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Original Article

Risk Factors, Perception of Caregivers and Impact of Early Childhood Caries on Quality of Life Related to Oral Health of Preschool Children and their Families

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Abstract

Objective: To identify risk factors, feeling of guilt, perception of caregivers and to evaluate the impact of early childhood caries (ECC) on quality of life related to oral health of children and their families. **Material and Methods:** 40 preschoolers were included in this study. Data were collected through an interview with caregivers regarding sociodemographic data, risks factors and ECC. Data on perception of caregivers related to child's oral health, as well of questionnaire to evaluate quality of life – BECOHIS were also collected thought interview. **Results:** Analysis of categorical variables investigated, such as the risk factors for ECC, was performed using Chi-square test. For numeric variables, such as the parents' perceptions and the BECOHIS questionnaire score was performed with Mann Whitney test. Significance level was set at 5%. A difference was found between groups for the following investigated issues: "reason for seeking treatment", and "type of feeding" (breastfeeding or milk bottle) ($p < 0.05$). Caregivers felt guilty in relation to the oral health of their children and also by perceiving changes in their oral health status such as the presence of pain. The feeling of guilt expressed by parents was observed when related to toothache ($p = 0.01$). Association between presence of caries and perception of caregivers of the oral health condition was observed ($p < 0.05$). ECC impacts quality of life related to oral health of children ($p = 0.003$) and caregivers ($p = 0.003$). **Conclusion:** Among the risk factors investigated, type of feeding is associated with ECC. ECC affects the quality of life related to oral health of children afflicted and their families.

Keywords: Dental Caries; Preschool; Toothache; Quality of Life.

Introduction

The early establishment of dental caries affects preschool children, being characterized by the presence of one or more decayed, lost or filled tooth surfaces [1]. It has multifactorial etiology and can be influenced by social and environmental factors, as well as by age, socio-economic level and general health conditions [2]. Due to its high occurrence among preschool children, rapid progression and ability to lead to severe damage in primary dentition, early childhood caries is considered a public health problem [3].

Dental caries early established in childhood interferes in the quality of life of children themselves and their families [4]. According to the World Health Organization, quality of life is defined as the "individuals' perception of their position in life, in the context of culture and system of values in which they live and in relation to their goals, expectations, standards and concerns" [5]. Based on the above, specific instruments for children and adolescents aimed at measuring the impact of oral health on quality of life have been developed in the last years. Among these, the questionnaire "The Early Childhood Oral Health Impact Scale" (ECOHIS) with validated version in Portuguese (B-ECOHIS) stands out [6]. Generally, the relevant aspects of quality of life addressed by ECOHIS involve many elements of life of individuals, including impacts on the lives of children and their families [7].

Prevention and control of dental caries should consider family and especially maternal awareness to overcome the limits and the pursuit of quality of life [8], considering that these social actors are the key agents for the development of healthy habits in children [9]. As the role of caregivers in controlling the disease is of paramount importance, it is essential to know how they evaluate the oral health status of their children to follow health strategies suggestions [10].

Thus, this controlled cross-sectional study aimed to identify risk factors, feelings of guilt and perceptions of caregivers and to assess the impact of early childhood caries on quality of life related to oral health of children and their families.

Material and Methods

Study Design

This is an observational controlled cross-sectional study where children with and without early childhood caries are compared under the following perspectives: 1 - risk factors for the onset of the disease; 2- feelings of guilt and perceptions of caregivers in relation to oral health status of their children; 3- impact of the disease on quality of life related to oral health of preschool children, caregivers and families.

Eligibility Criteria and Ethical Considerations

Healthy preschool children aged 6-60 months with at least four primary teeth erupted were selected for convenience in the period of six months. These children have been previously screened and referred for care at the Department of Pediatric Dentistry of a higher education institution in the

State of Rio de Janeiro. Children with neurological disorders, syndromes or those using prescription drugs were excluded.

This study was approved by the local Ethics Research Committee (number 129-13). Caregivers were informed about the research and signed a Post-Informed Consent Form. Children whose guardians did not agree to participate in the study were automatically excluded without problems to their routine care.

Data collection

Data on risk factors related to the development early childhood dental caries and the feeling of guilt of caregivers about the oral health status of their children were collected from the child's medical records.

For the identification of risk factors, caregivers answered the anamnesis questionnaire containing questions related to reason for consultation, medical and dental history of children, diet, hygiene and fluoride use. Data on the feeling of guilt were obtained from the direct questioning of caregivers about the fact that they feel guilty for the current oral status of their children.

For the evaluation of perceptions, direct questions were performed to caregivers to estimate how early childhood caries were / are associated with the presence of pain and how this problem affected the life of children themselves, caregivers and families. For the computation of responses, a visual analogue scale with scores ranging from 0 to 10 was used, where zero represented absence and ten represented maximum negative influence.

The Brazilian version of ECOHIS (B-ECOHIS) ⁶ was used to assess the impact of early childhood caries on the quality of life of children and their families. The questionnaire containing 13 questions corresponding to six domains was applied in the form of interview with caregivers. Of the six domains, four are in the child impact domain (CIS): symptoms - item 01; function - 04 items; psychological - 02 items; self-image/ social interaction - 02 items; and two are in the family impact domains (FIS): Parental distress - 02 items and family function - 02 items. In addition to the questionnaire information, general questions about how caregivers rate the general and oral health of their children and if the welfare of both has been affected due to oral health problems were also performed. The responses to the B-ECOHIS were coded as follows: 0 = no / never, 1 = almost never, 2 = occasionally 3 = frequently 4 = very frequently; 5 = do not know. The general questions were coded as follows: 1 = very good, 2 = good, 3 = neither bad nor good 4 = poor, 5 = very poor ⁷. For the final assessment, individual totals were calculated using the sum of the response codes. Higher scores indicate a more negative impact on quality of life related to oral health and vice versa ¹¹. In addition, children underwent dental examination in order to determine the presence or absence of early childhood dental caries. For this, the definition of AAPD was considered, where the disease can be defined as the presence of one or more decayed, missing or filled tooth surfaces in a child below 71 months [1]. For the examiner calibration process, five preschool children were randomly selected in the pediatric dentistry clinic at UFRJ. A total of 100 teeth were examined at two different times with

two-week interval between them by the graduate teacher and then by study examiner. The inter-examiner agreement was assessed (Kappa 0.838) as well as the intra-examiner agreement (0.836). Children who participated in this process were not included in the main study. After clinical evaluation, preschool children were divided into two study groups according to the presence or absence of early childhood caries.

Data analysis

All data were tabulated, described and analyzed in SPSS software version 20.0 (Chicago, IL, USA). Sociodemographic (gender, age) and economic variables and reason for seeking treatment were presented descriptively. Associations between categorical variables (gender, reason for seeking treatment, feeling of guilt of caregivers for the child's current situation, caries severity, involvement of anterior teeth, eating habits - breastfeeding type and time, oral hygiene habits -tooth brushing before sleeping and use of fluoridated toothpaste) and the presence of early childhood caries were obtained using the chi-square test. For numeric variables (perceptions of caregivers and B-ECOHIS data), the Mann-Whitney test was used. For the analysis of the internal consistency of B-ECOHIS, the Cronbach's Alpha test was used. A 95% confidence interval was adopted for all analyses.

Results

This study included 40 preschool children, of which 21 (52%) were boys. The average age was 36.3 (\pm 10.8) months and the family economic distribution concentrated on classes C, D, E (75%). The presence of pain and dental caries accounted for 62.5% of the demand for care and after dental clinical examination, it was found that 30 (75%) preschool children had early childhood caries.

Gender ($p=0.429$), breastfeeding period ($p=0.228$) as well as reporting brushing before sleep ($p=0.432$) and toothpaste without fluoride ($p=0.052$) were not associated with the presence of early childhood caries in the study sample (Table 1). However, statistically significant association between the reason for seeking treatment ($p=0.00$), the type of breastfeeding ($p=0.002$) and presence of the disease was observed (Table 1).

Table 1. Association between presence of early childhood caries, gender, reason for seeking treatment and eating and oral hygiene habits in pre-school children.

Variables		Early Childhood Caries		p-value
		Yes (n=30)	No (n=10)	
Gender	Male	15 (50.0%)	6 (60.0%)	0.429
	Female	15 (50.0%)	4 (40.0%)	
Reason for seeking treatment	Caries/pain	25 (83.4%)	0 (0.0%)	0.000*
	Guidance /others	5 (16.6%)	10 (100%)	
Type of feeding	Natural	23 (76.7%)	2 (20.0%)	0.002*
	Artificial	0 (0.0%)	3 (30.0%)	
	Mixed	7 (23.3%)	5 (50.0%)	
Extended breastfeeding	> 12 months	26 (86.7%)	7 (70.0%)	0.228
	< 12 months	4 (13.3%)	3 (30.0%)	

Report of tooth brushing before sleeping	Yes	21 (70.0%)	5 (50.0%)	0.432
	No	7 (23.3%)	2 (20.0%)	
Use of toothpaste	Sometimes	2 (6.7%)	3 (30.0%)	0.052
	With fluoride	27 (90.0%)	6 (60.0%)	
	Without fluoride	3 (10.0%)	4 (40.0%)	

In the total sample, it was found that caregivers felt guilty when their children complained of toothache ($p=0.010$). However, in children with the disorder, the severity (0.466) and involvement of anterior teeth (0.449) did not influence the feeling of guilt of caregivers (Table 2).

Table 2. Variables related to the guilt of caregivers.

Variables		Feeling of guilt of caregivers		p-value
		Yes	No	
Toothache in the total sample	Yes	13 (32.50%)	6 (15.00%)	0.010*
	No	8 (20.00%)	13 (32.50%)	
Caries severity	Enamel	7 (23.33%)	4 (13.34%)	0.466
	Enamel and Dentin	14 (46.67%)	5 (16.66%)	
Decayed anterior teeth	Yes	16 (53.33%)	9 (30.00%)	0.449
	No	4 (13.34%)	1 (3.33%)	

There was a statistically significant association between presence of early childhood caries in preschool children and perceptions of caregivers about past and/or present toothache in the child ($p=0.010$); on how the problem has affected the child's life in the last month ($p=0.009$) and on the day of consultation ($p=0.010$), and how it affected the lives of caregivers ($p = 0.006$) and families ($p=0.010$) (Table 3).

Table 3. Perception of caregivers on the magnitude of interference of the presence of early childhood caries in their own life, child's life and family.

Perceptions	Early Childhood Caries		p-value
	Yes (n=30)	No (n=10)	
On the magnitude of pain that the child felt or is feeling(0-10)	3.27 (± 4.09)	0.00(± 0.00)	0.010*
About how the oral problem has affected the child's life in the past / present(0-10)	4.30 (± 4.13)	0.70 (± 2.21)	0.009*
About how the problem at the time of consultation is affecting his life (0-10)	4.47 (± 4.16)	0.70 (± 2.21)	0.010*
About how the oral problem has affected the caregiver's life (0-10)	5.83 (± 4.10)	1.60 (± 2.83)	0.006*
About how the oral problem has affected the family's life (0-10)	5.27 (± 4.38)	1.10 (± 2.60)	0.010*

There was a statistically significant difference between groups with and without early childhood caries on the domain of impact on quality of life of both child ($p = 0.003$), family ($p = 0.003$) and for the total score of the questionnaire ($p = 0.002$). The questionnaires showed

satisfactory internal consistency for the child ($\alpha = 0.944$), family ($\alpha = 0.855$) and total score ($\alpha = 0.951$) (Table 4).

Table 4. Score of the B-ECOHIS questionnaire.

B-ECOHIS	Early Childhood Caries		p-value	Cronbach's alpha
	Yes (n=30)	No (n=10)		
CIS	16.67 (± 10.42)	9.50 (± 1.58)	0.003*	0.944
FIS	8.97 (± 4.84)	4.60 (± 1.07)	0.003*	0.855
Total	25.63 (± 14.68)	14.10 (± 2.51)	0.002*	0.951

For the impact on the child's quality of life, there was statistical difference among domains "tooth, mouth or jawache" ($p = 0.002$), "trouble drinking hot and cold beverages" ($p = 0.014$), "difficulty eating certain foods" ($p = 0.010$), "trouble sleeping" ($p = 0.040$) (Table 5).

For the impact on the family's quality of life, there was difference for domains "Got angry" ($p = 0.007$) and "Felt guilty" ($p = 0.003$). (Table 5)

Table 5. Child and family domains in the B-ECOHIS questionnaire.

Domains	Score		P-value
	Mean±(SD)	Variation	
Impact on child			
How often your child due to problems in the tooth and mouth?			
Symptom domains			
Had tooth, mouth or jawache	Caries		0.002*
	No	1.00 ±0.00	
	Yes	2.37 ±1.47	
Function domains			
Had trouble drinking hot and cold beverages	Caries		0.014*
	No	1.00 ±0.42	
	Yes	1.87 ±1.09	
Had difficulty eating certain foods	Caries		0.010*
	No	1.00 ±0.00	
	Yes	2.17 ±1.53	
Had difficulty pronouncing a word	Caries		0.258
	No	1.40 ±1.26	
	Yes	1.80 ±1.47	
Missed school	Caries		0.054
	No	1.00 ±0.00	
	Yes	1.83 ±1.41	
Psychological domains			
Had trouble sleeping	Caries		0.040*
	No	1.00 ±0.00	
	Yes	1.87 ±1.45	
Got angry	Caries		0.054
	No	1.00 ±0.00	
	Yes	1.83 ±1.46	
Social interaction and self-image domains			
Avoided smiling	Caries		0.576
	No	1.10 ±0.31	
	Yes	1.50 ±1.30	
Avoided talking	Caries		0.131
	No	1.00 ±0.00	
	Yes	1.47 ±1.13	
Impact on Family			

How often do you or another family member due to your child's teeth or mouth problems

<i>Distress domains</i>			
Got angry	Caries		0.007*
	No	1.40 ±0.96	0-4
Felt guilty	Yes	2.93 ±1.53	1-6
	Caries		0.003*
	No	1.00 ±0.00	0-1
	Yes	2.60 ±1.69	0-3
<i>Family functional domains</i>			
Missed work	Caries		0.173
	No	1.80 ±0.42	1-6
Felt familiar financial impact	Yes	1.20 ±1.24	0-2
	Caries		0.099
	No	1.00 ±0.00	1-6
	Yes	1.63 ±1.32	0-1

Discussion

The incidence of early childhood caries has decreased in recent years; however, the condition is still frequently diagnosed in preschool children [12]. Although some authors have found higher frequency of early childhood caries in boys [13] and others in girls [2], this study showed no predilection for gender, corroborating a previous study [14]. The presence of early childhood caries has been a major reason for seeking dental care in preschool children [14]. In this study, caries and toothache were factors perceived by caregivers as the main reasons for seeking dental treatment, both related to a significant guilt reported by them.

The feeling of guilt of caregivers in relation to the oral health condition of their children has been previously related to the severity of lesions [12]. In this study, neither dental caries severity (lesion in enamel or enamel and dentin with or without pulp involvement), nor location (anterior or posterior tooth), were related to the feeling of guilt of caregivers. However, feeling of guilt was associated with the presence of dental pain (Table 2) and this fact can be confirmed in the independent analysis of each domain of the B-ECOHIS questionnaire, which showed statistical association between the impact of the presence of dental caries and the feeling of family when asked if "caregiver was distressed with the child's oral condition" and if "caregiver felt guilty about the child's oral health quality". According to this question, parents' perceptions of pain and oral health status of their children were also associated with the presence of caries.

The association between early childhood caries and breastfeeding is still controversial in literature. It has been reported that the condition is associated with breastfeeding due to its free demand from mother, constant frequency of feedings during the day, prolonged night feeds in excess, which would justify higher prevalence of caries in babies [13]. In this study, exclusive breastfeeding was statistically associated with early childhood caries. It has been described that early childhood caries is a type of dental destruction associated with prolonged breastfeeding beyond the twelve months of age [15]. It was found in another study a greater prevalence of early childhood caries in children with prolonged breastfeeding [16]. In our study, breastfeeding was associated to early childhood caries, regardless if it is extended beyond 12 months. It can be observed, therefore, that in the sample studied, prolonged breastfeeding may have been the process initiator, but cannot be

considered as the sole responsible for the development of the condition. The introduction of cariogenic foods in the diet of preschool children or the switch to artificial feeding may also have contributed to this condition and their association should also be investigated in further studies. The quality of food offered, the frequency of carbohydrate intake and its relationship with breastfeeding beyond [12] months should be considered. Another study reported that oral hygiene before sleep is a fundamental oral health procedure as it is characterized as a long period with mouth shut, that is, there is no chewing or speech stimulation for the production of saliva [9]. However, in this study, the majority (70%) of caregivers for children with early childhood caries reported to brush the teeth of their children before sleep. Although brushing has been reported, it is not known for sure if caregivers or the children themselves do it adequately. In addition, some children have the habit of eating at night, returning to sleep without further cleaning. This may have reduced the effectiveness of night brushing, thus promoting the development of the disease in the sample. The reliability of this response from parents should also be considered, since a negative response to the question could characterize an attitude of neglect in relation to the problem and an affirmative response could be considered socially acceptable. However, in this study, the authors have not conducted this investigation, thus suggesting the need for further studies to elucidate the question. One should also take into account that the performance of interviews and use of questionnaires have limitations such as responses may be false or respondents may retain important data fearing disclosing their identity as well as the interviewer's reaction [17].

The use of fluoride toothpaste showed no statistical difference between groups, but was in the statistical association limit ($p = 0.052$). According to another study, the use of fluoride toothpaste proved to be associated with the presence of caries reduction [16]. In contrast, the present study showed that the disease has developed even in the presence of fluorine (Table 1). This finding may be related to peculiarities of the sample such as frequency of improper brushing, poor hygiene quality and frequent exposure to sucrose [18]. However, this study did not make such investigations, suggesting more studies on these possible relationships. On the perception of caregivers, statistically significant differences were observed in all aspects related to the oral health status of children, showing that parents whose children have early childhood caries realize how it affects the lives of their children, of themselves and the family. Corroborating this research, another study reported that most caregivers for children with caries reported perceiving that the oral health of children affected their lives in general [19]. The following are among the consequences of early childhood caries: presence of pain and loss of tooth structure, compromising aesthetics, speech, chewing and social relations, thus interfering with the child's self-esteem [20]. In the present study, statistical difference in the B-ECOHIS scores was found for both the impact of child and family and for the total score of the questionnaire. These data agree with the findings of another study that used the same measurement instrument [21].

Assessing the results of the B-ECOHIS questionnaire regarding the impact caused in preschool children, statistical differences were observed for the following domains: symptom

("presence of toothache"), function ("difficulty drinking hot and cold beverages", "difficulty eating certain foods") and psychological ("trouble sleeping"). The domains of social interaction and self-esteem showed no difference between groups, probably due to the young age of the study sample. Therefore, what really impacted the quality of life related to oral health of children in this study was the painful symptoms caused by the presence of caries, the difficulty that this condition generates in feeding and discomfort during sleep, which are the main reasons reported by caregivers for seeking treatment.

The impact on the family's quality of life was associated only with the emotional aspect ("got angry", "felt guilty") and was related to the concern of caregivers with the child's situation, as well as the feeling of guilt expressed by parents in relation to the oral health status of the child, a fact corroborated by direct questions about the feeling of guilt related to the oral health status of children.

Conclusion

Among the investigated risk factors, the type of feeding is associated with the occurrence of early childhood caries. Caregivers for children with early childhood caries feel guilty about the oral health of their children. Also, they perceive changes in oral health status as well as the presence of pain, which condition impacts the quality of life related to oral health of affected children and their families.

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