Are Oral Health Conditions and Anxiety During Dental Treatment Associated with Children`s Quality of Life?

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Abstract

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 worse the Quality of Life, the more the 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 the Quality of Life of children, and anxiety prior to the 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 functions 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 some reports in the literature about oral health related quality of life and dental treatment, but using general anesthesia or involving orthodontia and syndromes [12-14]. 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.

Materials and Methods

The ethical principles (Declaration of Helsinki-World Medical Association) were followed strictly. The study was approved by the Ethics Committee of the University São Francisco (CAAE: 38629914.6.0000.5514) and the children's responsible signed a positive consent form.

The convenience sample comprised 50 children attending the Dental Public System of the city of Bragança-Paulista-SP/ Brazil. 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 [8] in the waiting room before the dental procedure. This translated and validated questionnaire in Brazilian children [8] 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 [15], the heart rate frequency was measured during one minute by a previously trained researcher (K.F.R.). The Faces Pain Scale [16] was used to assess the children`s pain; the higher the score, the worse the 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

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were conducted in the waiting room by a previously trained researcher (K.F.R.) 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 (α=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, the more the 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.

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		Easy	Moderate	Difficult
Number and % of children		9 (18%)	29 (58%)	12 (24%)
DMFT/dmft		2.89	4.72	5.92
Presence of	Gingivitis	0(0%)	1(3%)	1(8%)
	Biofilm	1(11%)	8(28%)	6(50%)
	Malocclusion	1(11%)	1(3%)	1(8%)
	Diastema	0(0%)	1(3%)	3(25%)
Quality of life scores	Oral Symptoms (0-20)	5	6.55	8
	Functional Limitations (0-20)	3.78	3.41	4.08
	Emotional Well-being (0-20)	2.89	4.21	4.42
	Social Welfare (0-20)	2.78	3.45	5.5
	Total (0-100)	14.4	17.7	22
Faces Pain Scale	Before (0-5)	0.22	0.38	0.42
	After (0-5)	0.22	0.28	0.83
Heart rate frequency	Before	86. 11	91.34*	86.33
	After	85	87.45*	83.17
Procedure	Time (min)	23.6	33	31.8
	Pain report	0 (0%)	2(3%)	2(17%)
The astheristic "*" indicate statistical significance by Wilcoxon test (α=5%)				

Discussion

The reflection of the oral health condition on the child dental care anxiety and quality of life was 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), the 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 Rojas-Alcayaga [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].

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

	OS		FL		EWB		SW		TOTAL		Difficulty of procedure	
DMFT/ dmft	r=-0.24	p=0.87	r=-0.06	p=0.65	r=+0.01	p=0.95	r=-0.02	p=0.88	r=-0.11	p=0.46	r=+0.32	p=0.03*
Gingivitis	r=+0.18	p=0.12	r=+0.03	p=0.84	r=+0.15	p=0.28	r=-0.08	p=0.56	r=+0.10	p=0.49	r=+0.14	p=0.34
Biofilm	r=+0.28	p=0.04*	r=+0.06	p=0.69	r=-0.07	p=0.65	r=+0.16	p=0.27	r=+0.17	p=0.23	r=+0.28	p=0.05
Malocclusion and Diastema	r=-0.12	p=0.39	r=-0.17	p=0.22	r=+0.02	p=0.91	r=+0.02	p=0.90	r=-0.08	p=0.60	r=+0.02	p=0.89
Heart rate before	r=-0.00	p=0.99	r=-0.10	p= 0.49	r=+0.07	p= 0.63	r=-0.12	p=0.42	r=-0.06	p=0.69	r=+0.00	p=0.99
Heart rate after	r=+0.06	p=0.69	r=-0.02	p=0.89	r=-0.02	p=0.89	r=-0.03	p=0.82	r=+0.01	p=0.97	r=-0.05	p=0.76
Faces Pain Scale before	r=+0.51	p=0.00*	r=+0.36	p=0.01*	r=+0.32	p=0.02*	r=+0.44	p=0.00*	r=+0.47	p=0.00*	r=+0.03	p=0.81
Faces Pain Scale after	r=+0.14	p= 0.33	r=+0.12	p=0.40	r=+0.24	p=0.09	r=+0.29	p=0.04*	r=+0.26	p=0.07	r=+0.34	p=0.02*
Time of procedure	r=+0.19	p=0.19	r=+0.25	p=0.08	r=+0.42	p=0.00*	r=+0.21	p=0.15	r=+0.31	p=0.03*	r=+0.03	p=0.86
Pain report	r=+0.34	p=0.02*	r=+0.14	p=0.33	r=+0.14	p=0.34	r=+0.18	p=0.21	r=+0.26	p=0.07	r=+0.20	p=0.17
Ever been to the dentist?	r=+0.12	p=0.39	r=+0.18	p=0.22	r=+0.17	p=0.23	r=+0.17	p=0.25	r=+0.19	p= 0.18	r=-0.21	p=0.14
Ever been to this dentist?	r=-0.03	p=0.81	r=-0.06	p= 0.66	r=-0.17	p=0.23	r=-0.12	p=0.42	r=0.12	p=0.41	r=+0.12	p=0.40
Ever been afraid of dentist?	r=+0.24	p=0.10	r=+0.11	p= 0.45	r=+0.26	p=0.07	r=+0.36	p=0.01*	r=+0.27	p= 0.06	r=+0.10	p=0.48
Fear of dentist?	r=+0.24	p=0.09	r=-0.08	p=0.59	r=+0.02	p=0.87	r=+0.04	p=0.78	r=+0.78	p=0.59	r=+0.05	p=0.73

The astheristic "*" indicate statistical significance by Spearman correlation test (α=5%)
OS = Oral Symptoms
FL = Functional Limitations
EWB = Emotional Well-being
SW = Social Welfare

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 the more the pain reported during the treatment (p=0.017) (*Table 2*). This could be explained by the fact that biofilm is a crucial factor for caries development, since it harbors cariogenic bacteria that are capable of fermenting food substrates, leading to acid 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 the 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 should be strongly encoraged, 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 require more complex and emergency curative treatments, leading to discomfort and fear.

Conclusion

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

Acknowledgements

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