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SPECIAL CALL "GERIATRIC DENTISTRY AND ORAL HEALTH"

Geriatrics, Gerontology and Aging

Oral disorders among older Chileans: prevalence, incidence, and years lived with disability

Prevalência, incidência e anos vividos com incapacidade por doenças bucais no Chile

Soraya León[a], Karla Gambetta-Tessini[a], Mariana Pinto[a], Francisca Salvo[a], Javiera Herrera[a], Nicholas Kassebaum[b], Fernando Neves Hugo[c]

[a]Gerodontology Research Group and Interuniversity Center for Healthy Aging, Faculty of Dentistry, Universidad de Talca – Talca, Chile.
[b]Institute for Health Metrics and Evaluation, University of Washington – Seattle (WA), USA.
[c]Departamento de Odontologia Preventiva e Social, Universidade Federal do Rio Grande do Sul – Porto Alegre (RS), Brazil.

Correspondence data
Soraya León – 1 Poniente 1141, Talca, Chile.
E-mail: sleon@utalca.cl

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Abstract

Objective: Prior epidemiological surveys revealed that Chile experiences a high burden of oral diseases. However, no prior study has reported estimates of untreated dental caries, periodontitis, and edentulism over a three-decade period for the country. Using estimates of the Global Burden of Diseases Study (GBD) 2019, the objective of this study is to report the trends of prevalence, incidence, and years-lived with disability (YLDs) due to untreated dental caries, periodontitis, and edentulism in Chilean older adults between 1990 and 2019.
Methods: Estimates of prevalence, incidence, and YLDs due to dental caries, periodontitis, and edentulism were produced for Chile, by age and sex, between 1990 and 2019, using Dismod-MR 2.1. Trends of oral disorders were analyzed using generalized linear regression models applying the Prais-Winsten method.
Results: Untreated dental caries and periodontal disease showed an increase in prevalence and YLDs, whereas edentulism prevalence, incidence, and YLDs decreased in all older adults age groups. The incidence of dental caries decreased in the younger groups and increased in the older age groups; while the incidence of periodontal disease increased in the younger and decreased in the older age groups.
Conclusions: Overall, the burden of oral diseases in older Chileans increased between 1990 and 2019. This was particularly relevant for untreated caries and periodontal disease. Future estimates of oral diseases burden in Chile require concerted efforts to produce national health surveys that incorporate oral diseases metrics. These estimates are essential to inform policy formulation, implementation and evaluation.
Keywords: global burden of disease; dental caries; periodontitis; tooth loss; older adult.

Resumo

Objetivo: Pesquisas epidemiológicas anteriores revelaram que o Chile apresenta uma elevada carga de doenças bucais. No entanto, nenhum estudo anterior relatou estimativas de cárie dentária não tratada, periodontite e edentulismo ao longo de um período de três décadas para o país. Usando estimativas do Global Burden of Diseases Study (GBD) 2019, o objetivo deste estudo é relatar as tendências de prevalência, incidência e anos vividos com incapacidade (YLDs) devido a cárie dentária não tratada, periodontite e edentulismo em idosos chilenos entre 1990 e 2019.
Metodologia: Estimativas de prevalência, incidência e YLDs devido à cárie dentária, periodontite e edentulismo foram produzidas para o Chile, por idade e sexo, entre 1990 e 2019, usando o Dismod-MR 2.1. Tendências de distúrbios bucais foram analisadas usando modelos de regressão linear generalizada aplicando o método Prais-Winsten.
Resultados: A cárie dentária não tratada e a doença periodontal mostraram um aumento na prevalência e nos YLDs, enquanto a prevalência, incidência e YLDs do edentulismo diminuíram em todas as faixas etárias de idosos. A incidência de cárie dentária diminuiu nos grupos mais jovens e aumentou nos grupos etários mais velhos; enquanto a incidência de periodontite aumentou nos grupos mais jovens e diminuiu nos grupos etários mais velhos.
Conclusões: No geral, a carga de doenças bucais em idosos chilenos aumentou entre 1990 e 2019. Isso foi particularmente relevante para cárie não tratada e periodontite. As estimativas futuras da carga de doenças bucais no Chile exigem esforços concentrados para produzir

pesquisas nacionais de saúde que incorporem métricas de doenças bucais. Essas estimativas são essenciais para informar a formulação, implementação e avaliação de políticas.
Palavras-chave: carga global de doenças; cárie dentária; periodontite; perda dentária; idoso.

INTRODUCTION

According to the Institute for Health Metrics and Evaluation's Global Burden of Disease 2019 (GBD),[1] oral disorders, a group of chronic diseases that include dental caries, periodontitis, and edentulism, are the most prevalent diseases worldwide. They affect 44.50% of the global population and still remain a significant public health challenge.[2] Chile's population has one of the highest mean ages in the world,[3] but few epidemiological studies have reported on its oral health status. However, a recently published review reported a high prevalence of periodontal disease (100%), cavitated caries (56.60%), tooth loss (nonfunctional dentition 27%), and oral mucosal lesions (denture stomatitis 22.30%) in Chilean adults and older adults, with marked socioeconomic and cultural inequities.[4] In addition, the most recent National Health Survey showed that 81.70% of people over 65 had less than 20 teeth, 65.80% wore dentures, 57.20% had cavities in both dental arches, and 22.60% perceived their oral health as poor or very poor.[5] Despite these discouraging results, Chilean older adults, compared to their Latin American and Caribbean (LAC) counterparts, are less affected by oral diseases.[6]

The GBD[1] represents an excellent opportunity to analyze changes in the oral disease burden in older Chileans over 3 decades. Furthermore, data are limited regarding oral health differences among different age groups of older adults. Despite their great heterogeneity, older adults have typically been considered a single homogenous group for data analysis[7,8] and in epidemiologic surveys. The GBD[1] is currently the most comprehensive study of its kind. Its estimates include the prevalence, incidence, and years lived with disability (YLDs) due to oral disorders. Since the first publications based on the GBD study, no detailed analysis of oral disorders in Chile has been produced. These estimates could provide key information about the oral disease burden and trends in the older adult population. This is relevant because older adults have greater dental care needs, and accurate, up-to-date estimates are critical for policy development and to help assure that oral health care is incorporated into general health care programs for older Chileans.

Thus, the present study sought to describe trends in the prevalence, incidence, and YLDs due to untreated dental caries, periodontitis, and edentulism in older Chileans between 1990 and 2019 based on estimates from GBD 2019 and to compare the results with LAC.

METHODS

The full description of the methods for estimating the prevalence, incidence, and YLDs due to untreated dental caries, periodontitis, and edentulism is provided in the GBD capstone article. The estimates are reported for 1990–2019, based on data provided in GBD 2019.[1] With each iteration of the GBD, the values of the entire time series (beginning in 1990) are reestimated according to oral disorder, age, sex, and region. All estimates are reported as percentages and their respective 95% uncertainty intervals. The GBD complies with the Guidelines for Accurate and Transparent Health Estimates Report statement.[9]

The data used to inform oral disorder models were obtained from scientific articles and oral health surveys and were updated at each new iteration of the GBD Study. For GBD 2019, the data were derived from epidemiological studies and National Health Surveys.

The case definition for untreated dental caries is "teeth with an unmistakable coronal cavity at the dentin level, a root cavity in the cementum that feels soft or leathery to probing, temporary restorations, or missing teeth extracted due to a caries lesion". The reference definition for modeling caries is the presence of one or more teeth with current decay (for prevalence), whereas each additional carious tooth was counted as a separate incident event. The case definition for periodontitis is "loss of gingival tissue and alveolar bone destruction". The reference definition used to model data on periodontitis was taken from the World Health Organization's Community Periodontal Index of Treatment Needs = 4 (probing score > 5.5 mm.). The case definition for edentulism was "complete loss of natural teeth," which could be assessed by self-reports or clinical examination.

Modeling strategy

Estimates of the prevalence, incidence, and YLDs due to dental caries in permanent teeth, periodontitis, and edentulism were produced for Chile according to year, sex, and age using Dismod-MR 2.1.

Mortality was set at 0 for all oral disorders. For dental caries in permanent teeth, the models assumed estimates for the population aged ≥ 6 years. The incidence of periodontitis was allowed to rise beginning at age 9 years, based on the youngest age at which there was a non-zero point estimate for

prevalence in the dataset. For edentulism, as one would expect for an irreversible condition, remission was set at 0 for all ages.

YLDs were calculated by multiplying the frequency (prevalence), severity (disability weight), and duration of each oral disorder. The definition of disability associated with symptomatic dental caries is "a toothache that causes some eating difficulty." The definition of disability associated with symptomatic periodontitis is "bad breath, a bad taste in the mouth, and gums that bleed a little from time to time, but does not interfere with daily activities." The definition of disability associated with symptomatic edentulism is "great difficulty in eating meats, fruits, and vegetables." The weights of each disability are defined in a specific GBD survey.[10] The values calculated for dental caries, periodontitis, and edentulism were 0.01 (0.005–0.019), 0.007 (0.003–0.014), and 0.067 (0.045–0.095), respectively.

In all estimates, uncertainty was derived from 1000 draws at every step of the computational process. Uncertainty comes from sampling error in data sources, the distribution of condition severity and disability weights, as well as model coefficients. The final estimates were calculated as the average across 1000 draws, with the 95% uncertainty interval computed as percentiles 2.50 and 97.50 in the distribution.[1]

Percentage change and trend analysis

The percentage change was calculated using the following formula (Equation 1):

$$[(2019\ estimate - 1990\ estimate)/1990\ estimate] \times 100. \quad (1)$$

For the trend analysis, a generalized linear regression model applying the Prais-Winsten method was used. The dependent variable was the log-transformed measure and the independent variable was the year. The estimate of the annual percent change (APC) and its 95%CI was obtained using Antunes & Waldman's calculations (Equation 2):[1]

$$APC = (-1 + 10^{b1}) * 100\%$$
$$95\%\ CI^{lower} = (-1 + 10^{b1lower}) * 100\% \quad (2)$$
$$95\%\ CI^{upper} = (-1 + 10^{b1upper}) * 100\%$$

Where *b1* is the regression coefficient, and *b1lower* and *b1upper* are the limits of its 95%CI. This is an ascending trend if the APC and 95%CI are positive, a declining trend if the APC and 95%CI are negative, and stationary if the 95%CI includes 0.

RESULTS

Line graphs with overall trends of prevalence, incidence, and YLDs due to oral disorders are shown in Figures 1a, 1b and 1c. The lines are separated according to age groups. In general, the prevalence of oral disorders increased over time for all age groups. The older groups had the lowest prevalence of oral disorders (Figure 1a). The incidence of oral disorders tended to be more stable and similar in recent years (2014 to 2019) across age groups (Figure 1b). The tendency of YLD rates for oral disorders appeared to consistently decrease in all age groups (Figure 1c).

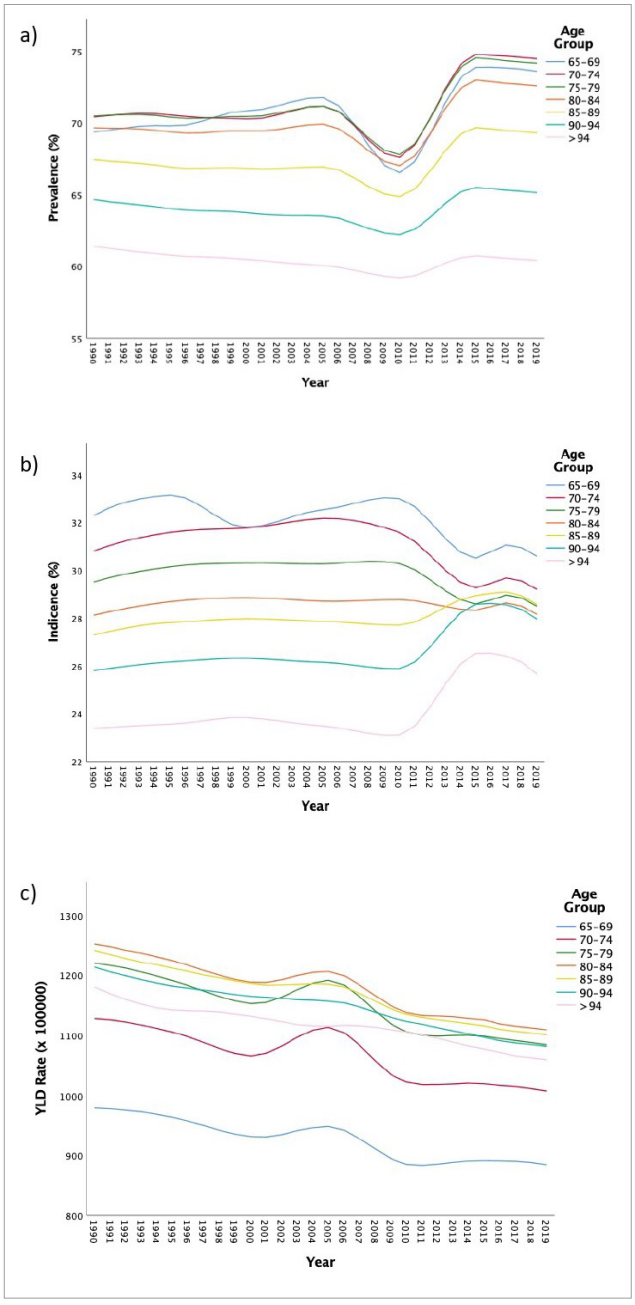

FIGURE 1. Trends for prevalence (a), incidence (b), and years-lived with disability rates (c) due to oral disorders, by age groups, Chile, 1990 to 2019.

Untreated caries affected 45.63% (59.60-33.30) and 23.31% (38.40-12.80) of the 65-69 and > 94-year-old groups, respectively, in 1990. The 2019 results indicate an increased prevalence of untreated caries, particularly in the youngest group (54.80%). Similar trends were found for YLDs due to dental caries, although the incidence of untreated caries was stable during the period (Table 1). Periodontal disease remained stable between 1990 and 2019 for all age groups, whereas edentulism decreased in all age groups during the same period, particularly YLDs due to edentulism (Table 1).

Figure 2 illustrates the overall trends for YLDs due to oral disorders among older adults in Chile (> 70 years old), in LAC, and globally. Chilean and global estimates were similar, but those in the LAC region were higher. These estimates remained stable between 1990 and 2019 in Chile (Figure 2). The prevalence of untreated caries was higher in Chile than in LAC, irrespective of age group. However, the prevalence of edentulism has decreased more markedly in Chile than in LAC (Table 2).

The prevalence of oral disorders among older Chileans remained stable. The incidence of oral disorders increased for older adults aged 85–89, 90–94, and > 94. Nevertheless, YLDs due to oral disorders decreased in all age groups between 1990 and 2019 (Figure 3).

The APCs for prevalence, incidence, and YLDs due to dental caries and periodontal disease were, in most cases, positive and the trend analyses showed an increase in many age groups over the study period. In contrast, the APCs for prevalence, incidence, and YLDs due edentulism were negative and statistically significant for most age groups (Table 3).

DISCUSSION

This study provides comprehensive estimates of the prevalence, incidence, and YLDs due to untreated dental caries, periodontitis, and edentulism in older Chileans over the last 3 decades. Its results are unprecedented, considering the extent and scope of GBD 2019 and the fact that oral disorders are the most common diseases worldwide, and Chile is no exception.[1]

Untreated dental caries, periodontal disease, and edentulism continue to be highly prevalent among older Chileans, as in LAC and worldwide.[1,2,6] It is important, however, to point out that there was an important reduction in the prevalence, incidence, and YLDs due to edentulism during the study period, which indicates greater dental preservation and entails a greater risk of dental caries and periodontal disease.

This gain is associated with longer life expectancy and more effective dental services regarding the promotion, prevention, and treatment of dental caries and periodontal disease, which may have ultimately helped reduce severe tooth loss.[11,12] Likewise, changes in some health-related behaviors, such as reduced smoking and widespread access to fluoride toothpaste,[11] may help explain the reduction. In Chile, public policies, such as the National Drinking Water Fluoridation Program (implemented in 1985) and a health reform called Explicit Health Guarantees, which included dental coverage, in addition to other complementary programs,[13] may help explain the lower edentulism-related burden. However, it should be pointed out that dental coverage is insufficient for the needs of the growing population of older Chileans.[14] This is evidenced by the marked increase in periodontal disease and caries, despite the reduction in edentulism. Although increasing tooth retention is seen as a leap forward in the oral health of older adults, it also involves the challenge of treating chronic oral diseases.[15] Unfortunately, current dental care methods are largely based on curative and interventionist approaches, which are not easily accessible to the populations of low-to-middle-income countries, thus contributing to widening oral health inequality.[16]

Addressing the oral diseases burden among older Chileans will require a shift from strategies focused on individual behaviors and risk factors to population-based approaches that promote health and multidisciplinary actions that addresses the broader determinants of health inequality.[17] Oral disease prevention is fundamental to lifelong oral health since it optimizes individual oral health trajectories well before advanced age, when people become more susceptible to oral diseases. The concept of lifelong prevention corresponds to the life-course epidemiology approach to oral diseases, which emphasizes the impact of a variety of factors on oral health, including malnutrition, social conditions, and behavioral risk factors. Finally, the lifelong prevention approach carries the promise of decreasing the burden of oral diseases.[18]

Although oral disorders among older Chileans tended to increase overall between 1990 and 2019, they began to decrease beginning in 2010. The lack of primary data for several years of the study period resulted in greater uncertainty during modeling, which in turn led to smaller shifts in mean values. A large increase was observed in 2016, likely due to data from the National Health Survey of 2016-2017, which incorporated oral examinations and data on the prevalence of dental caries, the use of dentures, and edentulism.[19]

The estimates reported in this study demonstrate important diversity in the oral disease burden among older adults.[7,8] For example, the most recent national health survey showed

TABLE 1. Prevalence, incidence and years lived with disability rates due to untreated caries, periodontitis, and edentulism in older Chileans according to age group in 1990, 2010 and 2019.

Years	1990			2010			2019		
Age groups	Prevalence (%)	Incidence (x 100)	YLD rate (x 100000)	Prevalence (%)	Incidence (%)	YLD rate (x 100000)	Prevalence (%)	Incidence (%)	YLD rate (x 100000)
Untreated caries									
65 – 69	45.63 (59.57 – 33.31)	28.67 (37.59 – 20.96)	43.38 (84.66 – 17.77)	42.69 (57.36 – 29.90)	29.64 (38.02 – 22.19)	40.58 (80.37 – 16.30)	54.80 (59.25 – 50.12)	27.21 (32.30 – 22.12)	52.00 (97.31 – 22.64)
70 – 74	45.04 (59.90 – 31.31)	27.21 (36.07 – 19.77)	42.38 (83.14 – 17.94)	42.16 (57.56 – 27.86)	28.11 (36.59 – 21.03)	39.65 (78.96 – 16.37)	54.88 (60.49 – 49.80)	25.77 (31.07 – 20.70)	51.50 (98.61 – 23.14)
75 – 79	43.10 (55.01 – 31.16)	26.23 (33.20 – 19.86)	40.02 (78.40 – 16.85)	40.27 (53.56 – 29.37)	27.02 (34.64 – 20.58)	37.33 (74.40 – 15.33)	52.87 (57.24 – 48.57)	25.31 (31.09 – 20.49)	48.88 (92.66 – 22.07)
80 – 84	40.32 (54.51 – 26.52)	25.21 (32.54 – 18.36)	36.91 (72.68 – 14.97)	37.49 (50.33 – 25.31)	25.85 (33.74 – 18.67)	34.36 (68.23 – 13.86)	48.87 (53.86 – 43.73)	25.30 (31.72 – 19.91)	44.50 (83.81 – 20.52)
85 – 89	35.41 (49.35 – 22.87)	24.59 (33.57 – 17.02)	31.86 (63.77 – 12.05)	32.47 (45.54 – 21.03)	24.97 (32.92 – 17.07)	29.16 (59.75 – 11.28)	41.80 (47.42 – 36.48)	25.90 (33.31 – 18.75)	37.47 (70.34 – 16.44)
90 – 94	29.84 (44.38 – 18.32)	23.13 (31.67 – 14.93)	26.53 (55.24 – 10.07)	26.87 (40.64 – 16.16)	23.20 (31.70 – 14.81)	23.80 (51.45 – 8.96)	33.39 (38.73 – 28.60)	25.34 (35.26 – 17.18)	29.46 (55.88 – 12.95)
> 94	23.31 (38.36 – 12.83)	20.70 (29.74 – 12.20)	20.48 (45.46 – 7.32)	20.62 (34.21 – 11.02)	20.41 (29.49 – 11.53)	18.00 (40.59 – 6.31)	23.85 (30.20 – 18.52)	23.01 (36.16 – 13.57)	20.73 (40.44 – 8.96)
Periodontal disease									
65 – 69	26.41 (34.73 – 19.27)	1.84 (2.68 – 0.92)	167.60 (338.12 – 64.73)	26.10 (33.80 – 19.59)	1.76 (2.62 – 0.91)	165.63 (332.75 – 64.65)	29.16 (37.59 – 22.02)	1.86 (2.65 – 0.95)	184.89 (374.59 – 71.62)
70 – 74	23.94 (31.91 – 17.63)	1.96 (2.75 – 1.15)	150.23 (304.34 – 58.55)	24.00 (31.55 – 18.06)	1.96 (2.75 – 1.13)	150.78 (307.46 – 60.20)	26.89 (34.97 – 20.27)	1.99 (2.72 – 1.19)	168.43 (340.75 – 65.84)
75 – 79	22.37 (29.34 – 16.25)	1.96 (2.74 – 1.10)	138.65 (281.04 – 55.85)	23.02 (29.46 – 17.34)	2.02 (2.77 – 1.13)	142.67 (286.07 – 56.99)	25.42 (32.19 – 19.26)	2.00 (2.71 – 1.15)	156.99 (310.02 – 61.69)
80 – 84	21.48 (27.63 – 15.57)	1.92 (2.78 – 1.03)	131.84 (267.51– 50.01)	22.51 (28.61 – 16.57)	1.98 (2.84 – 1.07)	137.79 (282.09 – 52.59)	24.49 (30.70 – 18.13)	1.94 (2.78 – 1.06)	149.42 (298.93 – 57.35)
85 – 89	21.05 (27.39 – 14.49)	1.87 (2.75 – 0.86)	127.62 (266.67 – 47.10)	22.25 (28.61 – 15.70)	1.93 (2.76 – 0.91)	134.37 (282.79 – 49.66)	23.88 (30.31 – 16.99)	1.88 (2.72 – 0.92)	143.70 (299.38 – 54.14)
90 – 94	20.83 (27.39 – 13.84)	1.80 (2.70 – 0.64)	124.74 (260.03 – 44.47)	21.92 (28.72 – 14.69)	1.84 (2.75 – 0.63)	130.54 (274.15 – 47.22)	23.28 (30.06 – 15.95)	1.80 (2.69 – 0.59)	137.88 (285.88 – 50.30)
> 94	20.70 (28.58 – 12.92)	1.75 (2.75 – 0.37)	121.91 (256.13 – 44.21)	21.65 (29.49 – 13.37)	1.76 (2.76 – 0.37)	126.44 (268.08 – 46.05)	22.77 (30.89 – 14.77)	1.74 (2.71 – 0.35)	132.27 (277.28 – 48.50)
Edentulism									
65 – 69	25.54 (35.89 – 17.78)	1.79 (2.80 – 1.00)	701.40 (1121.71 – 413.84)	22.32 (31.81 – 15.64)	1.60 (2.50 – 0.90)	612.83 (981.80 – 362.57)	21.22 (29.93 – 14.79)	1.52 (2.39 – 0.87)	581.59 (919.89 – 336.47)
70 – 74	32.26 (42.63 – 22.91)	1.64 (2.71 – 0.82)	875.91 (1353.48 – 529.53)	28.42 (37.94 – 20.04)	1.51 (2.50 – 0.76)	772.20 (1181.99 – 462.77)	26.88 (35.96 – 18.67)	1.44 (2.39 – 0.72)	728.36 (115.84 – 440.71)
75 – 79	37.06 (48.34 – 27.32)	1.32 (2.23 – 0.69)	994.04 (1494.22 – 603.91)	32.77 (42.10 – 23.65)	1.25 (2.16 – 0.66)	878.36 (1319.33 – 537.16)	31.07 (40.18 – 22.35)	1.19 (2.02 – 0.62)	830.46 (1250.11 – 507.88)
80 – 84	39.51 (50.21 – 29.38)	0.99 (1.73 – 0.56)	1045.46 (1559.75 – 660.94)	35.18 (44.85 – 25.56)	0.95 (1.63 – 0.53)	927.94 (1404.64 – 577.93)	33.36 (42.81 – 24.39)	0.92 (1.63 – 0.51)	877.86 (1319.13 – 546.64)
85 – 89	40.38 (52.01 – 30.22)	0.84 (1.45 – 0.45)	1052.39 (1564.41 – 658.81)	36.30 (47.32 – 26.96)	0.82 (1.40 – 0.41)	941.83 (1405.67 – 587.67)	34.44 (45.03 – 25.60)	0.80 (1.37 – 0.41)	890.16 (1334.31 – 542.83)
90 – 94	40.31 (51.91 – 30.40)	0.88 (1.52 – 0.43)	1037.10 (1539.31 – 645.99)	36.92 (47.99 – 27.83)	0.84 (1.45 – 0.40)	943.37 (1401.89 – 588.32)	34.95 (45.24 – 25.95)	0.83 (1.43 – 0.40)	888.53 (1326.01 – 551.71)
> 94	40.13 (51.47 – 29.19)	0.99 (1.95 – 0.41)	1013.54 (1500.36 – 621.92)	37.34 (48.02 – 26.97)	0.94 (1.89 – 0.38)	936.12 (1389.27 – 564.22)	35.40 (45.69 – 25.16)	0.92 (1.80 – 0.38)	881.39 (1320.64 – 533.24)

YLD: years lived with disability.

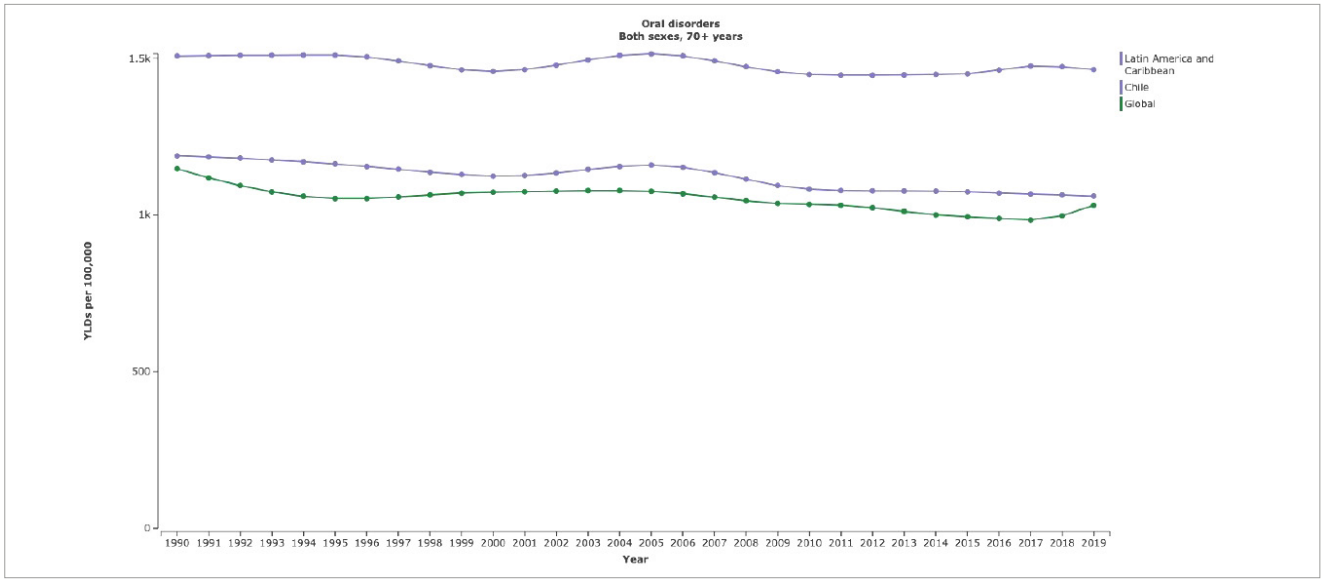

FIGURE 2. Trends of years lived with disability rates due to oral disorders among people aged > 70 years in Chile, the Latin America/Caribbean region, and globally between 1990 and 2019.

TABLE 2. Percentage change of oral disorders 1990-2019 in Chile, and Latin America/Caribbean Region by age groups.

	Chile			Latin America and the Caribbean		
	Untreated caries	Periodontal disease	Edentulism	Untreated caries	Periodontal disease	Edentulism
Age group						
65 – 69						
Prevalence	20.10	10.41	-16.91	-1.60	4.20	-4.30
Incidence	-5.09	1.09	-15.08	-0.10	-0.80	-4.50
YLD	19.87	10.32	-17.08	-1.50	4.30	-4.10
70 – 74						
Prevalence	21.85	12.32	-16.68	-2.40	4.90	-4.60
Incidence	-5.29	1.53	-12.20	0.20	-0.40	-3.90
YLD	21.52	12.11	-16.85	-2.20	5.20	-4.30
75 – 79						
Prevalence	22.67	13.63	-16.16	-2.10	5.80	-4.90
Incidence	-3.51	2.04	-9.85	-0.20	-0.20	-3.30
YLD	22.14	13.23	-16.46	-1.90	6.10	-4.50
80 – 84						
Prevalence	21.21	14.01	-15.57	-2.30	4.70	-3.90
Incidence	0.36	1.04	-7.07	-0.30	-0.10	-2.80
YLD	20.56	13.33	16.03	-1.90	5.10	-3.30
85 – 89						
Prevalence	18.05	13.44	-14.71	-2.90	3.90	-3.30
Incidence	5.33	0.53	-4.76	-0.20	-0.10	-2.70
YLD	17.61	12.60	-15.42	-2.50	4.50	-2.60
90 – 94						
Prevalence	11.90	11.76	-13.30	-6.40	3.10	-2.30
Incidence	9.55	0.00	-5.68	-1.40	0.00	-1.90
YLD	11.04	10.53	-14.33	-6.20	3.50	-1.80
> 94						
Prevalence	2.32	10.00	-11.79	-7.80	3.60	-2.50
Incidence	11.16	-0.57	-7.07	-3.10	0.20	-1.40
YLD	1.22	8.50	-13.04	-7.70	3.90	-2.10

YLD: years lived with disability.

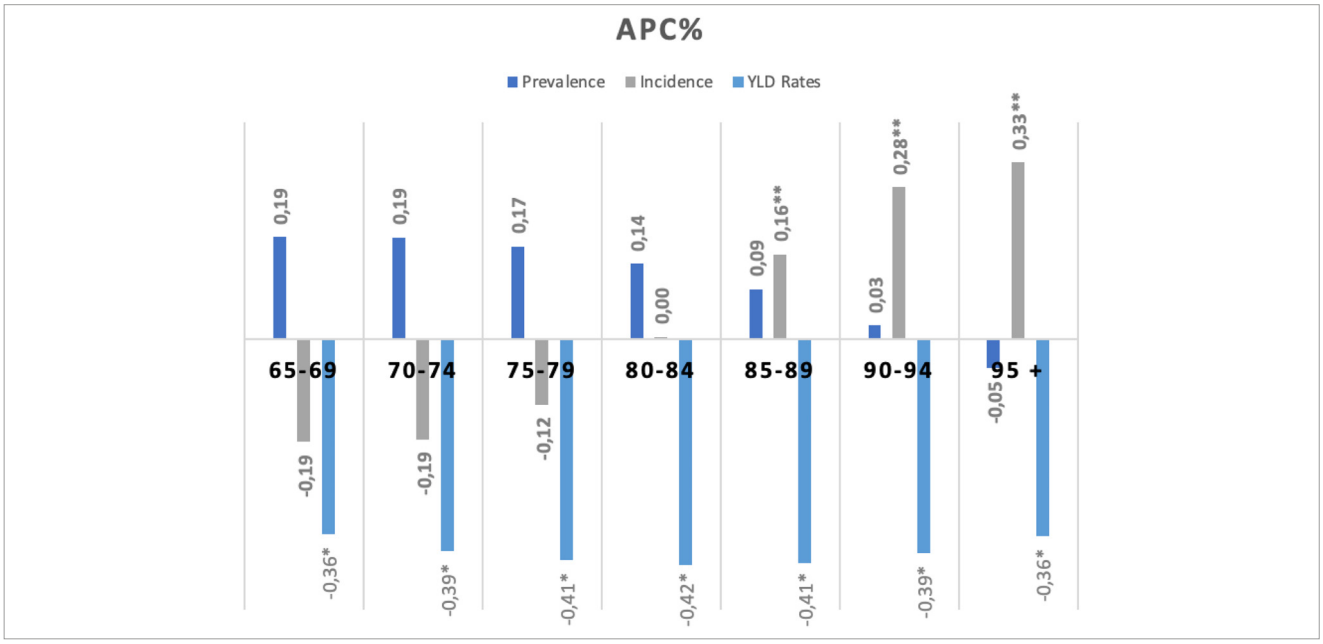

FIGURE 3. Annual percentage change of the prevalence, incidence, and years lived with disability rates for oral disorders according to age group in Chile from 1990 to 2019.

TABLE 3. Annual percentage change (95%CI) in the prevalence, incidence and years lived with disability due to untreated caries, periodontal disease, and edentulism among older Chilean according to age group between 1990 and 2019.

Age group			
65 – 69			
Prevalence	0.63 (0.01 – 1.24)*	0.24 (-0.19 – 0.67)	-0.63 (-0.74 – -0.52)†
Incidence	-0.18 (-0.40 – 0.04)	-0.02 (-0.25 – 0.21)	-0.55 (-1.22 – 0.13)
YLD	0.62 (0.01 – 1.23)*	0.23 (-0.19 – 0.66)	-0.64 (-0.74 – -0.53)†
70 – 74			
Prevalence	0.69 (0.01 – 1.37)*	0.31 (-0.08 – 0.71)	-0.62 (-0.84 – -0.40)†
Incidence	-0.19 (-0.48 – 0.10)	0.04 (0.00 – 0.08)	-0.44 (-0.74 – -0.13)†
YLD	0.68 (0.00 – 1.36)*	0.31 (-0.09 – 0.70)	-0.63 (-0.84 – -0.41)†
75 – 79			
Prevalence	0.71 (0.02 – 1.40)*	0.37 (0.06 – 0.69)*	-0.60 (-0.79 – -0.41)†
Incidence	-0.12 (-0.35 – 0.10)	0.08 (-0.02 – 0.17)	-0.33 (-0.48 – -0.19)†
YLD	0.69 (0.00 – 1.39)*	0.36 (0.04 – 0.68)*	-0.61 (-0.79 – -0.43)†
80 – 84			
Prevalence	0.67 (-0.01 – 1.35)	0.40 (0.17 – 0.64)*	-0.58 (-0.70 – -0.45)†
Incidence	0.01 (-0.12 – 0.14)	0.07 (-0.04 – 0.18)	-0.26 (-0.55 – 0.03)
YLD	0.65 (-0.03 – 1.33)	0.38 (0.15 – 0.62)*	-0.60 (-0.72 – -0.47)†
85 – 89			
Prevalence	0.58 (-0.11 – 1.27)	0.40 (0.23 – 0.57)*	-0.54 (-0.63 – -0.46)†
Incidence	0.18 (0.06 – 0.29)*	0.05 (-0.07 –0.16)	-0.21 (-0.56 – 0.14)
YLD	0.56 (-0.12 – 1.25)	0.37 (0.20 – 055)*	-0.57 (-0.66 – -0.49)†
90 – 94			
Prevalence	0.39 (-0.25 – 1.03)	0.36 (0.22 – 0.50)*	-0.49 (-0.57 – -0.41)†
Incidence	0.32 (0.07 – 0.57)*	0.03 (-0.08 – 0.13)	-0.21 (-0.55 – 0.14)
YLD	0.36 (-0.27 – 0.99)	0.32 (0.18 – 0.46)*	-0.53 (-0.61 – -0.45)†
> 94			
Prevalence	0.08 (-0.39 – 0.54)	0.31 (0.17 – 0.44)*	-0.42 (-0.53 – -0.31)†
Incidence	0.38 (0.02 – 0.74)*	-0.01 (-0.09 – 0.07)	-0.24 (-0.52 – 0.04)
YLD	0.04 (-0.42 – 0.50)	0.26 (0.10 – 0.42)*	-0.47 (-0.57 – -0.37)†

increasing trend; †decreasing trend. YLD: years lived with disability.

a caries prevalence of 57.20% in Chileans > 65 years of age,[5] whereas this study showed that by 2019, the younger group had a much higher prevalence than the older group: 54.80% vs. 23.85% respectively. This shows, on the one hand, the need for specific national oral health surveys, and, on the other, the dynamics and diversity of oral health during old age. Such information could facilitate more effective and better-tailored public health policies.[19]

This study's limitations include the availability of primary data, which are somewhat limited in Chile, resulting in greater uncertainty about the estimates. Moreover, the primary data used to generate the estimates were not obtained using the preferred case definitions or measurement methods for oral disorders.

CONCLUSIONS

As in most developed countries, older Chileans are experiencing an epidemiological transition in oral health. Our trend analysis found a shift from a high prevalence of edentulism in the 1990s to increased tooth retention accompanied by a higher prevalence of caries and periodontal disease in the 2010s. A radically different approach (ie, one that transforms how dental care is delivered) is now needed to address the increasing dental caries and periodontitis burden among older adults.[20] While Chile has significantly expanded access to dental care since the Explicit Health Guarantees were implemented in 2007, dental coverage is still insufficient for the needs of the growing older population. Bold action is urgently required to increase awareness of oral health's relevance to healthy aging, thus contributing to the World Health Organization's Decade of Healthy Aging (2020–2030). We must advocate national oral health surveys in order to obtain clear data to direct policy development, especially for older adults.

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Conflict of interest

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Author contributions

SL: conceptualization, data curation, funding acquisition, investigation, methodology, resources, supervision, validation, visualization, writing – original draft, writing – review & editing. **KGT:** formal analysis, methodology, software, validation, supervision. **MP:** investigation, methodology, software. **FS:** investigation, methodology, software. **JH:** investigation, methodology, software. **NK:** validation, supervision, visualization. **FNH:** data curation, methodology, software, supervision, validation, visualization, writing – review & editing.

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