

Impact of social marginalization on oral health-related quality of life in older adults

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Abstract: The aim of this study was to determine the association between oral health-related quality of life (OHRQoL) and social marginalization in people aged 60 years and older enrolled in social security in Mexico. A cross-sectional and analytical study was carried out in older adults. To assess the OHRQoL, the OHIP-14 instrument was applied, and the degree of social marginalization and sociodemographic characteristics were analyzed. Measures of central tendency and dispersion, simple frequencies and proportions were estimated. Student's t-test was used for comparison of means, and prevalence ratio (PR) and logistic regression were used to assess associations, all with a significance value of 0.05 and 95% confidence intervals. Perceived OHRQoL in the population measured through the OHIP-14 reached an average value of 9.84 ± 8.91 , with the highest value in the dimension of physical pain (2.06 ± 1.91). Perceived treatment need was higher among people with social marginality ($p = 0.011$). The multivariate analysis shows that marginalized people have a lower OHRQoL. Socially marginalized older adults showed a low a better perception of OHRQoL, independent of demographic and clinical factors.

Keywords: Oral Health; Tooth Loss; Adult; Quality of Life; Social Determinants of Health.

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Introduction

The World Health Organization (WHO) recognizes that the burden of oral disease is particularly high in the poorest and most vulnerable populations in both developed and developing countries.¹

Edentulism and other oral pathologies are considered global public health problems because these pathologies manifest in pain, chewing problems, loss of function, and esthetic problems that impact the overall health and quality of life of individuals.^{1,2} Oral health is therefore an important predictor of subjective well-being later in life.³

McGrath and Bedi point out that better oral health is associated with higher dental care attendance. Additionally, a relationship has been observed between the number of functional natural teeth and quality of life in the elderly population⁴ and socioeconomic conditions have been shown to be associated with the

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prevalence of edentulism among adults with the worst living conditions.^{5,6}

Although there is evidence of the relationship between socioeconomic conditions and oral health,^{7,8} this field has not been systematically studied in Mexico. Therefore, the objective of the present study was to determine the association between oral health-related quality of life (OHRQoL) and social marginality in people aged 60 years and older who are covered by social security in Mexico.

Methodology

A cross-sectional analytical study was conducted on 370 adults aged 60 years and older who were assigned to a medical unit of the Mexican Institute of Social Security in Mexico City from January to December 2020. After authorization by the local research committee, written informed consent was requested from the participants and an oral examination was performed by a qualified dentist.

For calculating the minimum sample size, an expected proportion of 87% was considered, which has been previously reported by Bellamy and Moreno.⁷ The calculated sample size was 173 adults aged 60 years and older, and to account for a loss of 10%, the final sample size was 190 individuals.

Systematic sampling was performed and the sampling interval was calculated by dividing the number of eligible individuals in the sampling frame by the specific sample size (n): $52820/190 = 3.5$. The first patient was chosen at random and from that point on, every 4th adult in the age group of interest who attended the medical unit during the study period was selected successively.

Tooth loss was identified as the absence or loss of a permanent tooth, either by its fall or its extraction, with the number of teeth present recorded, and the participant was classified as having a dysfunctional dentition when they had fewer than 20 teeth.⁹

The participants were asked about self-perceived need for treatment and use of dental prostheses. To determine the OHRQoL, the Oral Health Impact Profile 14 (OHIP-14) instrument was applied and functional limitation (difficulty in chewing), physical pain (tooth sensitivity), psychological discomfort,

physical disability (changes in diet), psychological disability, social disability (avoidance of social interaction), and handicap were evaluated. Each dimension is made up of two questions and a higher score represents a lower OHRQoL. Variables such as age, sex, level of schooling, perceived need for oral treatment, use of prostheses, and history of diabetes and hypertension were also recorded. Educational level was considered low when people had secondary education or less.

Social marginality was classified according to the domicile of the participants classification reported by the Secretary of Inclusion and Social Welfare of Mexico City at the block level. Those living in areas of very low and low marginality were the group with the best social conditions and were classified as having no marginality, while the rest of the participants were considered as having social marginality.¹⁰

An exploratory data analysis was performed for the distribution of the study population; measures of central tendency and dispersion, simple frequencies, ratios, and proportions were estimated. Normality tests were performed for quantitative variables, and according to the type of distribution, Student's *t*-test and Levene's test for data with normal distribution or Mann-Whitney U test for data that did not have a normal distribution were applied to compare means. Mantel-Haenszel chi-square tests and odd ratio (OR) with 95% confidence intervals (95%CI) were calculated for categorical data. Finally, a multivariate analysis was performed using logistic regression, classifying the value of the OHIP-14 into two groups, taking the 50th percentile as the cut-off point and contrasting the variables according to the marginality condition. The data were analyzed with the SPSS version 25.

Results

A total of 370 adults were studied, of whom 155 (41.9%) were men and 215 (58.1%) were women. The average age was 73 years; no age differences were found between men and women ($p = 0.43$). Of the population studied, 74.6% had a low level of education, while 25 older adults were illiterate, representing 6.8% of the population studied. Among the comorbidities

studied, 71.6% had hypertension and 147 (39.7%) had diabetes. People with marginalization accounted for 62.7% of the population studied.

The average number of teeth was 16.2 (standard deviation = 9.96), 98.6% of participants had at least one lost tooth and 15.1% were edentulous. The presence of a functional dentition, understood as the presence of 20 or more teeth, occurred in 53.5% of the people studied and 56.8% reported using some type of dental prosthesis. A total of 52.4% of the persons interviewed reported perceived need for treatment.

Regarding the presence of functional dentition, no statistically significant differences were found between men and women. People living

with hypertension were 39% more likely to have dysfunctional dentition than those without hypertension; this association was not statistically significant (95%CI = 0.88–2.19).

Those living with diabetes were 22% more likely to have dysfunctional dentition than non-diabetics (95%CI = 0.80–1.85). The analysis by level of schooling was not associated with the presence of functional dentition (95%CI = 0.80–2.04) (Table 1).

The dimension of the OHIP-14 with the highest value was physical pain followed by psychological discomfort, functional limitation, physical disability, psychological disability, and social disability; the lowest value was for the handicap dimension (Table 2).

Table 1. Characteristics of the population according to functional dentition.

Characteristics	Functional dentition		No functional dentition		OR	95%CI
	N	%	N	%		
Sex						
Male	73	47.1	82	52.9	1.04	0.70–1.57
Female	99	46.0	116	54.0		
Age (years)						
70 and more	110	44.0	140	56.0	1.36	0.88–2.10
60 to 69	62	51.7	58	48.3		
Hypertension						
Yes	117	44.2	148	55.8	1.39	0.88–2.19
No	55	52.4	50	47.6		
Diabetes						
Yes	64	43.5	83	56.5	1.22	0.80–1.85
No	108	48.4	115	51.6		
Need for treatment						
Yes	94	48.5	100	51.5	0.85	0.56–1.27
No	78	44.3	98	55.7		
Use of prosthesis						
Yes	80	38.1	130	61.9	2.20	1.45–3.34
No	92	57.5	68	42.5		
Educational level						
Low	124	44.9	152	55.1	1.28	0.80–2.04
Hight	48	51.1	46	48.9		
Marginality						
Yes	106	45.7	126	54.3	1.09	0.71–1.66
No	66	47.8	72	5.2		

OR: Odds ratio; 95%CI: 95% Confidence interval.

No differences were found in total OHIP-14 score according to the functionality of dentition. The results for the analysis of OHIP-14 dimensions according to dental functionality are shown in Table 2.

The items “Have you ever felt pain in your mouth?” and “Are you worried about problems in

your mouth?” had a greater impact among those who are socially marginalized compared to those who are not marginalized. The inability to perform daily activities due to problems with teeth, mouth or dentition was approximately twice as high among marginalized people ($p = 0.011$) (Table 3).

Table 2. Distribution of OHIP-14 scores by domain and type of dental functionality.

Type of dental functionality	Mean	Standard deviation	Median	Interquartile rank	p-value*
Functional limitation					
Both	1.81	2.00	1.00	3.00	0.144
Functional	1.93	1.95	2.00	4.00	
Non-functional	1.70	2.05	1.00	3.00	
Physical pain					
Both	2.06	1.91	2.00	3.00	0.377
Functional	2.13	1.88	2.00	4.00	
Non-functional	2.00	1.94	2.00	3.00	
Psychological pain					
Both	1.85	1.95	2.00	3.00	0.623
Functional	1.75	1.76	2.00	3.00	
Non-functional	1.95	2.09	2.00	3.00	
Physical disability					
Both	1.25	1.87	0.00	2.00	0.223
Functional	1.10	1.69	0.00	2.00	
Non-functional	1.37	1.70	0.00	2.00	
Psychological disability					
Both	1.22	1.64	0.00	2.00	0.683
Functional	1.16	1.57	0.00	2.00	
Non-functional	1.27	1.70	0.00	2.00	
Social disability					
Both	0.84	1.34	0.00	2.00	0.777
Functional	0.85	1.35	0.00	1.00	
Non-functional	0.82	1.35	0.00	2.00	
Obstacles					
Both	0.81	1.51	0.00	1.00	0.794
Functional	0.85	1.58	0.00	1.00	
Non-functional	0.78	1.46	0.00	1.00	
OHIP-14					
Both	9.84	8.91	7.00	11.00	0.789
Functional	9.77	8.75	7.00	12.00	
Non-functional	9.90	9.07	7.00	9.25	

p-value: significant when $p \leq 0.05$; *Mann-Whitney U test

Table 4 shows the distribution of the sample and the bivariate analysis of the OHIP-14 score by social marginalization according to the variables studied. A significant association was found between the OHIP-14 score and the perception of the need for

treatment among people with social marginalization ($p < 0.001$).

Multivariate analysis shows that marginalized people have a lower OHRQoL for the variables analyzed in this study (Table 5).

Table 3. Comparison of OHIP-14 scores for all domains by social marginalization.

OHIP-14 Domains	With social marginalization		Without marginalization		OR (95% CI)	p-value
	Never/ Almost ever	Often/ Occasionally/ Very often	Never/ Almost ever	Often/ Occasionally/ Very often		
	n (%)	n (%)	n (%)	n (%)		
Functional limitation						
1. Had difficulty to say a word due to problems with teeth, mouth or dentures	149 (64.22)	83 (35.78)	89 (64.49)	49 (35.51)	1.01 (0.65–1.57)	0.96
2. The taste of food has worsened due to problems with teeth, mouth or dentures	165 (71.12)	67 (28.88)	105 (76.09)	33 (23.91)	1.29 (0.80–2.09)	0.30
Physical pain						
3. Has felt strong pain in the mouth	136 (58.62)	96 (41.38)	107 (77.54)	31 (22.46)	2.44 (1.51–3.93)	< 0.001
4. Has felt uncomfortable eating some kind of food due to problems with teeth, mouth or dentures	130 (56.03)	102 (43.97)	88 (63.77)	50 (36.23)	1.38 (0.89–2.13)	0.14
Psychological discomfort						
5. Worried due to problems with teeth, mouth or dentures	141 (60.78)	91 (39.22)	104 (75.36)	34 (24.64)	1.97 (1.24–3.13)	0.004
6. Has felt stressed due to problems with teeth, mouth or dentures	156 (67.24)	76 (32.76)	109 (78.99)	29 (21.01)	1.83 (1.12–3.00)	0.015
Physical disability						
7. Was impaired to eat due to problems with teeth, mouth or dentures	185 (79.74)	47 (20.26)	112 (81.16)	26 (18.84)	1.09 (0.64–1.87)	0.74
8. Has stopped eating meals due to problems with teeth, mouth or dentures	187 (80.60)	45 (19.40)	109 (78.99)	29 (21.01)	0.90 (0.54–1.53)	0.71
Psychological disability						
9. Has had problems relaxing due to problems with teeth, mouth or dentures	177 (72.29)	55 (23.71)	114 (82.61)	24 (17.39)	1.48 (0.86–2.52)	0.15
10. Has felt ashamed due to problems with teeth, mouth or dentures	182 (78.45)	50 (21.55)	112 (81.16)	26 (18.84)	1.18 (0.70–2.01)	0.53
Social disability						
11. Has had difficulties carrying out daily activities due to problems with teeth, mouth or dentures	196 (84.48)	36 (15.52)	129 (93.48)	9 (6.52)	2.63 (1.23–5.65)	0.011
12. Has been irritated with other people due to problems with teeth, mouth or dentures	201 (86.64)	31 (13.36)	126 (91.30)	12 (8.70)	1.62 (0.80–3.27)	0.18
Handicap						
13. Has felt that life in general got worse due to problems with teeth, mouth or dentures	199 (85.78)	33 (14.22)	127 (92.03)	11 (7.97)	1.91 (0.83–3.38)	0.07
14. Has been unable to perform activities due to problems with teeth, mouth or dentures	200 (86.21)	32 (13.79)	126 (91.30)	12 (8.70)	1.68 (0.83–3.38)	0.14

OR: Odd ratio; 95%CI: 95% Confidence interval. p-value significant when $p \leq 0.05$

Table 4. Sample distribution and bivariate analysis of OHIP-14 score by social marginalization.

Variables	No social marginalization						With social marginalization					
	n	Mean	SD	Median	Interquartile range	p-value*	n	Mean	SD	Median	Interquartile range	p-value*
Sociodemographic												
Sex												
Female	77	9.10	9.35	6.00	12.00	0.923	138	11.50	9.99	8.00	13.25	0.188
Male	61	7.34	7.34	6.00	7.00		94	9.63	8.20	7.00	12.25	
Age												
60-69	42	7.90	7.67	5.00	10.00	0.575	78	12.40	9.59	10.00	12.50	0.028
70 and more	96	8.51	8.10	6.00	9.00		154	9.90	9.12	7.00	11.00	
Educational level												
Low	93	8.71	8.38	6.00	9.00	0.511	183	11.31	8.29	9.00	13.00	0.041
Hight	45	7.53	6.99	5.00	10.00		49	8.61	9.53	7.00	9.00	
Diabetes												
No	91	8.32	8.00	6.00	10.00	0.912	132	10.43	8.67	8.00	10.75	0.913
Yes	47	8.34	7.94	5.00	9.00		100	11.15	10.17	7.00	13.00	
Hypertension												
No	45	7.11	6.38	6.00	6.50	0.414	60	12.50	9.94	8.50	15.25	0.205
Yes	93	8.91	8.57	7.00	11.00		172	10.25	9.09	7.50	11.00	
Perceived need for dental treatment												
No	72	7.85	8.62	5.00	8.00	0.116	104	8.34	7.92	5.50	9.00	<0.001
Yes	66	8.85	7.18	7.00	10.00		128	12.69	9.95	10.00	12.75	
Use of prothesis												
No	60	7.85	7.49	6.00	8.50	0.865	100	10.87	10.12	8.50	11.75	0.837
Yes	78	8.69	8.31	6.50	11.25		132	10.64	8.72	8.00	12.75	
Functional dentition												
No	72	7.65	8.35	6.00	8.50	0.408	126	10.44	9.23	8.00	9.25	0.681
Yes	66	8.94	7.49	7.00	10.00		106	11.09	9.44	8.00	14.00	

SD: Standard deviation; p-value: significant when $p < 0,05$; *U Mann-Whitney test

Table 5. Logistic regression analysis of low OHIP-14 scores in the presence of social marginalization.

Variables	With social marginalization				Without social marginalization			
	OR	Standard error	p-value	95%CI	OR	Standard error	p-value	95%CI
No functional dentition	0.95	0.49	0.92	0.35-2.59	1.41	0.83	0.58	0.44-4.48
Presence diabetes	0.39	0.20	0.06	0.14-1.05	1.03	0.94	0.97	0.30-3.48
Male	1.02	0.27	0.95	0.61-1.70	1.20	0.37	0.55	0.65-2.21
Perceived need for dental treatment	4.96	2.78	0.004	1.65-14.90	2.99	1.84	0.07	0.90-9.96
Use of prosthesis	3.24	1.74	0.028	1.13-9.29	0.39	0.64	0.95	0.31-3.45
Low educational level	1.22	0.72	0.74	0.38-3.87	1.04	0.34	0.95	0.31-3.45

OR: Odd ratio; 95%CI: 95% Confidence interval. p-value: significant when $p \leq 0.05$

Discussion

In Mexico, it has been reported that 86.7% of adults over 50 years of age who are beneficiaries of the Mexican Institute of Social Security (IMSS) have some dental loss,⁷ but in our study we found a higher percentage (98.6%) with loss of at least one tooth. The percentage of edentulous persons was higher than the 2.7% reported by the Ministry of Health at the national level.¹¹

The percentage of participants with functional dentition was lower than the 89.9% reported in a Mexican population.¹² This is relevant given that tooth loss is related to the perception of a lower quality of life and has a negative impact on social relationships due to the lack of teeth.¹³

It has been demonstrated that people with poorer social conditions and living in a disadvantage territory present greater dental loss in comparison with those who have a better economic and territorial situation. The socially disadvantaged population may present the combination of various chronic diseases, have more severe oral diseases, and the lack of possibility of dental rehabilitation.¹³

Although oral esthetics have less impact in the elderly, which limits the perception for treatment need and search for care,¹⁴ there is a greater utilization of dental care in older adults with higher economic status and schooling compared to the rest of the population.¹⁵ This is congruent with the results obtained, showing that people without social marginalization indicated a greater perception

of the need for dental treatment, while this may indicate a process of naturalization of dental loss and a poorer quality of oral life among the more socially disadvantaged.

It has been reported that subjects with diabetes and cardiovascular disease exhibit greater tooth loss and periodontal disease than subjects without those conditions, while hypertension may be a risk indicator for tooth loss.^{2,16,17} Similarly, the presence of diabetes is strongly associated with poor OHRQoL.¹⁸⁻²¹ Despite this, in our study, we did not find an association between these diseases and OHRQoL, even when social marginality was present.

The main limitation of this study is its cross-sectional design and that it presents a problem of temporal ambiguity that therefore does not allow causal relationships to be established.

Conclusions

The OHIP-14 is a widely used assessment tool to measure the impact of oral problems in the lives of older adults. Based on OHRQoL outcomes, prevention and care actions can be proposed, since oral diseases start by a change in oral conditions, such as the alteration of the supporting tissues of teeth that can lead to tooth loss, which in turn results in a certain degree of functional limitation and disability. These actions will allow the promotion of healthy aging, especially among marginalized groups, and to avoid considering poor oral health as a natural phenomenon of the aging process.

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