ORIGINAL RESEARCH Community Dental Health

Impact of sense of coherence on oral health-related quality of life among Brazilian adults

Evely Sartorti da SILVA^(a) (D)
Rosana de Fátima POSSOBON^(a) (D)
Marcela Di Moura BARBOSA^(b) (D)
Marília Jesus BATISTA^(c) (D)

(a)Universidade de Campinas – UNICAMP, Piracicaba Dental School, Department of Community Dentistry, Piracicaba, SP, Brazil.

Livia Maria Andaló TENUTA(d) (i)

- (b) Universidade de Campinas UNICAMP, Piracicaba Dental School, Department of Prosthodontics and Periodontics, Piracicaba, SP, Brazil.
- (s)Faculdade de Medicina de Jundiaí, Department of Community Health, Jundiaí, SP, Brazil.
- (d)University of Michigan, School of Dentistry, Department of Cariology, Restorative Sciences and Endodontics, Ann Arbor, MI, USA.

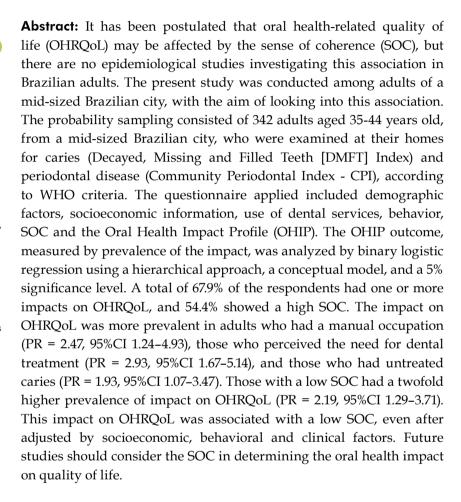
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Corresponding Author:

Evely Sartorti da Silva E-mail: evelysartorti@yahoo.com.br

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Introduction

According to the Global Burden of Disease (GBD) 2010 Study, the impact of oral diseases ranks among the top 100 worldwide diseases on a list totaling 291. It is well known that socioeconomic deprivation affects the occurrence of oral diseases, and the interpretation of their impact. However, the presence of oral diseases and unfavorable socioeconomic factors are not enough to explain the multidimensional and multifactorial oral health impact on quality of life, usually referred to as the oral health-related quality of life (OHRQoL).



In epidemiological studies measuring the OHRQoL in adults using the Oral Health Impact Profile (OHIP) questionnaire,³ associations have been found with socioeconomic factors, such as income, age, education, gender and ethnicity, as well as oral health conditions, such as dental loss, need for prosthetic rehabilitation, periodontitis and caries lesions⁴. In addition, the OHIP was associated with general health conditions, oral health behaviors, perception of the need for dental treatment, and psychosocial factors like the sense of coherence (SOC).⁴

The SOC evaluates how individuals give meaning to the world (understanding), recognize and use available resources to respond to a demand (management), and feel that these answers make sense emotionally (meaning).5 A high SOC reflects good adaptive ability of human beings to deal with stress, thus prompting people to stay well, or satisfied with their quality of life, even under adverse and stressful situations. 5,6 Epidemiological studies with adults have identified similar clinical and socioeconomic factors associated with a high SOC and a low OHIP.^{7,8} In fact, a high SOC is usually associated with the adoption of healthy oral health-related behaviors, which would change the clinical state of the individual, and his subjective interpretation of the importance of oral health.9,10,11

The influence of SOC on OHRQoL impacts was assessed in a study on a representative sample of the Finnish population,¹² whereby an association of the SOC with all dimensions of the OHIP was found, especially psychological discomfort, psychological incapacity and handicap. The authors of the study found that a low SOC would lead to a high impact on OHRQoL, regardless of oral health conditions, healthy behaviors or socioeconomic factors.¹² Other authors have also detected the same relationship between SOC and OHIP,713 in two studies, the ability to cope with stress caused by oral diseases mediated this association.^{8,10} Thus, inclusion of the SOC in a study assessing OHRQoL can promote a better understanding of the psychosocial aspects that might modify the interpretation of this impact. There are no studies that have investigated the association between SOC and OHRQoL in epidemiological studies with a probabilistic sampling in Brazil.

In addition, it should be taken into account that socioeconomic, demographic and even cultural differences between populations may alter the interpretation of both the OHRQoL and the SOC. Therefore, the objective of this study was to determine the effect of SOC on the OHRQoL, after adjusting for conditions of oral health, oral health-related behaviors and socioeconomic factors in Brazilian adults.

Methodology

Ethical issues

This study was conducted following the standards required by Brazilian regulations (Resolution 466/2012) on research in humans, and was approved by the Research and Ethics Committee of the Piracicaba Dental School - UNICAMP, on September 9, 2013 (protocol # 077/2013).

Study location

The study was conducted in the municipality of Jundiaí. According to the last census, conducted by the Brazilian Institute of Geography and Statistics (IBGE) in 2010, the number of inhabitants in Jundiaí, state of São Paulo, was 370,126, and the human development index was 0.857 (considered very high in comparison with other Brazilian cities). The planning stages and calibration of examiners occurred in 2013, and the data were collected in 2014.

Sample

The sample comprised adults aged between 35 and 44 years, which is considered the default age for evaluating oral health conditions in adults, according to the World Health Organization (WHO). This study was part of a larger project entitled "Epidemiological Surveys of Oral Health - Jundiai/SP 2014."

Sample size was calculated from the mean DMFT, and the periodontal disease data was obtained from the National Oral Health Survey, SB-Brasil 2010, Southeast region.¹⁵ An error of 10%, a design effect (deff) of 2, and a 95% confidence level were adopted. Calculations were adjusted to take into account a population size of 56,668 inhabitants in this age group (according to the IBGE). Moreover, a 50% prevalence of high SOC also was considered

in the sample calculation and corresponded to the highest and final value. After adding a sample loss of 30%, considering possible losses and refusals, the minimum sample size was established at 300.

The inclusion criteria were as follows: resident of Jundiaí, SP, aged between 35 and 44 years, cognitive ability to answer the questionnaire, and agreement to participate in the study. The exclusion criterion was individuals lacking cognitive ability to answer the questions assessed during the interview.

Participants were selected by a probabilistic sampling of households. Initially, 30 census regions and 2 substitute regions, involving both urban and rural areas, were chosen by sampling interval. The number of households was calculated considering the likelihood that one adult having the required age would be found in every two households visited, 16 resulting in a number of 20 participants per census region. These households were randomly selected by a sample interval. The participant to be included had to be at home, either at the time of the visit, or during a conveniently scheduled appointment.

The clinical examinations were carried out at home, under natural lighting, without prophylaxis or prior drying, with CPI probes and intraoral mirrors, as recommended by the WHO.¹⁴ The examiners comprised 5 dentists and 3 assistants, hired by the municipality. All were trained and calibrated in a 16-h theoretical and 64h practical training course. The percentage of agreement for the dental caries examination ranged from 80.4% to 99.2% (kappa 0.72 to 0.98), and for presence of periodontal disease, from 63% to 91% (kappa 0.63 to 0.76), which is considered a substantial or high agreement, according to Landis and Koch.¹⁷

Variables

This was a cross-sectional, observational study. The outcome was the OHIP, measured by the 14-question instrument (OHIP-14), applied in the form of interviews. The responses for each question ranged as follows: 0 = never, 1 = hardly ever, 2 = occasionally, 3 = fairly often, and 4 = very often. The evaluation of the questionnaires considered the absence or presence of an impact, in that absence was so considered when all responses were "0," and presence, when

there was at least one response from "1 to 4" to any of the questions.¹⁹

The main independent variable of interest was the SOC, which was investigated using its 13-question transculturally adapted version (SOC-13).6 The questions include the 5 to 1 responses on a Likert scale. The correction of the questionnaires was performed after the reversal of scores of questions 4, 5, 6, 7, 8, 9, 10, 11 and 12. The sum of SOC values of the individual responses can range from 13 to 65, with the median being considered the cut-off between a low and a high SOC.11 In questionnaires in which fewer than three questions were blank, the average value of the other answers was used in the blank questions.²⁰ The higher the value found, the better the individual's adaptive ability; conversely, the lower the value, the worse his adaptive ability. Moreover, data on clinical, demographic and socioeconomic variables, as well as use of dental services, were collected and used in a model, as possible predictor, confounding or effect modifier variables.

The conceptual theoretical model organized the variables into hierarchical blocks (Figure).^{20,21} The first block of the model included the exogenous variables of ethnicity (self-reported as white or not white [black, yellow, brown or indigenous]), age (35–39 or 40–44 years) and gender (male or female).

The second block included the primary determinants of oral health, described as follows: a) Availability of services and information on oral health: type of service used (private, insurance or public), and preventive guidance on oral health (whether it was ever received); b) Personal characteristics: civil status (partner or no partner), family income (> 4 minimum wages [MW] [MW was approximately US\$ 210.00/month at the time of the study], 2 to 4 MW and < 2 MW), number of people living in the same home (≤ 4 or > 5 people), level of education (high: university degree, middle: high school or vocational school; or low: less than high school), occupation of the respondent (non-manual or manual occupation, or having no activities, like pensioners or unemployed individuals), and SOC (high or low); and c) Characteristics of the environment: treated and fluoridated water (whether received or not received).

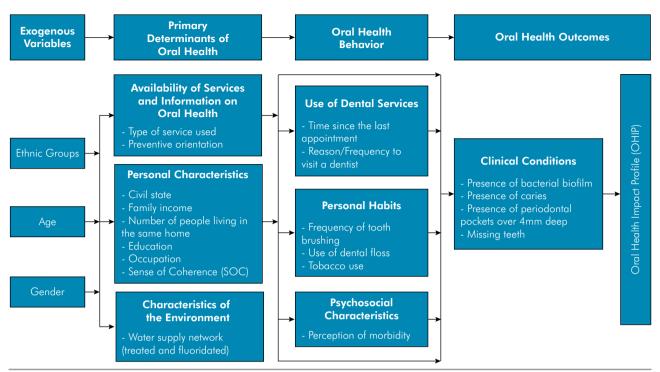


Figure. Adapted conceptual framework for the Oral Health Impact Profile outcome.²¹

The third block addressed the variables representing oral health behaviors, described as: a) Use of dental services (< 1 year, 1 to 2 years, or > 3 years since last visit), and the reason for/ frequency of visits to the dentist (routine, pain, or does not go to the dentist); b) Personal habits: toothbrushing (3 or more times per day or up to 2 times per day), daily flossing (yes or no), and smoking (yes or no); and c) Psychosocial characteristics: perception of morbidity (feeling a need or no need for dental treatment at the time).

The fourth block grouped the independent, clinically observed variables, such as dental biofilm in one or more sextants of the mouth, or else its absence in all sextants,²² caries (caries component of the DMFT index), periodontal pockets over 4-mm deep in at least 1 sextant (measured by the Community Periodontal Index - CPI), and missing teeth (between 0 and 4, or more than 5, being dichotomized in the third quartile).¹⁴ The last block contained the outcome variable of impact on OHRQoL, assessed by the OHIP.

Statistical model and analysis

The data was organized in an Excel® datasheet. Statistical analyses were performed using the

Statistical Package for the Social Sciences (SPSS) version 20.0. Simple descriptive statistics were used to describe the sample, with absolute and percentage distribution of the variables studied.

Bivariate analyses were made to assess the outcome of presence of impact on OHRQoL, considering the prevalence of any impact on one or more questions, or else absence of impact, based on single binary logistic regression. The main explanatory variable was SOC, dichotomized using the median between high and low. Then multivariate analyses were performed using hierarchical binary logistic regression, according to the adapted theoretical model. The variables that showed statistical significance of 5% were maintained and adjusted by those that presented p-value < 0.20. Each block of variables adjusted the subsequent block of variables, to obtain the final model.

Results

Although there was a non-response rate of 48.4% for the households, the residents of 330 households in the 32 test regions were examined, resulting in 342 examined adults. They corresponded to adults

within the age group range, and with cognitive ability to answer the questionnaire.

Table 1 describes the sampling characteristics. A higher prevalence of women (67.1%) and people living with a partner (69.3%) were found. The family income of 44.4% of those examined was ≥ 4 MW, and the number of people living in the same house was between 1 and 4 in 75.1% of the cases. A middle level of schooling (38.9%) and a non-manual occupation (56.7%) prevailed. Most of the respondents used private services (67%) and had visited the dentist for the last time sometime in the past year (53.5%), but many of those surveyed (74.9%) still believed they needed dental treatment. Most of the respondents claimed that they brushed their teeth 3 times a day (73.4%), and flossed daily (60.2%). However, 61.4% of them presented dental biofilm in one or more sextants. Untreated caries and periodontal pockets of > 4 mm were present in 36.5% and 24.3% of the sample, respectively. Seventy-five percent of the sample presented fewer than 5 missing teeth. The SOC score ranged from 37 to 62, for an average of 49.31 (SD = 5.79), and a median of 50 and 54%, representing a high SOC prevalence. The prevalence of any impact measured by the OHIP was 67.9%.

Table 2 presents the results of the bivariate analyses between the OHIP and independent variables of the proposed model. A significant association ($p \le 0.05$) was found with gender, ethnicity, family income, education, occupation, SOC, reason for/ frequency of visits to the dentist, toothbrushing, perception of morbidity, presence of bacterial biofilm, and presence of caries. Variables with a p level ≤ 0.20 were also kept in the model.

The results of the multivariate analyses using a hierarchical approach are shown in Table 3. The SOC and occupation results from block 1 were used to adjust block 2, and the SOC, occupation, perception of needs and toothbrushing results of this block were used to adjust block 3. The dental caries were included in block 3 to complete the final adjusted model. After making multivariate regression adjustments, the impact on OHRQoL was found to be more prevalent in adults who had a manual occupation (prevalence ratio [PR] = 3.07, confidence interval [CI] 95%CI 1.54–6.11), in those who perceived the need for dental

treatment (PR = 3.37, 95%CI 2.00-5.83), and those who had untreated caries (PR = 1.93, 95%CI 1.07-3.47). The SOC was maintained in the model after the three blocks were adjusted; those who presented a low SOC had a twofold higher prevalence of impacts on OHRQoL (PR = 2.19, 95%CI 1.29-3.71).

Discussion

The present study showed an association between a low SOC and its impact on OHRQoL. This means that there was a higher prevalence of low SOC among the individuals who had more impacts on quality of life. In addition to SOC, socioeconomic, behavioral and clinical variables were also associated with an impact on OHRQoL. This demonstrates the importance of a conceptual theoretical model for determining outcomes like OHRQoL, which are multidimensional and depend on multiple contextual factors.

The absence of an impact on OHRQoL was reported in the present study by 32.1% of respondents. Some of the participants had a hard time classifying similar answers like "hardly ever" and "occasionally"; accordingly, the answer "never" was used to report the absence of an impact¹⁹. Two studies with European adults reported a prevalence of approximately 60-70% of the answer "not at all" and "very seldom," a depiction not considered as representing a problem by its authors.^{8,12} Even considering methodological, socioeconomic, clinical, psychosocial and cultural differences, which could interfere with the self-perception of impact in these two studies, as well as in the present study, the SOC maintained an inverse relationship with the impacts on OHRQoL. This emphasizes the validity of this kind of study in different socioeconomic and cultural contexts.

The association between impacts in OHRQoL and clinical variables, such as untreated caries, periodontal diseases and dental loss in adults, has been widely reported in the literature, mainly concerning pain and psychological incapacity directly caused by oral diseases. ^{4,19} However, it has been suggested that the presence of these conditions has little influence on the perception of OHRQoL by Brazilian adults²³. Similar results were found in the present study, in which only the presence of untreated caries remained significantly

Table 1. Demographic, socioeconomic, psychosocial and clinical characteristics of adult residents in Jundiaí, Brazil, 2014.

Variable blocks	n (%)	Variable blocks	n (%)
xogenous variables		3. Characteristics of the environment	
Gender		Water supply network	
Male	111 (32.5)	Treated and fluoridated	288 (84.2)
Female	231 (67.5)	Not treated	54 (15.8)
Total	342 (100)	Oral Health Behavior	
Ethnicity		1. Use of dental services	
White skin	241 (70.5)	Time since last appointment	
Not white skin	100 (29.2)	< 1 year	183 (53.5)
Age		Between 1 and 2 years	96 (28.1)
35–39 years old	187 (54.7)	>3 years	63 (18.4)
40–44 years old	155 (45.3)	Reason/Frequency of visits to the dentist	
Primary determinants of oral health		Routine	215 (62.9)
A state for the first of	1.1 - 1.1	Pain	114 (33.3)
. Availability of services and information o	n orai nealth	Does not go to the dentist	13 (3.8)
Type of service used		2. Personal habits	
Private	229 (67)	Frequency of toothbrushing	
Insurance	65 (19)	≥ 3 times per day	251 (73.4)
Public	46 (13.5)	<2 times per day	91 (26.6)
Preventive orientation on oral health		Use of dental floss	
Not received	62 (18.1)	No	136 (39.8)
Received	279 (81.6)	Yes	206 (60.2)
2. Personal characteristics		Tobacco use	
Civil status		No	283 (82.7)
Partner	237 (69.3)	Yes	58 (17)
No partner	101 (29.5)	3. Psychosocial characteristics	
Family income		Perception of morbidity	
> 4 minimum wages	152 (44.4)	No	83 (24.3)
2–4 minimum wages	99 (28.9)	Yes	256 (74.9)
< 2 minimum wages	66 (19.3)	Oral Health Outcomes	
Number of people living in the same ho	me	Presence of bacterial biofilm	
≤ 4 people	257 (75.1)	Yes	210 (61.4)
> 5 people	83 (24.3)	No	132 (38.6)
Education level		Presence of untreated caries	
High	103 (30.1)	Yes	125 (36,5)
Middle	133 (38.9)	No	217 (63,5)
Low	94 (27.5)	Presence of periodontal pockets	
Occupation		(over 4-mm deep)	
Not manual	194 (56.7)	Yes, at least 1 sextant	83 (24.3)
Manual	85 (24.9)	No	259 (75.7)
With no activities	61 (17.8)	Missing Teeth	,
Sense of Coherence (SOC)		5 to 32 missing teeth	141 (41.2)
High	185 (54.4)	0 to 4 missing teeth	200 (58.5)
Low	155 (45.6)	Presence of Impacts on OHIP	
	. ,	No	109 (32.1)
		Yes	231 (67.9)

Note: Variables that did not complete 100% percentage values represent missing cases.

Table 2. Bivariate analyses and p value for presence and absence of impact in adults of Jundiaí, Brazil, 2014.

Variable blocks	Absence of impacts	Presence of impacts	p-value
variable blocks	n (%)	n (%)	p-value
xogenous variables			
Gender			
Male	44 (39.6)	67 (60.4)	0.04
Female	66 (28.6)	165 (71.4)	
Ethnicity			
White skin	86 (35.7)	155 (64.3)	0.036
Not white skin	24 (24.0)	76 (76.0)	
Age			
35–39 years old	62 (33.2)	125 (66.8)	0.666
40–44 years old	48 (31.0)	107 (69.0)	
Primary determinants of oral health			
Personal characteristics			
Civil status			
Partner	83 (35.0)	154 (65.0)	0.095
No partner	26 (25.7)	75 (74.3)	
Family income			
> 4 minimum wages	57 (37.5)	95 (62.5)	0.002
2–4 minimum wages	31 (31.3)	68 (68.7)	
< 2 minimum wages	9 (13.6)	57 (86.4)	
Number of people living in the same house	,	,	
≤ 4 people	80 (31.1)	177 (68.9)	0.657
> 5 people	28 (33.7)	55 (66.3)	
Education level	()	(')	
High	42 (40.8)	61 (59.2)	0.042
Middle	40 (30.1)	93 (69.9)	
Low	23 (24.5)	71 (75.5)	
Occupation	(=)	()	
Not manual	81 (41.8)	113 (58.2)	< 0.001
Manual	14 (16.5)	71 (83.5)	10,001
No activities	14 (23.0)	47 (77.0)	
Sense of Coherence (SOC)	11 (20.0)	17 (77.5)	
High	74 (40.0)	111 (60.0)	0.001
Low	35 (22.6)	120 (77.4)	0.001
Oral health behavior	00 (22.0)	120 (77.4)	
Use of dental services			
Time since last appointment			
< than 1 year	54 (29.5)	129 (70.5)	0.105
Between 1 and 2 years	39 (40.6)	57 (59.4)	0.100
> 3 years	17 (27.0)	46 (73.0)	
> 3 years Reason/Frequency of visits to the dentist	17 (27.0)	40 (73.0)	
Routine	81 (37.7)	134 (62.3)	0.018
			0.016
Pain Does not go to the dentist	26 (22.8) 3 (23.1)	88 (77.2) 10 (76.9)	

Continue

Continuation

Variable blocks	Absence of impacts	Presence of impacts	p-value
variable blocks	n (%)	n (%)	p-value
Personal habits			
Frequency of toothbrushing			
≥ 3 times per day	93 (37.1)	158 (62.9)	0.001
< 2 times per day	17 (18.7)	74 (81.3)	
Use of dental floss			
No	37 (27.2)	99 (72.8)	0.111
Yes	73 (35.4)	133 (646)	
Tobacco use			
No	96 (33.9)	187 (66.1)	0.087
Yes	13 (22.4)	45 (77.6)	
Psychosocial characteristics			
Perception of morbidity			
No	47 (56.6)	36 (43.4)	< 0.001
Yes	62 (24.2)	194 (75.8)	
Oral health outcomes			
Presence of dental biofilm			
Yes	59 (28.1)	151 (71.9)	0.042
No	51 (38.6)	81 (61.4)	
Presence of untreated caries			
Yes	24 (19.2)	101 (80.8)	< 0.001
No	86 (39.6)	131 (60.4)	
Presence of periodontal pockets (over 4-mm deep)			
Yes, at least 1 sextant	20 (24.1)	63 (75.9)	0.071
No	90 (34.7)	169 (65.3)	
Missing teeth			
5–32 missing teeth	46 (32.6)	95 (67.4)	0.903
0–4 missing teeth	64 (32.0)	136 (68.0)	

associated with the OHIP. The same clinical condition can be interpreted and managed differently, and have different meanings, depending on the SOC of the individual, and can present different impacts on OHRQoL, because of subjective and multidimensional aspects.

Although not all clinical variables were associated with the OHRQoL, the perception of positive morbidity had a high influence on the impact. Other studies also showed that there are discrepancies between real needs and those referred to by the patient²⁵. This suggests that the interpretation of the impact of illness can be considered as subjective, and may not always be linked to clinical and epidemiological disease detection.

Concerning the socioeconomic factors already established in the literature as determinants for health,

as well as the risk factors for disease development² and for a high impact on OHRQoL,^{4,23} the present study also showed that people who worked in manual occupations had a greater impact on OHRQoL. The WHO considers occupation as an intermediate determinant for health, and is directly connected to income and education level; therefore, it can also serve to determine access to health services and other resources.²⁶ The fact that these determinants did not reduce the influence of SOC on OHRQoL may confirm the salutogenic assumption that socioeconomic factors would not change the individual perception of quality of life in adults.⁵ Therefore, individuals with good oral health may perceive it negatively, owing to a low SOC, regardless of their socioeconomic status.

Table 3. Factors associated with presence of impact on OHRQoL in adults of Jundiaí, Brazil, 2014.

	-	-										:
Variables	Ž	No adjusted variables	oles	m	Block 1 adjustment	ta	BIC	Block 1 adjusted by 2	y 2	Blocks	Blocks 1 and 2 adjusted by 3	ed by 3
(OHIP-14)	PR	95%CI	p-value	PR	95%CI	p-value	PR	95%CI	p-value	PR	95%CI	p-value
Block 1: Primary determinants of oral health	al health											
Family income												
< 2 minimum wages	2.42	1.04–5.63	0.04	2.42	1.04–5.61	0.04	1.84	0.73-4.64	0.196			
2–4 minimum wages	1.12	0.64-1.98	69.0	Ξ:	0.62-1.95	0.74	0.82	0.45–1.51	0.530			
> 4 minimum wages	-			-			-					
Occupation												
No activities	1.73	0.84-3.57	0.14	1.75	0.84–3.61	0.13	1.65	0.81–3.35	0.17	1.51	0.73–3.1	0.27
Manual	3.07	1.54–6.11	< 0.001	3.1	1.56–6.19	0.001	2.53	1.27–5.02	0.008	2.47	1.24-4.93	0.01
Not manual	-			-			-			-		
Sense of Coherence (SOC)												
Low	1.91	1.13–3.22	0.02	1.88	1.12–3.17	0.02	2.22	1.31–3.74	0.003	2.19	1.29–3.71	0.004
High	_			_			_			-		
Block 2: Oral health behavior												
Frequency of toothbrushing												
< 2 times per day	1.16	1.04–1.29	0.01				2.00	1.04–3.82	0.04	1.83	0.95–3.55	0.07
≥ 3 times per day	_						-			_		
Perception of morbidity												
Yes	1.35	1.20–1.51	< 0.001				3.37	2–5.83	<0.001	2.93	1.67–5.14	< 0.001
οN	_						-			_		
Block 3: Oral health outcomes												
Presence of untreated caries												
Yes	1.52	1.64-4.65	0.002							1.93	1.07–3.47	0.03
No	_									_		
Missing teeth												
5–32 missing teeth	1.08	0.96–1.22	0.2									
0-4 missing teeth	-											
Note: The reference category for the multinomial analysis was "presence of impact"	ninhinomia.	" spw sisylpub l	ii fo abbasasas	"tout								

Note: The reference category for the multinomial analysis was "presence of impact".

Based on these results, it would be worthwhile to suggest that changes be made in the oral health practices directed at adults. If these practices are focused only on the clinical outcomes and the prevention of diseases risk factors, without considering OHRQoL and SOC, the objectives of oral health promotion will not be achieved, and the changes in behavior will be less substantial and shorter lasting. The effort to direct oral health care actions toward a better, overall understanding of its benefits by human beings, considering their beliefs and the socioeconomic and cultural context, may help humanize oral health care and bring it closer to the population, reduce differences and promote long-lasting healthy oral behaviors. 24,27 Although still incipient, studies that aim to improve SOC in adults assert that health promotion actions should focus on the "empowerment" of individuals to identify appropriate resources to cope with stressors, and encourage reflection on stressful situations, so as to render them comprehensible, manageable and meaningful. Every stressful situation that is successfully managed will increase the SOC, improving the prospects for successfully facing new situations that present new stressors. 28

One limitation of the present study was the proportion of men to women examined, since it may not fully characterize the profile of the population. A greater number of women than men is common in home sampling studies, and emphasizes the representability

of the present study sampling procedure. Moreover, considering the cross-sectional design of the study, it was suggested that the analysis of this subject be made by qualitative and interventional studies.

Conclusion

In the present study, there were a greater number of adults with a low sense of coherence, among those who showed a higher prevalence of impacts on OHRQoL. Untreated caries, manual occupation and positive perception of morbidity were also associated with the impact on OHRQoL. The results suggest that the SOC should be considered in further qualitative and interventional studies assessing the impact of oral health on quality of life.

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