

Relationship between oral health and its impact on quality of life among adolescents

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Abstract: The aim of this study was to assess oral health status and its relationship with quality of life. A household population, cross-sectional study was carried out; participants were between 15 and 17 years of age ($n = 247$) and were examined by two calibrated dentists. Socio-economic status was classified according to ANEP-ABIPEME criteria. Clinical examinations to observe DMFT, CPI and Dean indices were performed as per WHO criteria. The Significant Caries Index (SiC) was used to evaluate polarization of the occurrence of caries among participants of the tercile with higher DMF-T. The OHIP instrument was used to measure quality of life. The Spearman and Mann-Whitney tests were used for assessing correlations (5% significance level). Examinations were carried out in 117 (47.37%) females and in 130 (52.63%) males. Of the examined participants, 45.75% were classified as belonging to socio-economic class C. Caries occurrence was observed in 218 subjects (88.26%); the mean DMFT was 5.40. The SiC index was 9.97. Almost half (47.77%) of the participants examined did not present sextants affected by periodontal disease. Of the participants examined, 80.16% presented absence of fluorosis. The mean OHIP was 3.95. The following correlations were observed: a positive and statistically significant correlation between the highest score in the OHIP and decayed teeth; a positive correlation with threshold significance between OHIP and DMFT; an inverse correlation between intact teeth and OHIP; and a positive and non statistically significant correlation between SiC and OHIP (correlation coefficient = 0.13, $p = 0.245$). Association between the mean OHIP and the terciles was not significant ($p = 0.146$); there were also no associations between periodontal condition and OHIP nor were there associations between the presence of fluorosis and mean OHIP.

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Introduction

Certain recent epidemiological studies indicate a reduction in the occurrence of caries in Latin America,^{1,2} which is in line with the trend observed in industrialized countries in the last decades.³ Despite this reduction, a polarized distribution of the disease has been observed.⁴

In adolescents and adults, the reduction observed has been less pronounced, with great concern being maintained for the occurrence of caries in other age groups above the age of 12.⁵

Due to changes in the pattern of distribution of this disease, other aggravating circumstances in oral health have gained prominence, among them the concern with periodontal disease⁶ whose prevalence has increased.³

In addition to the prevalence of oral diseases, the physical and psychological influence of these aggravating circumstances in the lives of individuals must be considered, concerning their joy of living, possibility of speaking, capability of chewing and social insertion.⁷

Epidemiological studies in dentistry should monitor the population trends for the several aggravating circumstances to oral health and its interference in the quality of life. These studies should further aid in the planning of oral health programs to address the health needs observed.¹

Clinical indicators are important for the assessment of oral health and treatment needs, nevertheless their limitations must be considered.⁸ The associated clinical and subjective indicators define a multi-dimensional assessment of the oral health condition.⁹ The quality of life indicators related to oral health were defined as the measurements of how dental problems and oral disorders interfere in the normal functioning of an individual's life.¹⁰

Despite the fact that dental caries is one of the most commonly studied oral diseases, most population studies in Brazil are concentrated in school-age children, and there is insufficient data about the prevalence of dental caries and other oral diseases in adolescents² and its impact on quality of life. Hence, the aim of this study was to assess the oral health status and its relation to quality of life in adolescents in the township of Água Doce, State of Santa Catarina, Brazil.

Material and Methods

Type of study

This is a household, cross-sectional population study.

Location

The township of Água Doce is located in the Mid West of Santa Catarina State, 430 km from the state's capital. The city's estimated population in 2005 was 6,876 inhabitants and the major economic activity is farming and cattle raising. Fluoridation of water has been performed since 1989.

Reference population

Every adolescent between the ages of 15 and 17 were examined. At the moment of the examinations, the town had 2,409 dwellings, 799 of them with adolescents. Twenty residences had more than one participant in this study.

Data gathering

A household Census was performed in 2005. The adolescents were examined by two calibrated dentists after obtaining an appropriate kappa (> 0.80). Socio-economic status was classified according to criteria from the Brazilian Association of Market Survey Institutes (ANEP – ABIPEME).¹¹ Furthermore, the interviewees were asked if they had children and if they lived in a stable union.

The clinical examinations used for observation of the average number of decayed, missing or filled teeth (DMFT Index), periodontal condition (CPI index) and fluorosis (Dean Index) were performed according to criteria established by the World Health Organization handbook.¹² The Significant Caries Index (SiC) was used to measure the polarization of the occurrence of caries among participants of the tercile with higher DMF-T; the index was calculated according to World Health Organization recommendations.¹³ The instrument used to determine quality of life associated with oral health was the Oral Health Impact Profile (OHIP), Brazilian version.¹⁴

Data were analyzed using the statistical package Stata 8.0 (Stata Corporation, College Station, TX, USA); the Spearman and Mann-Whitney cor-

relation tests were used to assess possible associations between oral conditions and their impact on daily activities (the level of significance adopted was 5%).

Ethical issues

The project was submitted to and approved by the Research Ethics Committee, Oeste de Santa Catarina University (UNOESC).

Results

Two hundred and forty seven adolescents took part in the study, 117 (47.37%) of which were of the female gender and 130 (52.63%) were of the male gender (Table 1).

The socio-economic status assessment indicated that 45.75% of the participants were classified in class C; the family income was analyzed in terms of number of minimum wages (MW). The study presented an average of 3 to 5 MW in 43.72% of the population, and 1 to 2 MW in 22.27% of the population. The largest number of persons found in the household varied from 3 to 5 persons, in a total of 74.90% of the population. Just over half of the studied population (53.44%) occupied their homes for a period greater than 10 years, and 23.08% of the population has lived in the same residence for a period of more than 1 and less than 5 years. Furthermore, 95.51% of the studied population informed not having children, and 94.29% do not live in a stable union (Table 1).

Occurrence of caries was observed in 218 (88.26%) of the participants (Table 1).

The mean DMFT was 5.40, showing a greater index in the filled teeth of 3.40 and with an average of 22.33 for intact teeth. In the 3rd tercile of the distribution of caries occurrence, the DMFT was 9.97 (SD 3.15) (Table 2).

In relation to the occurrence of periodontal disease measured by the CPI, 7 (2.83%) participants presented pockets (4-5 mm), 24 (9.72%) presented calculus, 98 (39.68%) adolescents had gingival bleeding and, finally, 118 (47.77%) presented healthy sextants (Table 1).

Table 1 also shows that 49 participants (19.83%) presented various degrees of fluorosis (from ques-

Table 1 - Distribution of participants according to socio-economic data (gender, socio-economic status, income, number of people in the household, residence time, number of children and stable union) and the occurrence of oral diseases, Água Doce - SC, 2005.

Variable	Category	N	%
Gender	Female	117	47.37
	Male	130	52.63
Socio-economic Condition (ANEP - ABIPEME)	A1	2	0.81
	A2	11	4.45
	B1	9	3.64
	B2	37	14.98
	C	113	45.75
	D	69	27.94
Income (in MW, minimum wages)	E	6	2.43
	< 1 MW	9	3.64
	1 to 2 MW	55	22.27
	3 to 5 MW	108	43.72
	6 to 10 MW	55	22.27
	11 to 20 MW	7	2.83
	> 20 MW	4	1.62
Number of people in the household	No information	9	3.64
	More than 5	53	21.46
	3 to 5	185	74.90
	2	8	3.24
Residence time (in years)	1	1	0.40
	More than 10	132	53.44
	- 10 and + 5	41	16.60
	- 5 and + 1	57	23.08
Children*	- 1	17	6.88
	Yes	11	4.49
Stable union*	No	234	95.51
	Yes	14	5.71
Occurrence of caries	No	231	94.29
	Yes	218	88.26
Occurrence of periodontal disease	No	29	11.74
	Healthy	118	47.77
	Bleeding	98	39.68
	Calculus	24	9.72
Experience of fluorosis	Pockets (4-5 mm)	7	2.83
	Absence of fluorosis	198	80.16
	Questionable	33	13.36
	Very light	12	4.86
	Light	3	1.21
	Moderate	1	0.40

* 245 valid answers.

tionable to moderate), while 198 (80.16%) showed an absence of this condition.

The mean OHIP was 3.95 (SD = 4.88). With regard to the oral impact related by the OHIP, varying from 0 to 4, the largest percentage in 0 (never) prevailed, indicating that oral problems had little interference in the daily activities of the population (Table 3). The impact that interfered most in the daily activities was feeling moderate, but constant, pain in the mouth (OHIP item 3), reported by 89 participants (36.18%); OHIP item 4 (having felt any discomfort while eating foods) was present in 70 re-

ports (28.34%) (Table 3).

By correlating the impact of the oral condition on the daily activities of the participants with the occurrence of caries of the adolescents, positive and statistically significant correlation was observed between the highest OHIP scoring item and decayed teeth (D) (Table 4). A positive correlation with threshold significance was observed between OHIP and DMFT Index; and finally, as expected, an inverse correlation between the number of intact teeth and the OHIP was observed. This means that, the larger the amount of intact teeth that an individual possesses, the smaller were the limitations reported for performing daily activities as a result of oral problems (Table 4). A positive correlation with no statistical significance between the SiC and the OHIP was also observed.

Table 5 shows a threshold significance between DMFT Index and OHIP. The same table shows that, despite the fact that the mean OHIP is inferior in the 1st and 2nd terciles, in comparison with the 3rd tercile, this was not a significant association (p = 0.146). Furthermore, no association was observed between the periodontal condition or presence of fluorosis and OHIP (Table 5).

Table 2 - Average number of permanent decayed (D), missing (M), filled (F), intact (H) teeth, DMFT and mean significant caries index (SiC) among participants of the study, Água Doce - SC, 2005.

	N	Average	SD	Min	Max
D	247	1.59	2.05	0	11
M	247	0.31	0.71	0	3
F	247	3.40	3.18	0	17
H	247	22.33	4.22	9	36
DMFT	247	5.40	4.09	0	26
SiC	82	9.97	3.15	7	26

Table 3 - Frequency of the impact related in each OHIP item among the participants of the study, Água Doce - SC, 2005.

OHIP		0		1		2		3		4	
		n	%	n	%	n	%	n	%	n	%
Functional limitation	Pronouncing words	230	93.12	2	0.81	13	5.26	1	0.40	1	0.40
	Flavour of foods	219	88.66	4	1.62	23	9.31	0	0	1	0.40
Physical pain	Constant pains*	125	50.81	32	13.01	84	34.15	2	0.81	3	1.22
	Eating foods	165	66.80	12	4.86	63	25.51	3	1.21	4	1.62
Psychological discomfort	Been little at ease	215	87.04	3	1.21	26	10.53	1	0.40	2	0.81
	Felt stressed	190	76.92	12	4.86	39	15.79	2	0.81	4	1.62
Physical disability	Food intake	226	91.50	3	1.21	18	7.29	0	0	0	0
	Interrupt meals*	222	90.24	5	2.03	19	7.72	0	0	0	0
Psychological disability	Difficult relaxing	231	93.52	3	1.21	12	4.86	0	0	1	0.40
	Felt embarrassed	188	76.11	10	4.05	44	17.81	0	0	5	2.02
Social disability	Been irritable	231	93.52	1	0.40	14	5.67	1	0.40	0	0
	Difficulties - daily activities	235	95.14	1	0.40	11	4.45	0	0	0	0
Handicap	Life in general*	230	93.50	4	1.63	12	4.88	0	0	0	0
	Unable - daily activities	244	98.79	0	0	3	1.21	0	0	0	0

0 = never, 1 = rarely, 2 = sometimes, 3 = constantly, 4 = always. *246 valid answers.

Table 4 - Correlation coefficients between decayed (D), missing (M), filled (F), occurrence of caries (DMFT), intact (H) teeth and significant caries index (SiC) with the OHIP, among adolescents in Água Doce - SC, 2005.

	Correlation Coefficient	p
D	0.25	< 0.001
M	0.10	0.105
F	0.01	0.843
DMFT	0.12	0.057
H	-0.15	0.018
SiC	0.13	0.245

Table 5 - Distribution of the occurrence of caries, fluorosis and periodontal condition and mean OHIP. Adolescents in Água Doce - SC, 2005.

		Mean OHIP	p
Occurrence of caries (DMFT)	Absent	2.31	0.058
	Present	4.17	
Occurrence of caries (DMFT)	1 st & 2 nd terciles	3.80	0.146
	3 rd tercile (SiC)	4.26	
Fluorosis	w/o fluorosis	3.75	0.171
	with fluorosis	4.81	
CPI	w/o disease	3.24	0.053
	with disease	4.60	

W/o = without. CPI = Periodontal Condition.

Discussion

The prevalence of caries in the studied population was 88.26%, which is similar to the results observed by Gushi *et al.*² (2005). The observed DMFT was 5.40; this finding was in line with nationwide and regional epidemiological studies in this age group,^{2,5} but was higher than that observed in international studies and recommendations.^{1,4}

By separately discriminating the occurrence of caries in the participants according to the components (decayed, missing or filled), the past experience in caries, observed through the higher average of filled teeth (F) was observed. This demonstrates the access the population has to dental health services.³

The high percentage of intact teeth among the participants is in line with local and international

findings in which the population had access to systemic fluorine.

The DMFT Index has traditionally been used to measure the occurrence of caries, but it provides an incomplete view of this condition in situations of polarized distribution; the SiC Index⁴ can provide important additional information about the impact of caries on those individuals most affected.² By analyzing the 82 participants the mean DMFT found was 9.97. Considering the global decline in the occurrence of caries, associated with the occurrence of polarization groups (few individuals responsible for a greater occurrence of caries and many individuals with most of their teeth intact), the use of the SiC index in this study confirmed this tendency. The 9.97 value for the SiC was high, if compared to those found by Marthaler *et al.*⁴ (2005), who found a SiC of 4.31 at the age of 15, nevertheless, it was inferior to the value observed among adolescents aged between 15 and 19 in the State of São Paulo.² The authors⁴ suggest that a target SiC of 5.0 be adopted for the age of 15. An interesting finding in this group was that OHIP did not show variations, indicating that for some degree of disease, the quality of life was not considered poorer as oral health became worse.

The occurrence of periodontal disease may vary from 10 to 90% depending on etiological factors involved.^{15,16} Our study found the presence of this condition in 52.23% of the population, which is similar to the result found by a nationwide epidemiological study in adolescents.⁵

The prevalence of dental fluorosis was 19.83%. This finding is compatible with epidemiological studies performed in Brazil in locations that offer optimum levels of fluorine in the water.^{6,17}

The mean OHIP was 3.95, indicating that oral conditions had little interference in the performance of daily activities. This finding was also observed in other studies.¹⁴ The presence of moderate, but constant pains in the mouth (OHIP 3) and discomfort in eating certain foods (OHIP 4) were the most frequently reported impacts.

It was observed that decayed teeth were associated with a greater impact measured by the OHIP; this fact was also pointed out elsewhere.⁷

Access to health services is necessary to turn the present occurrence of caries (decayed teeth) into past occurrence (filled teeth), thus reducing the impact of the occurrence of caries in any given moment in the daily lives of the participants. Inverse correlation was found between the number of intact teeth and the impact to the daily activities: the absence of the occurrence of caries can be correlated to the absence of limitations in the daily activities resulting from oral problems.

Assessing the occurrence of caries measured by the SiC and the OHIP, no correlation was found between them; these findings suggest that, despite the 3rd tercile having presented a mean OHIP higher than that of the 1st and 2nd terciles, no impact was observed for the individuals that reported greater occurrence of caries.

No association of the OHIP with dental fluorosis was observed. Probably this finding is due to the low prevalence of the disease in the studied population; other authors^{6,17} state that fluorosis in this standard of distribution does not correspond to a public health problem since it has little impact on the quality of life.

Although the prevalence of periodontal disease

was elevated, its severity was low, not presenting impact to the quality of life of the participants.

The limitation of this study is that it is a cross-sectional study in which the analytical capability is lower than in other types of surveys, but it is very appropriate for the study of prevalence and for the initial indication of a possible cause-effect association. Another limitation could be that the participants were considered independently of their relationship, and the influence of neighborhood and similarities in data analysis has been discussed.

Conclusion

The epidemiological distribution of dental caries was elevated, and continues to be a public health problem; the prevalence of periodontal disease and fluorosis were compatible with that of epidemiological findings in Brazil.

The largest impact on the performance of daily activities was related to the number of decayed teeth and a higher DMFT. Participants with a higher average of intact teeth presented less impact on the performance of their daily activities. Fluorosis and periodontal condition did not present any relationship in this situation.

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