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Impact of oral health on quality of life of diabetic elderly in a family health unit

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• Conflicts of interest: none declared.

Abstract

Objective: to analyze the impact of oral health on the quality of life of elderly diabetics attended in a family health unit. **Material and Methods:** this was a descriptive cross-sectional exploratory study with the application at home of the Oral Health Impact Profile questionnaire - OHIP-14 and a questionnaire on socioeconomic evaluation, reported oral morbidity, use of dental services, self-perception in oral health and adherence to healthy practices for the control of *Diabetes Mellitus* (DM). The data were submitted to bivariate analysis and non-parametric Mann-Whitney statistical tests for comparisons and Spearman's for correlations, with a significance level of 5%, in order to determine the association between the OHIP-14 and the independent variables analyzed. **Results:** a total of 86 elderly diabetics, with a mean age of 70 years, mostly female, with per capita family of up to 1 minimum wage and literate. The total OHIP-14 average was 6.34. The domains that presented the most significant impact ($p < 0.001$) were physical pain (23.26%) and psychological discomfort (22.09%). Self-perception in oral health, adherence to the modified diet and non-adherence to physical activity showed a significant impact on the sum of OHIP-14 ($p < 0.001$). **Conclusion:** DM control through adherence to a modified diet and the use of insulin involves psychological factors and has a negative implication on quality of life. On the other hand, the positive impact of physical activity suggests that it should be promoted among the elderly in the family health strategy.

Keywords: Quality of life; Oral health; Diabetes Mellitus; Aged.

Introduction

Diabetes Mellitus (DM) is a disease characterized by chronic hyperglycemia with metabolic disorders[1] and considered a public health problem due to its high prevalence in Brazil and the world.[2] This condition is currently a significant cause of morbidity and mortality. The World Health Organization (WHO) estimates that by 2030 the DM will reach the 7th most expressive cause of death in the world.[3] In 2013, DM was estimated to have killed 5.1 million people between the ages of 20 and 79 years.[2]

The elderly highlight as a common age group among patients who have DM. The increase in life expectancy has led to a change in the health profile, with a higher prevalence of chronic diseases.[4] For metabolic control and prevention of DM complications, modifications are necessary ranging from changing eating habits to using specific drugs such as insulin, compromising the quality of life of these patients.[5] In the Sandberg and Wikblad[6] study analyzed diabetic and non-diabetic individuals and the second group presented a better quality of life when compared to diabetic individuals.

Studies have shown that the quality of life of the elderly is associated with oral health, and factors such as dissatisfaction with teeth or mouth and xerostomia may negatively influence the quality of life.[6] Self-perception of oral health status may be related to clinical factors (decayed, lost or restored teeth) and subjective factors, such as the person's ability to smile, speak or chew without difficulties.[7]

Among the various instruments developed to measure perceived needs, the Oral Health Impact Profile (OHIP) is one of the most used in studies of different sociodemographic contexts and profiles.[8,9] This instrument was developed to measure the dysfunction, discomfort, and incapacity attributed to the oral condition.[10]

Studies aim to evaluate the health, quality of life and factors associated with the aging process are frequent. The achievement of these studies with elderly diabetics is important since tooth loss and the use of prostheses, limitations commonly presented by patients in this age group, have a significant impact on the quality of life of this population, mainly in psychological, physical and social aspects.[11] Thus, obtaining complementary information on the traditional indicators of oral epidemiology becomes relevant to subsidize health actions and clinical behaviors that minimize the impact of DM on elderly patients lives.[12]

Given the above, the present study aims to analyze the impact of oral health on the quality of life of diabetic elderly patients enrolled in a family health unit through the Oral Health Impact Profile (OHIP-14).

Material and Methods

This was a descriptive cross-sectional exploratory study carried out from October to November 2015 and involved elderly individuals aged 60 and over, of both sexes, DM patients with a medical diagnosis proven for at least one year and enrolled in a Family Health Unit (USF) in a city in the interior of the State of São Paulo, Brazil.

The research project was approved by the Research Ethics Committee of the School of Dentistry of Ribeirão Preto at the University of São Paulo - FORP / USP (45391715.7.0000.5419).

For the sample calculation, it was considered as a reference the total number of elderly patients enrolled in the USF, the estimated prevalence of the event,[13] a fixed error of 5%, 95% confidence interval, plus 20% to compensate for possible losses, resulting in a sample of 92 diabetic individuals.

The criteria for inclusion of the participants were: to agree to participate in the study, to sign the informed consent form; be mentally qualified to complete the questionnaire and be physically independent.

The data collection was performed by two previously trained interviewers, composed of residents of the Multiprofessional Residency in Comprehensive Health Care of the Medical School of Ribeirão Preto, University of São Paulo - FMRP / USP. The questionnaires were applied in a previously scheduled home visit.

A pilot study was conducted with ten diabetic elderly patients enrolled in USF, with the same instruments that would be used in the research itself, in order to verify the applicability of the instruments and the average time spent in each interview. There were no inconsistencies in the questions or difficulties in elderly understanding. These data were not incorporated into the study.

The methodological strategy adopted for data collection was the structured interview conducted through the use of validated questionnaires in the literature: The Socioeconomic Assessment Questionnaire, the use of dental services, the reported oral morbidity and the oral health self-perception - SB Brazil 2010,[14] "*Oral Health Impact Profile*" - OHIP-14, [10,12] and obtaining secondary data from the medical record (B-DIA record - SIAB).

The Socioeconomic Assessment Questionnaire, the use of dental services, the reported oral morbidity and the oral health self-perception - SB Brazil 2010[14] were used to assess socioeconomic characteristics (sex, age, family income, and education), reported oral morbidity (need for treatment and presence access to dental services (location and reason for the last dental visit), self-perception in oral health (need for a prosthesis and satisfaction with mouth / teeth). Also, data from the medical record (B-DIA record - SIAB) were used to collect information on adherence to healthy practices (physical activity practice, adherence to diet, insulin use and oral hypoglycemic) to DM control.

Oral Health Impact Profile (OHIP-14) was used to evaluate the subjective perception of quality of life, an instrument with good response in the context of quality of life in the elderly. [15,16] The OHIP-14 has 14 questions categorized into seven domains (Functional limitation, Physical pain, Psychological discomfort, Physical disability, Psychological disability, Social disability, Handicap). The Likert scale was used to score the answers of each OHIP-14 question with the following values: 0 = never, 1 = rarely, 2 = sometimes, 3 = frequently, 4 = always, with the maximum possible score of 56 points. Based on previous studies[17,18] the answers of each question were dichotomized and was defined as the presence of impact the answers frequently and always, and without impact the answers sometimes, rarely and never.

OHIP-14 and its domains were adopted as dependent variables, and as independent variables, sociodemographic and economic conditions, reported oral morbidity, access to dental services, self-perception in oral health and adherence to healthy practices.

The data were tabulated in Microsoft Office Excel 2010 and analyzed in the SPSS (Statistical Package for the Social Sciences) version 17.0 (SPSS Inc., Chicago, IL, USA), adopting a significance level of 5%.

The stability of the questionnaires used within the context of the research was evaluated by the test-retest method in 10% of the sample with a time interval between the applications of 1 month. Moreover, the inter-rater reliability was determined using the Kappa coefficient.[19]

For the bivariate analysis, statistical tests were performed to determine the association between OHIP-14 and the independent variables. The distribution of the independent numerical variables was tested, and the hypothesis of normal data distribution was rejected. For the distribution of categorical dependent variables, we chose the non-parametric Mann-Whitney test for comparisons and Spearman's test for correlations, with significance level to 5%.

For the comparison between the OHIP-14 domains in the same subject, the Friedman non-parametric test was applied, using Conover's post hoc comparison method.

Results

A total of 86 elderly diabetics participated in this study, corresponding to 81.13% of the population of this group enrolled in a Family Health Unit in a city in the interior of the São Paulo State, Brazil. Related to the socioeconomic profile of the studied population (Table 1), the majority were female (n = 54, 62.79%), aged 60-69 years (n = 44, 53.01%), up to 4 years of study (n = 43; 52%) and family income per capita less than 2 minimum wages (n = 53; 61%).

Table 1. Distribution of socioeconomic data of diabetic elderly enrolled in a family health unit. Ribeirão Preto, São Paulo, Brazil, 2015

Variables	n	(%)
Sex		
Male	32	37.21
Female	54	62.79
Age		
60 to 69 years	44	53.01
70 to 79 years	33	39.75
> 80 years	6	7.22
Education		
Illiterate or up to 4th grade 0 to 4 years	43	52
5th grade through 8th grade 5 to 8 years	20	24
Uncompleted high school 9 a 11 years	07	09
Completed high school 12 years	06	07
University	07	08
Family income per capita		
0 |--- 1 wage	08	09
1 wage	09	10
1,1 |--- 2 wages	36	42
2 wages	16	19
+ 2.1 wages	17	20

The agreement between two moments of application of the intra-interviewer questionnaires was excellent (Kappa = 0.96) and inter-interviewers were good (Kappa = 0.82).

Table 2 shows the distribution of the diabetic elderly according to the impact frequency in each OHIP domain. The physical pain and psychological discomfort domains were those with the highest averages (1.31 and 1.38, respectively) and frequencies (23.26% and 22.09%, respectively) concerning the impact of oral health conditions.

Table 3 shows the association between OHIP-14 and its domains and the variables reported oral morbidity, use of dental services, self-perception in oral health, and life and care habits of the studied population.

Table 2. Distribution of diabetic elderly enrolled in a family health unit of Ribeirão Preto, São Paulo, Brazil, 2015, according to the frequency of impact, by domains (n = 86)

Domains *	No impact n (%)	Impact n (%)	Average	Standard deviation
1 Functional limitation (a)	77 (89,53%)	9 (10,47%)	0,6628	1,37721
2 Physical pain (b)	66 (76,74%)	20 (23,26%)	1,3140	1,83599
3 Psychological discomfort (c)	67 (77,91%)	19 (22,09%)	1,3837	2,06465
4 Physical disability (b,c)	75 (87,21%)	11 (12,79%)	0,9302	1,85847
5 Psychological disability (b,c)	71 (82,56%)	15 (17,44%)	1,0465	1,98172
6 Social disability (d)	78 (90,70%)	8 (9,30%)	0,5814	1,24111
7 Handicap (a)	80 (93,02%)	6 (3,98%)	0,4186	1,02286

*p<0.001 - comparison between OHIP domains non-parametric Friedman test; Different letters indicate significant statistical difference between the dimensions

Table 3. Association between OHIP-14, its domains ** and reported oral morbidity, use of dental services, self-perception of oral health, and lifestyle and care habits of diabetic elderly enrolled in a family health unit. Ribeirão Preto, São Paulo, Brazil, 2015

Variables		Averages by OHIP-14 Domains (SD)							
	N (%)	1	2	3	4	5	6	7	OHIP
	86 (100%)	0.66 (1.377)	1.31 (1.835)	1.38 (2.064)	0.93 (1.858)	1.03 (1.981)	0.58 (1.241)	0.42 (1.022)	6.34 (8.860)
Reported Oral Morbidity Need for Treatment									
Yes	45(52.33%)	0.933 (1.629)	1.933 (2.125)	2.222 (2.411)	1.288 (2.272)	1.644 (2.450)	0.888 (1.540)	0.577 (1.215)	9.490 (10.571)
p-value		0.038	0.002	0.000	0.257	0.046	0.039	0.127	0.000
Pain last 6 months									
Yes	13(15.11%)	0.769 (1.480)	3.538 (2.295)	3.307 (2.287)	1.615 (2.467)	2.307 (2.462)	1.769 (2.087)	1.000 (1.527)	14.310 (11.877)
p-value		0.845	0.000	0.000	0.262	0.028	0.002	0.011	0.000
Use service Local									
Public	33(38.37%)	0.757 (1.696)	1.454 (1.804)	1.484 (2.223)	0.666 (1.594)	0.878 (1.849)	0.5455 (1.201)	0.454 (1.148)	6.240 (8.540)
Private	50(61.63%)	0.640 (1.173)	1.220 (1.865)	1.260 (1.849)	1.040 (1.926)	1.080 (1.946)	0.580 (1.263)	0.420 (0.970)	6.240 (8.847)
p-value		1.000	0.387	0.678	0.235	0.911	0.761	0.921	0.496
Reason Last Inquiry									
Prevention/ Assistance	67(89.55%)	0.656 (1.409)	1.029 (1.632)	0.955 (1.561)	0.806 (1.725)	0.701 (1.576)	0.417 (1.061)	0.313 (0.856)	4.880 (7.658)
Urgency	09(10.45%)	1.111 (1.763)	2.444 (2.351)	3.777 (2.948)	1.444 (2.651)	2.444 (3.086)	1.333 (2.061)	0.777 (2.061)	13.330 (12.520)
p-value		0.540	0.055	0.002	0.603	0.031	0.202	0.181	0.001
Self-perception Prosthesis need									
Yes	27(31.39%)	0.888 (1.846)	1.925 (2.217)	2.037 (2.594)	1.222 (2.224)	1.740 (2.595)	1.000 (1.687)	0.333 (0.877)	9.150 (10.787)
p-value		0.770	0.072	0.129	0.693	0.026	0.146	0.416	0,063
Physical activity									
Adere	35(40.7%)	0.722 (1.649)	1.027 (1.843)	0.777 (1.658)	0.833 (1.843)	0.812 (1.874)	0.611 (1.378)	0.277 (0.913)	4.640 (8.445)
p-value		0.634	0.070	0.005	0.747	0.249	0.041	0.304	0.029
Modified Diet									
Adere	58(67.45%)	0.741 (1.291)	1.637 (2.006)	1.637 (2.261)	1.120 (2.018)	1.327 (2.130)	0.724 (1.373)	0.465 (1.095)	7.660 (9.813)
p-value		0.226	0.022	0.153	0.204	0.014	0.114	0.700	0.044
Insulin									
Uses	17(19.77%)	0.588 (1.175)	0.200 (1.903)	1.764 (2.537)	1.352 (2.234)	1.294 (2.391)	0.882 (1.536)	0.529 (1.328)	8.41 (11.408)
p-value		0.978	0.049	0.484	0.242	0.979	0.441	0.932	0.620
Hypoglycemic									
Uses	74(86.04%)	0.594 (1.121)	1.283 (1.847)	1.364 (1.983)	0.932 (1.845)	1.054 (1.971)	0.567 (1.205)	0.364 (0.915)	6.16 (8.388)
p-value		0.926	0.510	0.660	0.883	0.647	0.941	0.507	0.919

* Non-parametric Mann-Whitney test, Highlighted - statistically significant difference p <0.05, ** 1- Functional limitation; 2- Physical pain; 3- Psychological discomfort; 4- Physical disability; 5- Psychological disability; 6- Social disability; 7- Handicap, SD - Standard deviation.

The total OHIP-14 average was 6.34. The elderly diabetics who considered needing dental treatment had an impact on the quality of life for total OHIP and the functional limitation, physical pain, psychological discomfort, psychological disability, and social disability domains.

Those who considered having experienced pain in the last six months had an impact on total OHIP and the physical pain, psychological discomfort, psychological disability, social disability, and handicap domains.

We observed elderly patients predominantly attended the private dental service (n = 50, 61.63%). The search for emergency treatment (pain and/or exodontia) (n = 9; 10.46%) had an impact on quality of life for the psychological discomfort and psychological disabilities domains and the total OHIP.

For prosthesis needs, there was an impact on the psychological disability domain. Most of the participants use modified diet; however, they do not practice physical activity, and a statistically significant association was observed between this variable and the psychological discomfort and social disability domains and for the total OHIP. We revealed the impact of oral health on quality of life is higher in diabetic elderly patients who are not in the habit of practicing physical activity.

A small number of participants use insulin (n = 17; 19.76%), and most of the patients use some form of oral hypoglycemic for the DM treatment (n = 69; 80.23%). The use of insulin is related to impact in the physical pain domain, although the use of hypoglycemic agents did not show a statistically significant association.

Discussion

The evaluation of the quality of life of diabetic elderly, through OHIP-14, represents an attempt to analyze the impact of factors related to oral health on the well-being sensation of the DM individual. Moreover, in a scenario in which the incidence of DM is increasing,[20] this study is relevant to highlight the importance of planning and organizing actions aimed at the prevention and care of the oral health of the elderly with DM.

The majority of the study population consisted of women, this gender has presented a longer life expectancy due to the economic, social and cultural conditions, and because they are more sensitive to the personal and familial care act, seek more health services and report with more frequent morbidity.[21] The elderly of this study had a mean age of 70 years and education up to four years of study, in consonance to research performed with elderly patients in the context of the family health strategy.[22] It is important to emphasize that social determinants are indicators that should be observed by managers in the planning of actions aimed at this group and by health professionals in daily practice to guarantee equity in care.[22-24]

The need for prosthesis use reported by participants in this study had a significant impact on quality of life. Also, this finding was reported by a study with diabetic elderly patients from a city in southeastern Brazil[11] and may be associated with the fact that the absence of teeth can generate apprehension in social life, in addition to pain and difficulties in chewing.

Among the elderly evaluated, the prevalence of adherence to the modified diet (67.45%) stands out. Possibly, this is associated with the health promotion actions adopted by the team in the family health strategy. Health professionals, based on their extended listening and bonding with the population, should analyze these aspects for the implementation of health education actions aiming to increase the autonomy and knowledge about the importance of an adequate diet and healthy life habits.[23-25]

Adherence to the modified diet had a negative impact on quality of life and association with the psychological domain. The change in eating habits involves psychosocial aspects because it interferes in the social relationship and can mean a loss of pleasure, or even deprivation and suffering because of not being able to eat some foods.[26-28] Likewise, DM requires a lifestyle change, restriction of social activities, adherence to a complex diet regime, glycemic control and regular use of medications.

It was also observed the impact of the diet on the physical domain, which may be associated to the fact that the use of multiple medications can generate a dependence on third-party mediation due to the possible difficulty concerning the schedule and the adequate form in the use of medicines.[29,30]

Physical activity absence (59.30%) had a negative influence on the quality of life associated with oral health, especially in the psychological and social domains. It is well known that the correct and regular practice of physical activity slows the functional losses and provides the elderly with a better quality of life.[31] A recent study with 654 elderly patients from the city of Maringá (Paraná State, Brazil) found participants with higher levels of physical activity had better scores of general cognitive status when compared to sedentary and/or those who demonstrated low levels of physical exercise.[32]

All of the elderly in this study reported having already sought the dentist and most use the public service. The reason for seeking care had an impact on quality of life, with higher values in the sum of OHIP-14 and in the physical and psychological domains for the group that reported pain/urgency as the reason for the consultation. In fact, the elderly tend to seek dental care only when they present oral problems associated with pain or discomfort,[33] which may be associated with past experiences/phobias that generates a vicious cycle since less frequent dental appointments can

aggravate problems of oral health.[34]

On the other hand, this scenario may be a reflection of curative and poorly resourced health policies, with no focus on preventive actions and health promotion.[35] This trend could be reversed with health education actions by the multi-professional team by encouraging among users the use of dental services routinely, which, according to Slade and Spencer [12] indicates a significant improvement in the quality of life of the population.

Oral health self-perceived variable had an impact on the sum of OHIP-14, and all domains studied. According to a research conducted in 2012 also using the OHIP-14, the dissatisfaction with the appearance of teeth was one of the predictive variables of individuals with high scores.[36] Another study conducted in a city of Rio Grande do Sul (Brazil) observed elderly patients who complained of problems with their teeth, mouth, and gums had lower rates of quality of life.[37] Thus, it is confirmed the higher degree of dissatisfaction with oral health has a negative impact on quality of life.

Recognizing that DM is an irreversible clinical condition with significant impacts on the elderly's lives, government investment and action strategies with the participation of family health teams are necessary. The Strategic Action Plan for Confronting Noncommunicable Chronic Diseases (CNCD) highlights the need for actions aimed at promoting healthy living habits as indicated by the Ministry of Health[38]. However, it is also relevant to emphasize the need to sensitize those with chronic diseases to their self-care and the importance of individual perception regarding their oral health and how it interferes in their daily lives.

It is substantial to highlight some limitations of the study should be considered, such as the cross-sectional design that does not allow establishing causal relationships and the presence of comorbidities related to DM, which may influence the observed impacts. Furthermore, the shortage of national studies performed under similar conditions and using OHIP-14 made it difficult to compare the results obtained.

The results obtained here reinforce the importance of new studies that evaluate the quality of life as an indicator of health among the elderly and can provide subsidies for the development of actions in oral health, considering the singularities that involve the aging process, from subjective observation aspects implicated in the reduction of quality of life.

Conclusion

DM control through adherence to a modified diet and the use of insulin involves psychological factors and has a negative implication on quality of life. On the other hand, the positive impact of physical activity suggests that it should be promoted among the elderly in the family health strategy.

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