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Negative impact of oral health conditions on oral health related quality of life of community dwelling elders in Mexico city, a population based study

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Aim: Oral health in old persons is frequently poor; non-functional prostheses are common and negatively affect quality of life. The objective of this study was to estimate the impact of oral health problems on oral health related quality of life in a sample of home dwelling Mexican elders.

Methods: Household survey in 655 persons 70 years old and over residing in one county in Mexico City.

Variables: Oral Health Related Quality of Life (Short version of the Oral Health Impact Profile validated in Mexico-OHIP-14-sp), self-perception of general and oral health, xerostomia, utilization of dental services, utilization and functionality of removable dental prostheses, dental and periodontal conditions, age, gender, marital status, schooling, depression, cognitive impairment and independence in activities of daily living (ADL). A negative binomial regression model was fitted.

Results: Mean age was 79.2 ± 7.1 years; 54.2% were women. Mean OHIP-14-Sp score was 6.8 ± 8.7, median was 4. The final model showed that men (RR = 1.30); persons with xerostomia (RR = 1.41); no utilization of removable prostheses (RR = 1.55); utilization of non-functional removable prostheses (RR = 1.69); fair self-perception of general health (RR = 1.34); equal (RR = 1.43) or worse (RR = 2.32) self-perception of oral health compared with persons of the same age; and being dependent for at least one ADL (RR = 1.71) increased the probability of higher scores of the OHIP-14-sp. Age, schooling, depression, cognitive impairment and periodontal conditions showed no association.

Conclusions: Oral rehabilitation can improve quality of life, health education and health promotion for the elder and their caregivers may reduce the risk of dental problems. **Geriatr Gerontol Int 2016; ••: ••–••.**

Keywords: aged, health survey, periodontitis, quality of life, xerostomia.

Introduction

Caries and periodontal diseases are highly prevalent and are the main causes of tooth loss among the elderly.[1] Oral health problems are associated with changes in food selection, decreased quality of nutrition and quality of life[2,3].

The oral health of elders reflects the accumulation of previous chronic and acute conditions, such as caries, periodontitis and trauma. The most frequently reported oral conditions among the elderly are tooth loss, coronal and root caries, periodontal diseases, xerostomia (perception of dry mouth), oral mucosal lesions and decreased masticatory efficiency resulting from tooth loss. [2]

The prevalence of edentulism among those >65 years of age in Mexico is 30.6% according to results of the National Performance Evaluation Survey.[4] A study of individuals 60 years and older in three different locations in Mexico found 57% prevalence of moderate and severe periodontitis among inner-city residents, a 73.3% prevalence among those living in the suburbs and a 29.4% prevalence among those in a rural location in Central Mexico, arguing such differences due to differences in lifestyle, diet and overall health among urban and rural populations. [5]

Since mouth and structures are important for functioning and daily living there are several studies approaching to the impact of oral health on quality of life.

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Persons with xerostomia in cross-sectional and longitudinal studies have shown higher scores in the Oral Health Impact Profile (OHIP), representing a poorer Oral Health Related Quality of Life (OHRQoL).[6–8]

Tooth loss impacts the quality of life of older adults. Somsak in Thai elderly, and Jensen in the United States, found that people with <20 functional teeth and <17 teeth respectively had worse OHRQoL. In Australia missing teeth were associated with poor OHRQoL. [9–11]

In relation to the utilization of removable prostheses, Perea et. al., in Spain found that persons with defective dentures and those who need removable prostheses had higher OHIP scores, similar results were obtained in Brazil. [12,13] Cornejo et. al., in old Spaniards, found that poor OHRQoL was associated with the need for upper dentures, and bad perception of oral health.[14]

Regarding periodontal status, a study in elders in China found that persons with teeth and loss of attachment ≤6 mm had better OHRQoL.[15] Durham et.al., in the UK, compared OHRQoL between persons (mean age 47 years) with and without periodontitis, and observed that periodontally healthy persons had better OHRQoL. [16]

Studies carried out in Australia, Spain, Korea and Iran agree that there is an association between bad self-perception of oral health and poor OHRQoL. [11,14,16]

On the other hand, Jensen et. al., in the USA and Andrade in Brazil reported that poor self-rated general health was associated with poor OHRQoL[9,12]

The aim of the present study was to estimate the impact of oral health conditions on oral health related quality of life among a sample of home dwelling elders 70 years and older from one district in Mexico City.

Methods

Population and sample

This report is the analysis of the baseline data from the cohort study "Nutritional and Psychological Markers of Frailty". The study population consisted of 33 347 persons living independently in Coyoacán, one district of Mexico City. All persons received support from the government program "Food Support, Medical Care, and Free Drugs Program" (FMDP), that includes 95% of persons ≥70 years. [17]

The sample was chosen by random sampling, stratified by age and gender, the sample size reliably estimated a prevalence rate of frailty of at least 14% (α = 5%, β = 20%) (n = 1294). [17]

Baseline data were collected on two visits to the homes of participants. In the first visit, an interview was conducted; during the second visit, a clinical (medical and dental) evaluation was carried out. The Ethical Committee of the National Institute of Medical Sciences and Nutrition approved the study protocol (INCMNSZ Ref.1679; Mar/2007). Each participant provided informed consent.

To be eligible, participants had to be 70 years and older; reside in Coyoacán; not being institutionalized, and being registered at the FMDP.

From the eligible sample (1294) the acceptance rate was 86.9%. A total of 1124 persons were included. All participants with complete data for this study (n = 655) were included in the present report.

Variables

Age in years and grouped (70-79, 80-89, ≥90), gender (male/female), marital status (single/married-cohabiting/divorced-separated/widowed), years of schooling (0 /1-6 / 7-9 / 10-12 / >13 years), self-perception of general health (good/fair/bad), self-perception of oral health compared with others of the same age (better/same/worse), Xerostomia was defined as the positive answer to the question "Commonly ¿your mouth feels dry? (yes, always/ yes, only when I take medication / yes, sometimes)", utilization of dental services was the positive answer to the question "Have you received dental care in the past 12 months? and when the participants answered "one year" to the question ¿when was the last time you visited the dentist?,[18] use and functionality of removable partial and complete dentures (no need [≥25 teeth]/need but do not use/use and functional/use and non-functional) and dental and periodontal status (healthy/gingivitis and calculus /moderate periodontitis/severe periodontitis/ edentulous). Depression (Geriatric Depression Scale)[19] (0-4 = no depression/ 5-10 = suggestive of mild depression / ≥11 = suggestive of severe depression), Cognitive impairment (Minimental State Examination)[20] (≤23 impairment / 24-30 no impairment) and functional dependence measured with the Katz Index of Independence in Activities of Daily Living (ADL)[21] (0 = independent / ≥1 = dependent for at least one activity). OHRQoL was measured with the short version of the Oral Health Impact Profile validated in Mexico (OHIP-14-Sp).[22]

The functionality of dental prostheses was measured using Ettinger's criteria, evaluating stability, retention, extension and integrity of the prostheses. [23] Those prostheses that failed in any of these criteria and those not worn on a daily basis were classified as non-functional.

Dental and Periodontal conditions were assessed with a modified version of the Periodontal Screening and Recording Index, measuring the clinical level of probing depth for each tooth. Edentulism was included (absence of all teeth) (Table 1).

The participants were visited by an interdisciplinary and standardized team (a physician, a nutritionist and a dentist). The persons underwent a geriatric evaluation including functional status, depression, cognitive impairment, oral conditions and anthropometry.

Four final year students of the Dental School at the National Autonomous University of Mexico were standardized in the periodontal evaluation (kappa = 0.7)

Table 1 Classification of dental and periodontal conditions by teeth and by participant

Teeth Classification	
Healthy	The dark band of the probe is completely visible in the deepest point of the sulcus. There is no gingival recession beyond the dark band in every site probed.
Gingivitis or calculus	The dark band of the probe is completely visible in the deepest point of the sulcus. There is no gingival recession beyond the dark band in every site probed. There is bleeding on probing and/or calculus is detected supra or subgingival in at least one site.
Moderate periodontitis	The dark band of the probe is partially visible in the deepest point of the sulcus in at least one site. There is no gingival recession beyond the dark band in every site probed.
Severe periodontitis	The dark band of the probe is not visible in the deepest point of the sulcus in at least one site; or The dark band of the probe is partially visible in the deepest point of the sulcus in at least one site and showed recession that extend beyond the dark band in at least one site; or The dark band of the probe is completely visible in the deepest point of the sulcus and shows gingival recession that extent beyond the dark band of the probe; Or/and furcation is affected
Participants classification	
Healthy	When all teeth present were classified as healthy
Gingivitis or calculus	When at least one tooth was classified as gingivitis or calculus, but none was classified as moderate or severe periodontitis
Moderate periodontitis	When at least one tooth was classified as moderate periodontitis, but none was classified with severe periodontitis
Severe periodontitis	When at least one tooth was classified as severe periodontitis
Edentulous	When no teeth were present in both jaws

and in the evaluation of dental prosthesis (kappa = 0.9). Clinical evaluations were performed in a portable chair using artificial light, a #5 dental mirror and a PCP11.5 probe (Hu-Friedy®, Chicago, IL, USA). Infection control procedures were followed.

Analysis

We calculated the prevalence of oral conditions. Univariate analysis was performed using parametric (Students T Test, and ANOVA) and non-parametric tests (Chi-square, Mann-Withney and Kruskal-Wallis tests) to assess the association between all variables and the OHIP-14-Sp score. To establish significant associations between the independent variables and poor OHRQoL a negative binomial regression model was fitted. The independent variables were sex, age, schooling, dental and periodontal condition, xerostomia, use and functionality of removable prosthesis, self-perception of oral health and self-perception of general health, cognitive impairment, depression and functional dependence. A *P*-value of 0.05 was used as a threshold for statistical significance, and 95% confidence intervals were calculated. Stata software was used (StataCorp. 2013. *Stata Statistical Software*: *Release 13*. College Station, TX: StataCorp LP.)

Results

A total of 655 people were interviewed and clinically examined. Mean age was 79.2 ± 7.1 years; 54.2% were women. Half of the women (52.5%) were widowed and 65.7% of men were married; 42.8% of men and 45.7% of women had 1 to 6 years of schooling. The sociodemographic distribution of the sample is presented in Table 2.

The scores for the OHIP-14-Sp were: mean, 6.8 ± 8.7; median, 4; range, 0-43. No differences were found in the scores by gender, age group and marital status (median = 4). Persons with no schooling had a higher OHIP-14-Sp score (median = 5) than persons with >13 years of schooling (median = 2), the differences were statistically significant (P = .002) (Table 3).

Almost half of the participants (46.5%) rated their general health as "good", 35.0% rated it "fair" and 3.2% as "bad", those with bad self-perception had a higher score (median = 6) than those with good self-perception (median = 2) ($P < 0.001$) (Table 3).

Among the participants, 36.7% rated their oral health "better", 35.0% rated "the same" and 9.2% "worse than others of the same age". Those who rated their oral health worse had higher OHIP-14-Sp scores (median 13) than the other categories ($P < 0.001$) (Table 3).

Table 2 Distribution of sociodemographic characteristics by gender and age group. Persons 70 years and older residing in one district (Coyoacan) in Mexico City

Variables	Gender (%)		Age group (%)			Total n (%)
	Male	Female	70 - 79	80 - 89	≥90	
N	300 (45.8)	355 (54.2)	397 (60.6%)	183 (27.9%)	75 (11.5%)	655
Mean age (years)						
$\bar{x}$ (SD)	79.0 (5.9)	79.4 (7.4)				79.2 (7.1)
	F = .66, p = 0.415					
Marital status (n = 654 [one person gave no information about marital status])						
Single	12 (4.0)	34 (9.6)	26 (6.5)	12 (6.6)	8 (10.7)	46 (7.0)
Married or cohabiting	197 (65.7)	101 (28.6)	216 (54.5)	65 (35.7)	17 (22.7)	298 (45.6)
Divorced or separated	15 (5.0)	33 (9.3)	31 (7.8)	11 (6.0)	6 (8.0)	48 (7.3)
Widowed	76 (25.3)	186 (52.5)	124 (31.2)	94 (51.7)	44 (58.6)	262 (40.1)
Total (n)	300 (100)	354 (100)	397 (100)	182 (100)	75 (100)	
	$X^2 = 90.5$, $p < 0.001$		$X^2 = 41.79$, $p < 0.001$			654 (100)
Years of Schooling (n = 647 [8 persons gave no information about schooling])						
No schooling (0 years)	43 (14.5)	72 (20.6)	57 (14.4)	42 (23.1)	16 (23.3)	115 (17.8)
1-6 years	127 (42.8)	160 (45.7)	185 (46.8)	69 (37.9)	33 (47.8)	287 (44.4)
7-9 years	39 (13.1%)	48 (13.7)	56 (14.1)	25 (13.7)	6 (8.7)	87 (13.4)
10-12 years	28 (9.4)	35 (10.0)	44 (11.1)	16 (8.8)	3 (4.3)	63 (9.7)
>13 years	60 (20.2)	35 (10.0)	54 (13.6)	30 (16.5)	11 (15.9)	95 (14.7)
Total (n)	297 (100)	350 (100)	396 (100)	182 (100)	69 (100)	647 (100)
	$X^2 = 15.1$, $p = 0.004$		$X^2 = 14.0$, $p = 0.081$			

Regarding the use of dental services, 45.6% of the participants had visited the dentist in the previous year. The median OHIP-14-Sp scores were similar between users and non-users (Table 3).

The overall prevalence of xerostomia was 43.6%. 23 participants (3.5%) reported dry mouth when taking medications. Those who reported xerostomia had a higher OHIP-14-Sp score (median = 6) than those with no xerostomia (median =2; $P < 0.001$) (Table 3).

Prevalence of mild and severe depression was 88.6% and 5.4% respectively, no differences were observed among the median OHIP-14-Sp scores; 36.2% of the participants were dependent for at least one activity of daily living, the OHIP-14-sp value was higher (median = 6) than that of the independent participants (median = 2) (P < .001). Participants with cognitive impairment (29%) had higher values of the OHIP-14-sp (median = 4) than those with no cognitive impairment (median = 3) (P = .004) (Table 3).

The mean number of teeth was 11.0 ± 9.3. Data on the use and functionality of removable partial or complete dental prostheses were as follows: 9.5% did not need dental prostheses, 35.4% needed but did not use prostheses, 17.7% wore functional prostheses and 37.4% wore non-functional prostheses. The OHIP-14-Sp score was higher for those not wearing but in need for dental prostheses (median = 4.1) and those using non-functional prostheses (median = 4); ($P < 0.001$) (Table 4).

A low percentage of the participants was periodontally healthy (9.0%), the prevalence of gingivitis and calculus was 27.6%, of moderate periodontitis was 33.7%, of severe periodontitis was 6.3% and of edentulism 23.4%. No differences in median values were observed ($P = 0.305$) (Table 4).

A negative binomial regression was fitted. No multicollinearity was detected among the independent variables. The model showed that men (RR = 1.30, 95% CI 1.03 – 1.64); those with xerostomia (RR = 1.41, 95% CI 1.11 – 1.78); those who considered their oral health equal (RR = 1.43, 95%CI 1.13 – 1.83) or worse (RR = 2.32, 95%CI 1.56 – 3.45) compared with persons of the same age, with a fair self-perception of general health (RR = 1.34, 95%CI 1.05 - 1.70), persons needing but not wearing removable prostheses (RR = 1.55, 95% CI 1.00 – 2.39), or wearing non-functional removable prosthesis (RR = 1.69, 95%CI 1.08 – 2.65), and being dependent for at least one activity (RR = 1.71, 95%CI 1.34 – 2.21) had higher mean scores of the Oral Health Impact Profile. Age, schooling, depression, cognitive impairment and periodontal conditions showed no association (Table 5).

Discussion

In this study we found that xerostomia and the need for removable prosthesis, the use of non-functional

Table 3 Self-perception of general and oral health, utilization of dental services in the previous year and prevalence of xerostomia by gender and age group, and median values of OHIP-14-Sp. Persons 70 years and older residing in one district (Coyoacan) in Mexico City

Variables		OHIP-14			
	N(%)	Mean (SD)		median	
Gender					
Male	300 (45.8%)	6.9 (8.5)		4	
Female	355 (54.2%)	6.7 (8.9)		4	
Total	655	6.8 (8.7)	T (p = .826)	4	M-W (p = .553)
Age group					
70-79	397 (60.6%)	6.8 (8.6)		4	
80-89	183 (27.9%)	7.3 (9.5)		3	
≥90	75 (11.5%)	6.1 (7.3)		4	
	655 (100%)	6.8 (8.7)	F (p = .556)	4	K-W (p = .921)
Marital status (one person gave no information)					
Single	46 (7.0%)	7.4 (9.0)		4	
Married or cohabiting	298 (45.6%)	6.6 (8.6)		3.5	
Divorced or separated	48 (7.3%)	6.2 (8.8)		2	
Widowed	262 (40.1%)	7.1 (8.8)		4	
Total (n)	654 (100%)	6.8 (8.7)	F (p = .852)	4	K-W (p = .639)
Years of schooling (eight persons gave no information)					
No schooling (0 years)	115 (17.8%)	9.2 (10.4)		5	
1-6 years	287 (44.4%)	6.8 (8.6)		4	
7-9 years	87 (13.4%)	6.8 (8.3)		4	
10-12 years	63 (9.7%)	7.2 (9.4)		4	
>13 years	95 (14.7%)	3.9 (5.9)		2	
Total (n)	647 (100%)	6.9 (8.8)	F (p = .001)	4	K-W (p = .002)
How would you rate your general health					
Good	305 (46.5%)	4.8 (7.1)		2	
Fair	229 (35.0%)	8.5 (9.5)		5	
Bad-very bad	21 (3.2%)	11.9 (12.6)		6	
No data	100 (15.3%)	8.3 (9.0)		4	
Total (n)	655 (100)	6.8 (8.7)	F (p < .001)	4	K-W (p < .001)
Self-perception of oral health compared with persons of the same age					
Better	241 (36.7%)	4.7 (6.7)		2	
The same	229 (35.0%)	6.4 (8.1)		4	
Worse	60 (9.2%)	15.3 (12.0)		13	
Doesn't know	25 (3.8%)	5.4 (8.2)		2	
No data	100 (15.3%)	8.3 (9.0)		4	
Total (n)	655 (100%)	6.6 (8.7)	F (p < .001)	4	K-W (p < .001)
Utilization of dental services in the past 12 months					
Yes	299 (45.6%)	6.9 (9.2)		3	
No	356 (54.4%)	6.8 (8.3)		4	
Total (n)	655 (100%)	6.8 (8.7)	F (p = .841)	4	M-W (p = .530)
Xerostomia (two persons gave no information)					
No	368 (56.4%)	4.9 (6.8)		2	
Yes	285 (43.6%)	9.4 (10.1)		6	
Total (n)	653 (100%)	6.8 (8.7)	T (p < .001)	4	M-W (p < .001)
Depression (GDS) (3 participants gave no information)					
No depression	39 (6.0%)	7.4 (10.1)		2	
Mild depression	578 (88.6%)	6.6 (8.4)		4	
Severe depression	35 (5.4%)	10.1 (11.4)		5	
Total	652 (100%)	6.9 (8.7)	F (p = .067)	4	K-W (p = .067)

(*Continues*)

Table 3 (Continued)

Variables				OHIP-14	
Functional dependence (Katz index)					
Independent for all activities	418 (63.8%)	5.4 (7.5)		2	
Dependent for at least one activity	237 (36.2%)	9.4 (10.0)		6	
Total	655 (100%)	6.8 (8.7)	T ($p < .001$)	4	M-W ($p < .001$)
Cognitive impairment (MMSE) (51 persons gave no information)					
No	429 (71.0%)	5.9 (7.9)		3	
Yes	175 (29.0%)	8.2 (9.4)		4	
Total	604 (100%)	6.6 (8.4)	T ($p = .002$)	4	M-W ($p = .004$)

removable dental prostheses, being male, having fair self-perception of general and equal or worse self-perception of oral health were associated with higher scores of OHIP-14-Sp. Besides, participant's dependent on more than one ADL showed worse OHRQoL.

Regarding xerostomia, one study found higher risk estimations (OR = 2.55), and other study similar estimates (OR = 1.30) to those in this analysis (RR = 1.41).[6,7] Even when xerostomia is a subjective perception of dry mouth which not necessarily indicates a salivary gland hypofunction, it has an impact on quality of life, halitosis, problems swallowing or talking have been reported in persons with xerostomia. [24] Although we did not register all the medications taken by the participants, 3.5% reported dry mouth when taking medications. A systematic review concluded that salivary flow is reduced in older adults, and could not be explained by the use of drugs. [25]

About the use and functionality of removable dental prosthesis, those needing but not wearing removable dental prostheses and those wearing non-functional prostheses had higher scores of OHIP-14-Sp than those who did not need prostheses (>25 teeth). The problems associated with non-functional prostheses include impaired chewing ability, oral mucosal lesions, root caries and tooth mobility, impacting several dimensions of the OHIP.[22] Several studies found that problems with removable prosthesis in denture and non-denture wearers and the type of removable prosthesis have an impact on OHRQoL.[12–14] Besides, effective prosthetic treatment has demonstrated to improve OHRQoL.[26]

On the other hand, persons with >25 teeth had better OHRQoL than persons needing or with defective removable prosthesis, but showed no differences with those wearing functional removable prosthesis. Having all functional teeth is the goal of oral health, but when this

Table 4 Distribution of oral health conditions by gender and age group, and median values of OHIP-14-Sp. Persons 70 years and older residing in one district (Coyoacan) in Mexico City

Variables			OHIP-14-Sp
	N(%)	Mean (SD)	median
Utilization and functionality of removable partial and complete dentures			
No need (≥25 tooth)	62 (9.5%)	4.3 (5.5)	2
Do not use but needs	232 (35.4%)	8.1 (9.4)	4.1
Use functional	116 (17.7%)	4.9 (7.4)	2
Use non functional	245 (37.4%)	7.1 (9.1)	4
Total	655 (100%)	6.8 (8.7)	4
		F ($p = .001$)	K-W ($p < .001$)
Dental and Periodontal conditions			
Healthy	59 (9.0%)	5.7 (7.9)	2
Gingivitis and calculus	181 (27.6%)	8.0 (9.8)	4
Moderate periodontitis	221 (33.7%)	6.3 (7.9)	3
Severe periodontitis	41 (6.3%)	7.6 (9.1)	4
Edentulous	153 (23.4%)	6.5 (8.5)	3
Total	655 (100%)	6.8 (8.7)	4
		F ($p = .236$)	K-W ($p = .305$)

Table 5 Negative binomial regression model. Orla Health Related Quality of Life controlling for gender, age, schooling, use and functionality of removable prosthesis, xerostomia, periodontal conditions, self-perception of general health, self-perception of oral health, depression, cognitive impairment and functional dependence. (n = 590)

OHIP-14-Sp	RR	P	95% CI
Gender			
Female	1		
Male	1.30	.030	1.03-1.64
Xerostomia			
No	1		
Yes	1.41	.004	1.11-1.78
Self-perception of oral health compared to others same age			
Better	1		
The same	1.43	.003	1.13-1.83
Worse	2.32	.000	1.56-3.45
Does not know	1.12	.688	.63-1.99
Age	.99	.213	.97-1.01
How would you rate your general health			
Good	1		
Fair	1.34	.016	1.05-1.70
Bad	1.57	.114	.89-2.76
Dental and Periodontal conditions			
Healthy	1		
Gingivitis and calculus	1.09	.699	.71-1.67
Moderate periodontitis	.95	.809	.62-1.44
Severe periodontitis	1.01	.965	.55-1.87
Edentulous	.98	.922	.91-3.13
Utilization and functionality of removable partial and complete dentures			
No need (≥25 tooth)	1		
Do not use but needs	1.55	.048	1.00-2.39
Use functional	1.18	0.501	.73-1.89
Use non functional	1.69	.021	1.08-2.65
Cognitive impairment (MMSE)			
No	1		
Yes	1.22	.219	.89-1.66
Years of schooling			
No schooling (0 years)	1		
1-6 years	1.26	.231	.86-1.84
7-9 years	1.23	.373	.78-1.96
10-12 years	1.29	.294	.80-2.10
>13 years	.88	.594	.56-1.39
Depression (GDS)			
No depression	1		
Mild depression	1.13	.603	.71-1.82
Severe depression	1.70	.195	.76-3.82
Functional dependence (Katz index)			
Independent for all activities	1		
Dependent for at least one activity	1.71	.000	1.34-2.21

RR: Rate Ratio; CI: Confidence Interval

cannot be achieved, wearing a functional prosthesis may improve oral health and OHRQoL.

Concerning periodontal conditions, no association was found between the presence or severity of periodontal diseases and poor OHRQoL. Two studies found that periodontal problems have a negative impact, and one study found no association with OHRQoL.[11,15,27] Gingivitis and moderate periodontitis (prevalence 61.3%) are often asymptomatic conditions. Besides, the onset of severe periodontitis occurs in younger ages, and

people who had severe periodontitis may already be edentulous.

With regard to self-perception of oral health, those who felt that their oral health was the same (RR = 1.43) as or worse (RR = 2.32) than others of the same age had poorer OHRQoL. This is a consistent result in several studies.[11,14] In Brazil, a similar ratio (PR = 2.49) was found in independent elderly with poor self-perception of oral health.[28] Self-perception of oral health is a complex variable that links diverse dimensions of health, representing the trajectory of health, probably reflected in the OHRQoL.[29]

Rating general health as fair was associated with poor OHRQoL. This association has previously been reported for those rating their general health poor in a similar community-dwelling population with the same mean age (79 years).[9] This might be an expression of the association between oral and general health. [30]

Concerning gender, the OHIP-14-Sp score was higher among men. Results are not consistent among studies. Some report higher scores among women,[11,28] some found no differences,[12] and one study found higher scores among men in the general population and higher scores in women in a patient population.[31] We could assume that men in our study had higher prevalence of other dental problems not assessed in our study (coronal or root caries). Also, women use more dental services, and the no utilization or utilization of non-functional prostheses is associated with lack of dental care, the differences by gender may be due to the use of long-term dental services by women.

In relation to age, we did not find differences in OHIP-14-Sp scores. A study of institutionalized people (mean age 82) found no association with OHRQoL.[32] Probably the dental conditions of this population (mean age 79) may not have changed significantly over the years, and persons may have adapted.[33]

Among the three confounding variables (depression, cognitive impairment and dependence on ADL), only dependence on ADL was associated with poor OHRQoL. Probably, dependence on ADL also hinder oral hygiene practices and utilization of dental services. Furthermore, it is likely that dependent persons are helped by caregivers who do not perceive that the person has oral health problems. Meaning that there is a need for oral health education and training (on oral and denture hygiene practices, identification of ill prostheses, of oral mucosal lesions, caries, root remains) for the elders and their caregivers, whether they are at home or institutionalized.

Limitations of the study

A limitation of this study is the reduction in the sample size (655/1124), which prevents the results to generalize to the study population and introduces selection bias. Also we did not measure the presence or severity of coronal and root caries, and did not record the condition of pillars for removable prostheses (information bias). These conditions can produce discomfort and pain affecting OHIP-14-Sp scores. We must highlight that we measured xerostomia (subjective measurement), which is not necessarily accompanied by a reduction in salivary flow. However, we found that xerostomia has a deleterious effect on quality of life[24]. In contrast, some of the responses for depression, cognitive impairment and functional dependence were obtained by a proxy measurement, which may underestimate or overestimate the condition of the participant.

Even when the sample decreased, we consider that these results can be an approach to the oral health conditions of this and other elder household populations in Mexico City. A strength is that clinical variables were assessed by standardized dental examiners, increasing validity of the evaluation.

It is important to encourage good oral and prosthesis hygiene. To repair or replace removable prosthesis will improve chewing ability, decrease the risk of infections and lesions in the oral mucosa and prevent tooth loss. Health education programs for the elderly and their caregivers can be promoted either at health centers or institutions, this will improve oral health, OHRQoL and general wellbeing (better feeding practices). Health care professionals should take into account the impact of oral health conditions on quality of life of their patients.

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Disclosure statement

The authors declare no conflict of interest.

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