

**Are oral health conditions and anxiety during dental treatment
associated with children`s Quality of Life?**

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SUMMARY

This study aimed at evaluating the quality of life related to oral health status in children aging 8 to 10 years old, and the anxiety of these children according to the dental procedures they need. Oral Health was evaluated by World Health Organization (WHO) criteria, Quality of Life by questionnaire (CPQ8-10), anxiety by heart rate frequency and pain before and after the dental procedure by Faces Pain Scale. The results are the worse the Quality of Life, more faces indicating pain were observed before the procedure ($p < 0.05$). Moderate positive correlations ($p < 0.05$) were found between the variables: difficulty of the procedure and caries index; difficulty of the procedure and Faces Pain Scale after the dental visit; Oral symptoms and biofilm presence; Oral symptoms and pain during the procedure; Clinical attendance time and Emotional Well-being; Clinical attendance time and Quality of Life; Social Welfare and Faces Pain Scale after the dental visit; Social Welfare and dentist fear. In procedures classified as moderate, heart rate frequency was significantly lower after the dental appointment. In conclusion painful symptoms resulting from dental problems affected Quality of Life of children, and anxiety prior to dental appointment depends on the procedure performed.

KEY WORDS: quality of life, anxiety, Pediatric Dentistry, Dental Care for Children.

INTRODUCTION

It is currently understood that health is not achieved only with treatment of signs and symptoms of a disease(1). The concept of quality of life encompasses physical health, well-being perception and social or family relationships(2,3). Considering the child audience, studies have shown that when appropriate tools are used, a valid and consistent report of quality of life related to oral health(4) can be obtained, as the oral disorders have a negative effect on the children`s well-being(5).

The questionnaires group “Child Oral Health Quality of Life Questionnaires”, evaluate the understanding of children concerning the relationship between quality of life and oral health(6). These tools include the child's perception regarding the impact of changes in the oral cavity in physical and psychosocial functioning of 8 to 10 year old children (CPQ 8-10)(7,8). Caries treatment is quite important for a good quality of life in the childhood. Many children, especially those seeking dental care, are very anxious and have fear of the dentist, avoiding dental visits(9,10). The greater the anxiety, the higher the difficulty to handle the children`s behavior.

As childhood is an important stage in the formation of the individual(11), studies involving child anxiety related to dental visits should be encouraged in order to provide subsidies for developing preventive strategies to reduce this fear, and thus favoring better oral health related parameters. There are reports in the literature of oral health related quality of life and dental treatment, but using general anesthesia or involving orthodontia and syndromes(12,13,14). No one considered the impact of different procedures on anxiety together with quality of life. This way, this research aimed to evaluate the quality of life related to oral health status in children aging 8 to 10 years old, and the anxiety of these children in relation to the dental procedures they need.

METHODS

The ethical principles (Declaration of Helsinki-World Medical Association) were followed strictly. The study was approved by the Ethics Committee [REDACTED] and the children's responsible signed a consent form and enlightened.

The convenience sample comprised 50 children attending the Dental Public System of the city [REDACTED]. The first fifty 8-to-10-year-old-children, scheduled for a dental visit in the Central Basic Health Unit in the fall semester 2014, were included in the research, since they didn't have special needs or disorders.

Children were asked to answer the Brazilian CPQ 8-10 in the waiting room before the dental procedure. This questionnaire was self-administered and presents four domains: Oral Symptoms (OS=5 questions), Functional Limitations (FL=5 questions), Emotional Well-being (EWB=5 questions) and Social Welfare (SW=10 questions). The child's quality of life was rated by the sum of the alternatives scores; the higher the scores the worse the child's quality of life. Also, they were asked if they had ever visited the dentist, if they had ever been afraid of the dentist, and if they had already met the dentist who would perform the procedure.

To enable the anxiety assessment, the heart rate frequency was measured during one minute by a previously trained researcher [REDACTED] (15). The Faces Pain Scale (16) was used to assess the children's pain. Both analyses were conducted in the waiting room before and after the dental procedure.

Clinical examinations were performed to verify the decayed missing or filled permanent (DMF-T) and primary (dmf-t) teeth, the presence of visible biofilm in the upper incisors, gingivitis, malocclusions and diastema. These evaluations were conducted in the waiting room by a previously trained researcher [REDACTED] and calibrated by a gold standard (Kappa = 0.90) with the child sitting under artificial light, using Individual Protection Equipment and a wooden spatula.

Dental procedures were performed by the dentist of the Basic Health Unit, accompanied by the researcher, and then grouped according to the difficult degree into: easy (cleanings and fluoride application), moderate (sealants, small restorations without isolation and without anesthesia, radiographs and supragingival scrapings) and difficult (surgery, restorations with anesthesia and endodontic dressings). The duration of the procedures, in minutes, was recorded with a progressive timer, and if the child reported pain during the clinical procedures, the researcher made a note in the research book.

The data were analyzed by descriptive statistics, Spearman correlation and Wilcoxon test ($\alpha=5\%$).

RESULTS

Table 1 displays the oral health conditions, quality of life and anxiety in children according to the difficulty of the dental procedure: easy, moderate or difficult. Most of the patients seek for moderate treatments, which involved sealants, small restorations, radiographs and supragingival scrapings, taking about half an hour to be performed. The prevalence of gingivitis, diastema and malocclusions was low among the studied population, and the more the difficulty of the procedure the worse the quality of life (higher scores). Dental biofilm was more prevalent among children who needed surgery, restorations with anesthesia and endodontic dressings (difficult procedures), as well as the pain report during the dental appointment. Considering statistical difference, heart rate frequency was significantly lower after the dental appointment ($p < 0.001$) in procedures classified as moderate.

Statistical significant correlations among quality of life, clinical parameters, anxiety and stress related to dental procedures are shown in Table 2. The worse the Quality of Life, more faces indicating pain were observed before the procedure ($p < 0.05$). Moderate positive correlations were found between the variables ($p < 0.05$, $r = 0.3 - 0.5$): difficulty of the procedure and caries index; difficulty of the procedure and Faces Pain Scale after the dental visit; Oral symptoms and biofilm presence; Oral symptoms and pain during the treatment; Clinical attendance time and Emotional Well-being; Clinical attendance time and Quality of Life; Social Welfare and Faces Pain Scale after the dental visit; Social Welfare and dentist fear.

DISCUSSION

The reflection of the oral health condition on child anxiety to dental care and quality of life were demonstrated in the present study.

The domains of the Brazilian CPQ 8 - 10 questionnaire showed positive correlation ($p < 0.05$ - Table 2) with the Faces Pain Scale before the procedure, thus, the worse the oral health related quality of life (higher scores), more the children pointed to faces indicating pain before being treated. Similar results were obtained by the study of Abanto(5), who verified a better oral health related quality of life after the dental treatment was performed.

The anxiety associated to dental appointment may occur due to some reasons: the child did not know exactly “how” and “what” would happen; they had already experienced pain at the dentist office before, or have had negative ideas told by the family or other people; and because of the office environment itself (15). As moderate procedures encompassed relatively simple techniques, children became more relaxed during the dental appointment, and hence when leaving the dental office a significant smaller number of heartbeats was observed ($p < 0.001$ - Table 1). The same situation did not happen with the difficult procedures, probably because the heart rate frequency was measured just after the dental appointment, and the child should have been anxious from the beginning to the end of the procedure. Another explanation could be the small number of children facing difficult procedures in the present study, which is a limitation.

A high number of heartbeats is related to increased blood pressure due to the child stress during the dental appointment. This stress stimulates increased production of adrenaline by the adrenal glands and in the bloodstream, this hormone increases the heart rate frequency, raises blood pressure, glucose level and can trigger crying, gastrointestinal disorders, paleness, decreased flow salivary rate and trembling. For these reasons, frightened patients avoid visiting the dentist and look for them only when the oral condition gets worse and more painful(17, 18).

In line with this assumption, the findings of (19), demonstrated that children who had previous experience of emergency visits showed greater dental caries damage. In the same way, our results showed that children submitted to difficult procedures (Table 1), presented a higher DMF- T/dmf- t and oral symptoms, as well as pain report (Table 2). Thus, the positive correlation between the difficulty of the procedure and caries index (Table 2) suggest that the higher the index, the higher the need for complex treatments ($p=0.026$). In addition, the difficulty of the procedure was also positively correlated with the Faces Pain Scale ($p=0.018$), reflecting more pain after more invasive treatments, which could also be related to anxiety, as invasive procedures, such as local anesthesia, as well as the dentist behavior, are capable of producing paleness(10).

The worse the oral symptoms obtained by the CPQ 8 - 10, the greater the presence of biofilm in the upper incisors ($p=0.049$) and more pain reported during the treatment ($p=0.017$) (Table 2). This could be explained by the fact that the biofilm is a crucial factor for caries development, since it harbors cariogenic bacteria that are responsible to ferment food substrates, leading to acids production and, consequently, teeth demineralization(20).

The Social Well-being had a positive correlation with children having dental fear ($p=0.011$) and increased pain sensibility after the procedure ($p=0.041$) (Table 1). The well-being relates to the child socialization: absences in school, the ability to go to the park and play or laugh with other children. In this regard, good oral health conditions are of prime importance.

The Emotional Well-being and the total scores of oral health related quality of life have shown positive correlations with the appointment duration ($p<0.05$) (Table 2); the worse the emotional well-being and quality of life, the longer the duration of dental procedure. This happened because the patient asked the dentist to stop the treatment requesting clarification, which reflects anxiety. Thus, a bad emotional well-being can influence the procedures performance.

The data analysis suggests that the majority of actions performed were dental restorations/curative procedures (moderate Table-1), corroborating with the research of Massoni(21) who found that most of the examined Brazilian children needed restorative dental treatment. Moreover, the bad oral health related quality of life was strongly associated with longer dental appointments ($p=0.026$) (Table 2). In this context, it is clear that preventive programs are strongly needed, establishing therapeutic management strategies to reduce anxiety and promote oral health(22). Such action is highly recommended to children's public health system, generating lower treatment costs for the government and favoring a better quality of life, as well as less anxiety, considering the complexity of the dental procedures required, that would be simpler than the curative ones.

This research shows that anxiety and fear are still very present in the daily lives of pediatric patients. According to Bottan(17), it is in childhood and adolescence that the fear of dental treatment is first observed and about 15 to 20% of the population is affected by dental phobia. This creates a cyclical problem, because when no preventive treatment is established, the dental pathology can get worse and requires more complex and emergency curative treatments, leading to discomfort and fear.

It could be concluded that painful symptoms resulting from dental problems affected children's quality of life in the public health system of [REDACTED] and anxiety prior to the dental appointment depended on the procedure to be performed.

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TABLES

Table 1. Oral health conditions, quality of life and anxiety in children according to the difficulty of the dental procedure performed.

Difficulty of the procedure	Number and % of children	DMFT dmft	Presence of				Quality of life scores					Faces Pain Scale		Heart rate frequency		Procedure	
			<i>Gingivitis</i>	<i>Biofilm</i>	<i>Malocclusion</i>	<i>Diastema</i>	<i>Oral symptoms (0-20)</i>	<i>Functional Limitations (0-20)</i>	<i>Emotional Well-being (0-20)</i>	<i>Social Welfare (0-40)</i>	<i>TOTAL (0-100)</i>	<i>Before (0-5)</i>	<i>After (0-5)</i>	<i>Before</i>	<i>After</i>	<i>Time (min)</i>	<i>Pain report</i>
0 easy	9 (18%)	2.89	0 (0%)	1(11%)	1(11%)	0	5.00	3.78	2.89	2.78	14.44	0.22	0.22	86.11	85.00	23.56	0
1 moderate	29 (58%)	4.72	1(3%)	8(28%)	1(3%)	1(3%)	6.55	3.41	4.21	3.45	17.72	0.38	0.28	91.34*	87.45*	33.03	2(3%)
2 difficult	12 (24%)	5.92	1(8%)	6(50%)	1(8%)	3(25%)	8.00	4.08	4.42	5.50	22.00	0.42	0.83	86.33	83.17	31.83	2(17%)

The asteristic “” indicate statistical significance by Wilcoxon test ($\alpha=5\%$)*

Table 2. Correlation among quality of life, clinical parameters, anxiety and stress related to dental procedures

	DMF-T dmf-t	Gingivitis	Biofilm	Malocclusion and Diastema	Heart rate before	Heart rate after	Faces Pain Scale before	Faces Pain Scale after	Time of procedure	Pain report	Ever been to the dentist?	Ever been to this dentist?	Ever been afraid of dentist?	Fear of dentist?
OS	R=-0.24 P=0.869	R=+0.185 P=0.199	R=+0.280 P=0.049*	R=-0.124 P=0.389	R=-0.002 P=0.990	R=+0.057 P=0.692	R=+0.510 P=0.001*	R=+0.140 P=0.333	R=+0.187 P=0.194	R=+0.336 P=0.017*	R=+0.124 P=0.390	R=-0.035 P=0.810	R=+0.237 P=0.097	R=+0.245 P=0.087
FL	R=-0.065 P=0.655	R=+0.029 P=0.843	R=+0.057 P=0.694	R=-0.175 P=0.225	R=-0.099 P=0.493	R=-0.019 P=0.895	R=+0.360 P=0.010*	R=+0.122 P=0.400	R=+0.251 P=0.078	R=+0.140 P=0.331	R=+0.176 P=0.221	R=-0.063 P=0.663	R=+0.109 P=0.451	R=-0.077 P=0.594
EWB	R=+0.009 P=0.951	R=+0.155 P=0.283	R=-0.066 P=0.648	R=+0.016 P=0.911	R=+0.070 P=0.630	R=-0.020 P=0.890	R=+0.318 P=0.025*	R=+0.241 P=0.092	R=+0.424 P=0.002*	R=+0.138 P=0.339	R=+0.171 P=0.234	R=-0.171 P=0.235	R=+0.256 P=0.072	R=+0.024 P=0.866
SW	R=-0.022 P=0.879	R=-0.083 P=0.565	R=+0.159 P=0.269	R=+0.018 P=0.899	R=-0.118 P=0.416	R=-0.033 P=0.822	R=+0.441 P=0.001*	R=+0.290 P=0.041*	R=+0.207 P=0.148	R=+0.180 P=0.210	R=+0.167 P=0.246	R=-0.116 P=0.422	R=+0.357 P=0.011*	R=+0.041 P=0.778
TOTAL	R=-0.107 P=0.458	R=+0.099 P=0.493	R=+0.174 P=0.227	R=-0.076 P=0.600	R=-0.057 P=0.693	R=+0.006 P=0.969	R=+0.467 P=0.001*	R=+0.260 P=0.069	R=+0.315 P=0.026*	R=+0.256 P=0.073	R=+0.193 P=0.179	R=0.120 P=0.408	R=+0.269 P=0.059	R=+0.78 P=0.590
Difficulty of procedure	R=+0.318 P=0.026*	R=+0.139 P=0.340	R=+0.278 P=0.053	R=+0.020 P=0.890	R=+0.002 P=0.987	R=-0.046 P=0.756	R=+0.035 P=0.809	R=+0.337 P=0.018*	R=+0.026 P=0.859	R=+0.201 P=0.166	R=-0.212 P=0.144	R=+0.123 P=0.400	R=+0.102 P=0.484	R=+0.051 P=0.728

The asterisk "*" indicate statistical significance by Spearman correlation test ($\alpha=5\%$)

OS = Oral Symptom /FL= Functional Limitations /EWB = Emotional Well-being /SW = Social Welfare