHIQoL to the person-years lived in different age categories derived from the abridged life tables, as follows:

$$HLE_x = \sum \frac{(1 - {}_n\pi_x) {}_nL_x}{l_x} \quad (1)$$

and

$$ULE_x = \sum \frac{({}_n\pi_x) {}_nL_x}{l_x} \quad (2)$$

HLE _{x} is the average number of years that an individual will live without negative POHIQoL (life expectancy without negative POHIQoL), starting from the age x ; ULE _{x} is the average number of years that an individual will live with negative POHIQoL (life expectancy with negative POHIQoL), starting from the age x ; ${}_n\pi_x$ is the proportion of age group x to $x + n$ with negative POHIQoL (obtained from SABE Study); ${}_nL_x$ is the amount of person-years lived in the age interval; l_x is the number of people that have already survived to age x (${}_nL_x$ and l_x were obtained from SEADE); $1 - {}_n\pi_x$ is the proportion of age group x to $x + n$ without negative POHIQoL; $(1 - {}_n\pi_x) {}_nL_x$ is the number of person-years lived in an age interval without negative POHIQoL; $({}_n\pi_x) {}_nL_x$ is the amount of person-years lived with negative POHIQoL in age interval x to $x + n$; $\sum (1 - {}_n\pi_x) {}_nL_x$ is the total amount of years lived without negative POHIQoL from age x and it was obtained from the sum of every $(1 - {}_n\pi_x) {}_nL_x$ from age x up to the final age group (85 and over); $\sum ({}_n\pi_x) {}_nL_x$ is the total amount of years lived with negative POHIQoL from age x ^{10,11,26}.

Life expectancy without negative POHIQoL (HLE _{x}) and life expectancy with negative POHIQoL (ULE _{x}) were estimated in 5-year intervals, starting at 60 years old, according to sex and schooling (in the highest and lowest levels). These estimates are independent of the population age structure ²⁷. Statistical analyses were performed using the software Stata 15.0 (<https://www.stata.com/>). A correction for the design effect was applied to analyze data originating from a complex sample, using the *survey* command.

Results

Table 1 shows that most of the population of older adults was composed of women both in 2000 (58.7%) and in 2010 (60%). The proportion of older adults in the highest education level group increased in the period (18% of the participants in 2000 and 27.4% in 2010 had 8 or plus years of schooling).

Table 2 shows that POHIQoL also increased in the period, from 23.4% (95%CI: 20.2-26.9) in 2000 to 30.4% (95%CI: 27.0-34.3) in 2010. The negative POHIQoL was higher in the lowest education level group (2000: 28.1% [95%CI: 24.0-32.6] vs. 16.9% [95%CI: 13.0-21.7] in the highest education level group; 2010: 35.7% in the lowest education level group [95%CI: 30.7-41.1] vs. 22% [95%CI: 17.2-29.7] in highest education level group). There were no significant difference regarding sex in negative POHIQoL in both years.

Table 1

Distribution of older adults according to sociodemographic characteristics in 2000 and 2010. São Paulo, Brazil: 2000 and 2010 (weighted estimates).

| | 2000 | | 2010 | |
|-------------------------|------|-----------|------|-----------|
| | % | 95%CI | % | 95%CI |
| Age group (years) | | | | |
| 60-64 | 32.4 | 28.8-36.2 | 31.5 | 24.1-40.0 |
| 65-69 | 26.8 | 24.1-29.7 | 22.6 | 15.8-31.3 |
| 70-74 | 18.8 | 16.7-21.1 | 17.8 | 14.5-21.5 |
| 75-79 | 11.2 | 8.6-14.3 | 12.8 | 10.0-16.2 |
| 80-84 | 6.2 | 4.7-8.1 | 8.2 | 6.3-10.6 |
| 85 and over | 4.6 | 3.5-6.1 | 7.1 | 4.8-10.4 |
| Sex | | | | |
| Women | 58.7 | 56.0-61.2 | 60.0 | 57.1-62.9 |
| Men | 41.3 | 38.8-44.0 | 40.0 | 37.1-42.9 |
| Education level (years) | | | | |
| 0-3 | 45.2 | 40.0-50.5 | 35.3 | 30.8-40.2 |
| 4-7 | 36.8 | 33.8-39.8 | 37.3 | 34.0-40.7 |
| 8 or over | 18.0 | 13.7-23.4 | 27.4 | 22.5-32.9 |

95%CI: 95% confidence interval.

In Table 3, we can observe an increase in TLE for all age groups and both sexes in the studied period. The TLE for women was higher than men in 2000 (22 vs. 17.5 years among 60-year-old people) and in 2010 (23.7 vs. 19.4 years among 60-year-old people). The estimated average number of years to be lived without negative POHIQoL was kept stable from 2000 to 2010. However, the proportion of remaining years to be lived with negative POHIQoL increased in the period. In 2000, at the age of 60, older adults lived 25.1% of the remaining years with negative POHIQoL, whereas this proportion raised to 32.1% in 2010. Regarding differences between the sexes in the life expectancy with negative POHIQoL, it was expected an average of 5.9 years with negative POHIQoL – ULE – for 60-year-old women and 3.9 for 60-year-old men in 2000. However, ULE was 7.7 years for women and 6.1 for men aged 60. Regarding education inequalities in HLE, the highest education level group could expect to live more years without negative POHIQoL (15.9 [95%CI: 15.0-16.8]) than the lowest education level group (14.3 [95%CI: 13.7-14.8]) in 2000 and in 2010 (16.3 [95%CI: 15.1-17.4] and 14.1 years [95%CI: 13.2-15.1] for higher and lowest education level groups, respectively).

Figure 1 shows both the increase in life expectancy with negative POHIQoL between 2000 and 2010 and its inequalities in sex and education level. The women and the lowest education level group had similar life expectancy with negative POHIQoL in 2000 that men and highest education level group in 2010, respectively.

Table 2

Prevalence of negative physical oral health impact on quality of life (POHIQoL) among older adults according to age, sex and education level. São Paulo, Brazil: 2000 and 2010 (weighted estimates).

| Variables (years) | 2000 | | 2010 | |
|-------------------------|------|-----------|------|-----------|
| | % | 95%CI | % | 95%CI |
| Total | 23.4 | 20.2-26.9 | 30.5 | 27.0-34.3 |
| 60-64 | 20.4 | 16.7-24.6 | 25.7 | 19.6-32.9 |
| 65-69 | 20.9 | 15.9-27.0 | 25.8 | 20.6-31.9 |
| 70-74 | 24.7 | 19.2-31.2 | 33.9 | 27.0-41.5 |
| 75-79 | 26.6 | 22.5-31.1 | 35.1 | 27.5-43.6 |
| 80-84 | 26.8 | 21.2-33.2 | 42.9 | 34.0-52.3 |
| 85 and over | 41.6 | 33.8-49.8 | 37.4 | 30.3-45.1 |
| Women | 25.4 | 22.1-29.0 | 30.9 | 26.9-35.1 |
| 60-64 | 24.9 | 20.1-30.4 | 27.7 | 20.5-36.3 |
| 65-69 | 21.4 | 15.9-28.2 | 21.6 | 16.0-28.6 |
| 70-74 | 26.1 | 20.0-33.3 | 34.6 | 26.0-44.3 |
| 75-79 | 28.3 | 23.3-34.0 | 35.3 | 25.9-45.9 |
| 80-84 | 27.2 | 20.9-34.6 | 45.2 | 35.5-55.4 |
| 85 and over | 36.7 | 28.1-46.2 | 36.8 | 27.8-46.8 |
| Men | 20.6 | 16.8-24.9 | 30.0 | 25.4-35.0 |
| 60-64 | 14.6 | 10.0-20.9 | 23.0 | 15.4-32.8 |
| 65-69 | 20.4 | 13.7-29.1 | 31.5 | 24.2-39.9 |
| 70-74 | 22.6 | 14.8-33.0 | 32.8 | 22.6-45.0 |
| 75-79 | 23.9 | 19.9-29.5 | 34.9 | 22.9-49.2 |
| 80-84 | 25.9 | 18.5-34.9 | 37.4 | 23.0-54.4 |
| 85 and over | 51.1 | 38.8-63.3 | 38.4 | 25.8-52.6 |
| Lowest education level | 28.1 | 24.0-32.6 | 35.7 | 30.7-41.1 |
| 60-64 | 27.1 | 20.1-35.4 | 26.5 | 16.1-40.4 |
| 65-69 | 24.8 | 17.9-33.5 | 34.6 | 24.5-46.2 |
| 70-74 | 29.0 | 22.1-37.0 | 39.5 | 29.4-50.6 |
| 75-79 | 27.2 | 22.0-33.0 | 39.5 | 27.7-52.5 |
| 80-84 | 25.9 | 19.3-33.9 | 38.3 | 27.6-50.4 |
| 85 and over | 45.2 | 35.0-55.8 | 37.4 | 27.8-48.1 |
| Highest education level | 16.9 | 13.0-21.7 | 22.8 | 17.2-29.7 |
| 60-64 | 10.8 | 5.9-18.7 | 21.2 | 13.6-31.5 |
| 65-69 | 14.3 | 7.8-24.6 | 23.9 | 14.3-37.2 |
| 70-74 | 27.2 | 15.9-42.4 | 12.5 | 5.7-25.1 |
| 75-79 | 31.4 | 18.9-47.2 | 27.3 | 13.9-46.7 |
| 80-84 | 28.2 | 14.2-48.4 | 47.3 | 22.6-73.3 |
| 85 and over | 19.7 | 6.6-45.8 | 32.2 | 16.3-53.6 |

95%CI: 95% confidence interval.

Note: lowest education:: 0-3 years of study; highest education: 8 or over years of study.

Table 3

Total life expectancy (TLE) and life expectancy without negative POHIQoL (healthy life expectancy – HLE) among older adults. São Paulo, Brazil: 2000 and 2010.

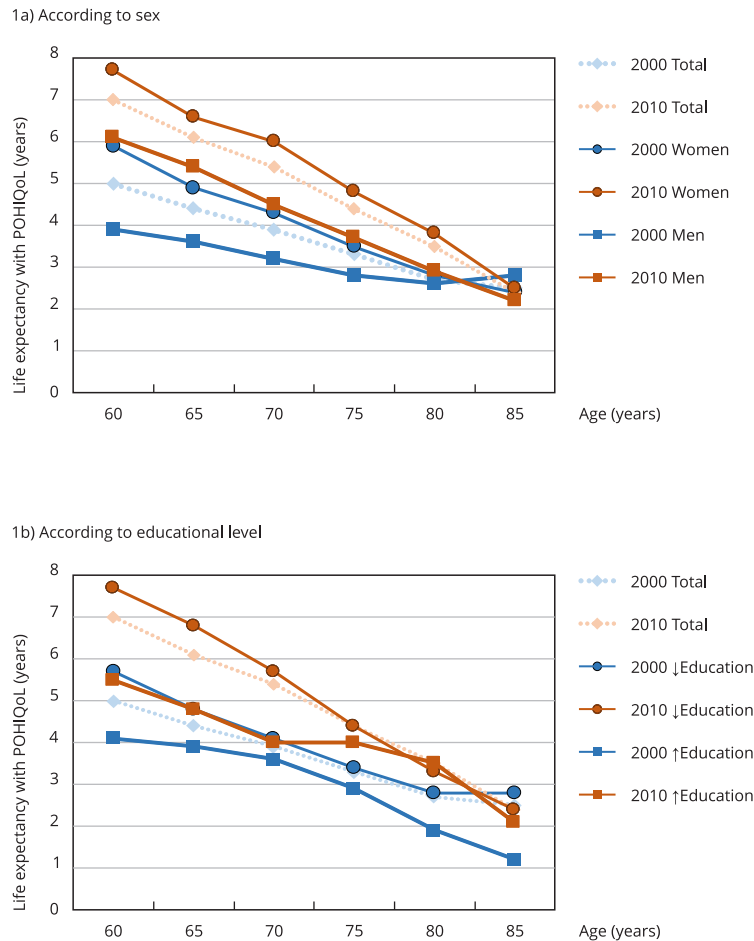
| Variables (years) | 2000 | | | | 2010 | | | |
|-------------------------|------|------------------|-----------|-----|------|------------------|-----------|-----|
| | TLE | HLE (95%CI) | % ULE/TLE | ULE | TLE | HLE (95%CI) | % ULE/TLE | ULE |
| Total | | | | | | | | |
| 60-64 | 20.0 | 15.0 (14.6-15.4) | 25.1 | 5.0 | 21.8 | 14.8 (14.3-15.4) | 32.1 | 7.0 |
| 65-69 | 16.5 | 12.1 (11.8-12.5) | 26.5 | 4.4 | 18.1 | 11.9 (11.4-12.5) | 33.9 | 6.1 |
| 70-74 | 13.4 | 9.5 (9.2-9.9) | 28.8 | 3.9 | 14.6 | 9.3 (8.7-9.8) | 36.8 | 5.4 |
| 75-79 | 10.5 | 7.3 (7.0-7.6) | 30.9 | 3.3 | 11.5 | 7.1 (6.6-7.6) | 38.1 | 4.4 |
| 80-84 | 8.1 | 5.3 (5.0-5.6) | 34.0 | 2.7 | 8.8 | 5.3 (4.8-5.7) | 40.1 | 3.5 |
| 85 and over | 6.1 | 3.6 (3.2-4.0) | 41.6 | 2.5 | 6.4 | 4.0 (3.6-4.5) | 37.4 | 2.4 |
| Women | | | | | | | | |
| 60-64 | 22.0 | 16.2 (15.6-16.7) | 26.6 | 5.9 | 23.7 | 16.0 (15.3-16.8) | 32.4 | 7.7 |
| 65-69 | 18.2 | 13.3 (12.8-13.8) | 27.1 | 4.9 | 19.6 | 13.0 (12.3-13.8) | 33.6 | 6.6 |
| 70-74 | 14.7 | 10.4 (9.9-10.9) | 29.1 | 4.3 | 15.9 | 9.9 (9.2-10.6) | 37.5 | 6.0 |
| 75-79 | 11.5 | 8.0 (7.5-8.4) | 30.6 | 3.5 | 12.4 | 7.6 (7.0-8.3) | 38.7 | 4.8 |
| 80-84 | 8.7 | 5.9 (5.4-6.4) | 32.1 | 2.8 | 9.4 | 5.6 (5.0-6.2) | 40.7 | 3.8 |
| 85 and over | 6.5 | 4.1 (3.5-4.7) | 36.7 | 2.4 | 6.8 | 4.3 (3.7-4.9) | 36.8 | 2.5 |
| Men | | | | | | | | |
| 60-64 | 17.5 | 13.6 (13.1-14.1) | 22.4 | 3.9 | 19.4 | 13.3 (12.5-14.1) | 31.4 | 6.1 |
| 65-69 | 14.3 | 10.7 (10.2-11.2) | 25.3 | 3.6 | 16.0 | 10.5 (9.7-11.3) | 34.1 | 5.4 |
| 70-74 | 11.5 | 8.3 (7.9-8.8) | 27.7 | 3.2 | 12.8 | 8.3 (7.5-9.1) | 35.2 | 4.5 |
| 75-79 | 9.1 | 6.3 (5.9-6.7) | 30.9 | 2.8 | 10.1 | 6.4 (5.6-7.1) | 36.6 | 3.7 |
| 80-84 | 7.0 | 4.4 (4.0-4.8) | 37.0 | 2.6 | 7.7 | 4.8 (4.1-5.5) | 37.9 | 2.9 |
| 85 and over | 5.4 | 2.6 (2.1-3.2) | 51.1 | 2.8 | 5.7 | 3.5 (2.9-4.2) | 38.4 | 2.2 |
| Lowest education level | | | | | | | | |
| 60-64 | 20.0 | 14.3 (13.7-14.8) | 28.7 | 5.7 | 21.8 | 14.1 (13.2-15.1) | 35.2 | 7.7 |
| 65-69 | 16.5 | 11.7 (11.2-12.2) | 29.2 | 4.8 | 18.1 | 11.3 (10.4-12.1) | 37.7 | 6.8 |
| 70-74 | 13.4 | 9.2 (8.8-9.7) | 30.9 | 4.1 | 14.6 | 9.0 (8.2-9.8) | 38.8 | 5.7 |
| 75-79 | 10.5 | 7.2 (6.8-7.6) | 31.9 | 3.4 | 11.5 | 7.1 (6.3-7.8) | 38.5 | 4.4 |
| 80-84 | 8.1 | 5.2 (4.8-5.6) | 35.4 | 2.8 | 8.8 | 5.5 (4.8-6.1) | 37.8 | 3.3 |
| 85 and over | 6.1 | 3.4 (2.9-3.8) | 45.2 | 2.8 | 6.4 | 4.0 (3.4-4.6) | 37.4 | 2.4 |
| Highest education level | | | | | | | | |
| 60-64 | 20.0 | 15.9 (15.0-16.8) | 20.4 | 4.1 | 21.8 | 16.3 (15.1-17.4) | 25.4 | 5.5 |
| 65-69 | 16.5 | 12.6 (11.7-13.6) | 23.5 | 3.9 | 18.1 | 13.3 (12.1-14.4) | 26.6 | 4.8 |
| 70-74 | 13.4 | 9.7 (8.8-10.7) | 27.2 | 3.6 | 14.6 | 10.6 (9.4-11.7) | 27.6 | 4.0 |
| 75-79 | 10.5 | 7.7 (6.8-8.6) | 27.1 | 2.9 | 11.5 | 7.5 (6.3-8.7) | 34.7 | 4.0 |
| 80-84 | 8.1 | 6.1 (5.2-7.1) | 24.0 | 1.9 | 8.8 | 5.3 (4.1-6.6) | 39.5 | 3.5 |
| 85 and over | 6.1 | 4.9 (3.9-5.9) | 19.7 | 1.2 | 6.4 | 4.4 (3.0-5.8) | 32.2 | 2.1 |

%ULE/TLE: % of years remaining with negative POHIQoL; 95%CI: 95% confidence interval; POHIQoL: prevalence of negative physical oral health impact on quality of life.

Note: lowest education: 0-3 years of study; highest education: 8 or over years of study.

Figure 1

Life expectancy with negative POHIQoL (in years) according to sex and education level among older adults. São Paulo, Brazil: 2000 and 2010.



POHIQoL: prevalence of negative physical oral health impact on quality of life.

Discussion

In our study, we estimated the life expectancy with and without POHIQoL among older adults of São Paulo according to sex and education level in 2000 and 2010. We cite as our main findings the increase in unhealthy life expectancy in the studied period and the existence of inequalities, that is, women and the lowest education level group were expected to live longer with negative POHIQoL.

The simultaneous increase in TLE as well as in negative POHIQoL may support an expansion of life spent with perception of negative impact of oral health on quality of life. This expansion in morbidity is described in a pessimistic theory, which considers that technological advances are extending the total life expectancy of those with disabilities and diseases^{28,29}. However, this finding contradicts results related to healthy life expectancy performed with measures other than oral health among older adults in different countries, including Brazil^{10,12,13,30}. Those results have shown delays and decreasing rates of health problems along with increasing life expectancy in the last decades, which characterizes compression of morbidity²⁹. These breakthroughs in general health, oral health and life

expectancy^{10,12,16} may be explained by a set of public policies aimed at promoting social justice by means of the distribution of income and strengthening social protection, leading to improvements in living conditions, reduction of poverty, increase in education level, as well as expansion in the provision and access to health services for the Brazilian population^{15,31,32}.

Regarding oral health, the Brazilian National Oral Health Policy, from 2004, provided massive insertion of oral health teams into primary health services and expansion in coverage of the specialized care¹⁵. Hence, tooth decay reduction has been observed among children and adolescents³³ along with a considerable decrease in the prevalence of periodontal diseases and tooth loss among young adults^{15,33}. However, no significant breakthrough has been recorded among older adults, since oral diseases are cumulative and edentulism affected 53.7% of the population from 65 to 74-years-old in 2010 in Brazil³³. In fact, a study comparing the two last national oral health surveys, performed in 2003 and 2010, showed that functional dentition among adults in this age range established¹⁶. The aforementioned changes may be too recent to result in noticeable improvements in oral diseases in this age group³³ and reduce the negative impact of oral health on quality of life. On the other hand, the increase in access to oral health services is one of the reasons that contribute to the increase in the self-reported negative physical oral health impact on quality of life by raising the awareness about the importance of oral health among older adults^{23,34}. Older adults are living longer and with more negative impact, which is also expected to increase in the following years, since different studies found that the younger generation in Brazil have higher self-reported prevalence of negative impact of oral health on quality of life^{5,22,23,34}.

Our study also found that women have more TLE^{10,11,12,13} and live longer with negative POHIQoL. Social, behavior and health factors could explain such worse results for women, since they are the most affected in these conditions^{10,11,12,13}. This expanded burden of negative POHIQoL represents a new challenge to this group, considering the consistent reported impact of oral health on morbidities closely related to reduced healthy years in later life^{7,10,11,12,13}.

Regarding the observed education inequalities in life expectancy, the fact that individuals in the lowest education level group lived longer with negative POHIQoL is consistent with the patterns observed for other health measures, such as chronic diseases^{35,36}, quality of life^{37,38}, disabilities and healthy life expectancy^{10,30}. This result may be supported by the persistent inequalities in dental treatment needs, access to dental services^{15,17} and functional dentition that affect the most vulnerable groups¹⁶. In addition, those individuals are less aware of their own health problems³². Moreover, the increase in life expectancy with negative POHIQoL in both groups of education level may share common pathways regarding the general increase in the perception of the negative impact of oral health on quality of life already^{23,34,37}. However, the higher increase in life expectancy with negative POHIQoL for the lowest education group may be a reflect of an phenomenon known as “inverse care law”, which results in higher benefits for individuals in less need when equity policies are first extended or implemented^{39,40}.

The persistent inequality reinforces the need for a continuous expansion of the access to dental health services aimed at the most vulnerable groups. Although the expansion in coverage of health services may initially contribute to raise awareness of poor health and its related inequalities⁴⁰, improvements in oral clinical conditions are discreetly in course^{15,33}. However, recent austerity policies, whose great burden lies on the health sector, are concerned with the continuity of programs to increase coverage of social services and reduce inequalities, such as *Brasil Sorridente*^{41,42}. This scenario could mean loss of access to dental services for millions of individuals^{17,41,42}, especially among the most vulnerable groups, since the use of public dental services is disproportionately concentrated among the poorest and least schooled Brazilian older adults¹⁷.

The strengths of our study relate to the fact that this was the first study that directly evaluates the impact of an oral health measure (negative POHIQoL) on life expectancy, being performed in a developing country marked by high levels of social inequalities. It was conducted with data from a large household cohort survey that represents the older adults from the biggest city in Brazil. Among the limitations we the fact that the survey was not conducted across the entire country, thus limiting the generalization of the results. However, studies have shown that in both oral health^{22,33} and socioeconomic conditions¹², the municipality of São Paulo represents Brazil's major aspects. We did

not include institutionalized populations; however, this is a small group in the country as families are the main source of care for older individuals⁴³.

Our study showed an increase in life expectancy with negative POHIQoL from 2000 to 2010 together with the existence and increase in inequalities in this unhealthy life expectancy among older adults. This allows us to conclude that efforts by policymakers and the government are still needed to expand the coverage and access to oral health care as well as strengthening equity practices to reach the most deprived people. Further studies should facilitate evaluating if the trends for the expansion of negative POHIQoL and socioeconomic inequalities will remain. They should also include clinical measures of oral health in the assessment of oral impairment-free life expectancy.

Contributors

E. J. P. Oliveira participated in conception and design of the research project, data analysis, interpretation and drafting of the article, critical review of the manuscript, and approval of the final version. L. C. Alves and Y. A. O. Duarte contributed in the data analysis, interpretation, critical review of the manuscript, and approval of the final version. F. B. Andrade contributed in conception and design of the research project, interpretation, critical review of the manuscript, and approval of the final version.

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Additional informations

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Resumo

As doenças bucais podem afetar a saúde geral e a expectativa de vida dos idosos. O estudo avalia a expectativa de vida com impacto negativo da saúde bucal física sobre a qualidade de vida (POHIQoL, por sua sigla em inglês) em idosos. A expectativa de vida com POHIQoL negativa foi estimada pelo método de Sullivan, usando a prevalência de POHIQoL, obtida no estudo Saúde, Bem-Estar e Envelhecimento (Estudo SABE), e dados de mortalidade oficiais para adultos com idade de 60 anos ou mais e residentes em São Paulo, Brasil. Entre 2000 e 2010, a POHIQoL negativa aumentou de 23,4% (IC95%: 20,2-26,9) para 30,4% (IC95%: 27,0-34,3) entre idosos. Nos indivíduos com 60 anos, a expectativa de vida total era maior em mulheres do que em homens em 2000 (22 e 17,5 anos, respectivamente) e em 2010 (23,7 e 19,4 anos respectivamente). A proporção de indivíduos com anos de vida remanescentes com POHIQoL negativa aumentou de 25,1% para 32,1% no mesmo período. Os indivíduos com 60 anos com menor escolaridade viveriam menos anos com POHIQoL negativa, comparados aos com escolaridade maior (2000: 15,9 [IC95%: 15,0-16,8] vs. 14,3 [IC95%: 13,7-14,8]; 2010: 16,3 [IC95%: 15,1-17,4] vs. 14,1 [IC95%: 13,2-15,1]). Além disso, as mulheres poderiam esperar viver mais anos com POHIQoL negativa do que os homens. Entre 2000 e 2010, houve um aumento na expectativa de vida com POHIQoL negativa, além da existência de desigualdades por gênero e escolaridade, entre os idosos brasileiros. A ampliação da cobertura e o foco na assistência odontológica ainda são necessários para superar os problemas persistentes de saúde bucal e as desigualdades associadas, e assim, contribuir para o envelhecimento saudável.

Expectativa de Vida; Qualidade de Vida; Envelhecimento; Saúde Bucal

Resumen

Los trastornos orales pueden afectar sobretodo la salud y esperanza de vida de adultos mayores. El estudio evalúa la esperanza de vida, asociada al impacto de una salud bucodental negativa que afecta a la calidad de vida (POHIQoL, por su sigla en inglés) de adultos mayores. La esperanza de vida con una POHIQoL negativa se estimó mediante el método Sullivan, usando: prevalencia de POHIQoL -obtenida en Salud, Bienestar y Envejecimiento (Estudio SABE); y los datos oficiales de mortalidad para adultos con edades comprendidas entre 60 años o más, que viven en São Paulo, Brasil. De 2000 a 2010, la POHIQoL negativa se incrementó de 23,4% (IC95%: 20,2-26,9) a 30,4% (IC95%: 27,0-34,3) entre adultos mayores; la esperanza de vida total se incrementó de 22 y 17,5 a 23,7 y 19,4 años entre mujeres y hombres con 60 años, respectivamente; y la proporción de años restantes de vida con una POHIQoL negativa, se incrementó de 25,1% a 32,1% para el mismo grupo. Las personas con una edad de 60 años y bajos niveles de escolaridad vivirían más años con una POHIQoL negativa, si los comparamos con los más escolarizados (2000: 15,9 [IC95%: 15,0-16,8] vs. 14,3 [IC95%: 13,7-14,8]; 2010: 16,3 [IC95%: 15,1-17,4] vs. 14,1 [IC95%: 13,2-15,1]). Igualmente, las mujeres vivirían más años con una POHIQoL negativa que los hombres. Hubo un incremento en la esperanza de vida con POHIQoL negativa desde el 2000 al 2010, junto con la existencia de inequidades por sexo y escolaridad entre adultos brasileños mayores. La expansión de la cobertura dental, enfocándonos en la equidad de su cuidado dental, es necesaria para superar los problemas dentales persistentes y las inequidades descritas, con el fin de contribuir, de esta forma, a un envejecimiento saludable de la población.

Esperanza de Vida; Calidad de Vida; Envejecimiento; Salud Bucal

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