Pesquisa Brasileira em Odontopediatria e Clínica Integrada 2021; 21:e0035
https://doi.org/10.1590/pboci.2021.147
ISSN 1519-0501 / eISSN 1983-4632

ORIGINAL ARTICLE

Association Between Dental Caries Experience and Socioeconomic Determinants on Oral Health-Related Quality of Life among Children and their Families

Kamila Rodrigues Junqueira Carvalho[1], Amanda Priscila de Jesus Ribeiro[1], Camila Faria Carrada[2,3], Flávia Almeida Ribeiro Scalioni[1], Karina Lopes Devito[4], Saul Martins Paiva[3], Fernanda Campos Machado[1], Rosangela Almeida Ribeiro[1]

[1]Department of Social and Paediatric Dentistry, School of Dentistry, Federal University of Juiz de Fora, Juiz de Fora, MG, Brazil.
[2]Department of Paediatric Dentistry, School of Dentistry, Faculty of Medical and Health Sciences, Juiz de Fora, MG, Brazil.
[3]Department of Paediatric Dentistry and Orthodontics, School of Dentistry, Federal University of Minas Gerais; Belo Horizonte, MG, Brazil.
[4]Department of Restorative Dentistry, School of Dentistry, Federal University of Juiz de Fora, Juiz de Fora, MG, Brazil.

Correspondence: Camila Faria Carrada, Faculdade de Odontologia da Universidade Federal de Minas Gerais, Avenida Antônio Carlos 6627, Pampulha, Belo Horizonte, MG, Brazil. 31270-901. **E-mail:** camilacarrada_89@hotmail.com

Academic Editor: Catarina Ribeiro Barros de Alencar

Received: 08 February 2021 / **Review:** 14 May 2021 / **Accepted:** 04 June 2021

How to cite: Carvalho KRJ, Ribeiro APJ, Carrada CF, Scalioni FAR, Devito KL, Paiva SM, et al. Association between dental caries experience and socioeconomic determinants on oral health-related quality of life among children and their families. Pesqui Bras Odontopediatria Clín Integr. 2021; 21:e0035. https://doi.org/10.1590/pboci.2021.147

ABSTRACT

Objective: To assess the association between dental caries experience, severe dental caries experience and socioeconomic determinants on oral health-related quality of life among children and their families. **Material and Methods:** This is a cross-sectional study whose sample was composed of children aged 4-12 years, who sought dental care in a dentistry school clinic, and their parents/caregivers. Dental caries experience and severe dental caries experience were assessed according to the DMF-T/dmf-t indexes. Parents/caregivers answered the Parental-Caregiver Perceptions Questionnaire (P-CPQ), the Family Impact Scale (FIS) and a questionnaire on socioeconomic and demographic conditions. Data analysis included the chi-square test and Poisson regression (PR). **Results:** The sample was composed of 105 children and their parents/caregivers. Severe dental caries experience in children was determinant for negative perception of children's OHRQoL by parents/caregivers (PR = 1.22; CI = 1.05-1.41). Negative impact on OHRQoL perceived by family members was determined by severe dental caries experience in children (PR = 1.22; CI = 1.05-1.42) and family income <5 minimum wage (PR = 1.32; CI = 1.08-1.61). **Conclusion:** Severe dental caries experience was associated with a negative impact on OHRQoL perceived by children and their families. Low family income was associated with a negative impact on the OHRQoL perceived by children and their families.

Keywords: Quality of Life; Oral Health; Child; Parents.

Introduction

A new definition of oral health was approved by the FDI World Dental Federation General Assembly. Currently, oral health is defined as multifaceted and includes the ability to speak, smile, smell, taste, touch, chew, swallow, and express a range of emotions through facial expressions with confidence and without pain, discomfort, and absence of craniofacial complex diseases [1]. It is a fundamental component of health and physical and mental well-being, reflecting the physiological, social, and psychological attributes essential to quality of life, being influenced by experiences, perceptions, expectations, and ability to adapt to circumstances [1]. Oral health-related quality of life (OHRQoL) comprises individuals' subjective perceptions concerning their health and the extent to which oral cavity problems can affect their daily lives and the lives of their families [2].

The growing need to determine the full repercussion of oral alterations on children's quality of life has resulted in the development of instruments aimed at their assessment [2]. However, OHRQoL in childhood should be measured by focusing on the perspective of the child and his/her family [3,4]. Therefore, to assess the impact of oral health on the quality of life of children, health professionals must also address the impact of these problems on the quality of life of their families [3,4].

Previous studies have shown that dental caries experience in children at various age groups is associated with a negative impact on their OHRQoL and on the OHRQoL of their families [5-7]. Knowing the factors that can have a negative impact on the OHRQoL of children and their families allows dentists, both in public and private spheres, to obtain the necessary information for the better planning of preventive and curative actions aimed at improving the living conditions of children and their families [4-9].

The relationship between clinical variables and OHRQoL is mediated by personal, social, and environmental factors, being influenced by the context in which individuals are inserted [10,11]. Socioeconomic factors can influence the capacity of individuals to respond to oral cavity problems [12,13]. A systematic review that assessed the impact of parents' socioeconomic status on children's OHRQoL showed that the existing evidence is weak and that precise conclusions based on the works reviewed are not possible, motivating further primary studies on the topic [14].

Therefore, this study aimed to assess the association between dental caries experience, severe dental caries experience and socioeconomic determinants on oral health-related quality of life among children and their families.

Material and Methods

Ethical Considerations

This study was approved by the Human Research Ethics Committee of the Federal University of Juiz de Fora (Opinion No. 2.941.359). Parents/caregivers received information regarding the objectives and importance of the research and signed the Free and Informed Consent Form authorizing their participation and the participation of their children.

Sample Characteristics and Study Design

This is a cross-sectional study whose sample was composed of children aged 4-12 years who sought dental care for the first time at the Department of Pediatric Dentistry, Federal University of Juiz de Fora (UFJF), in the period from August to December 2019. Parents/caregivers, regardless of age, sex, or ethnicity, also participated in the study.

Children unable to undergo satisfactory clinical examination due to behavioral or physical alterations were excluded from the study. Parents/caregivers who presented any visual, neurological, intellectual, cognitive, or motor impairments that prevented them from interpreting or adequately answering the self-administered questionnaire, as well as those who did not answer it completely, were also excluded from the study.

Sample Size

The formula applied to calculate the sample size was N = Z2pq/e2 (equation 1, by Cochran [15]), which is valid where N is the sample size, Z2 is the abscissa of the normal curve that cuts off an area α at the tails (1 - α equals the desired confidence level, e.g., 95%), e is the desired level of precision, p is the estimated proportion of an attribute that is present in the population, and q is 1 p. The value for Z is found in statistical tables, which contain the area under the normal curve. Considering α = 5%, Z = 1.96, p = 0.32 [16], q = 0.68, and e = 10%, the minimum sample size was 84 children.

Non-clinical Data Collection

Questionnaires were answered by parents/caregivers in the waiting room of the School of Dentistry at UFJF while their children underwent intraoral clinical examination. Questionnaires were conducted by researchers other than those who carried out the children's intraoral clinical examination.

OHRQoL Instruments

The perceptions of parents/caregivers of their children's oral health-related quality of life (OHRQoL) were assessed using the short version of the Parental-Caregiver Perceptions Questionnaire (P-CPQ) [17]. The short version of the P CPQ consists of a self-administered instrument with 13 questions. These questions are directed at the frequency of events in the past three months and are divided into three domains: oral symptoms (three questions); functional limitations (four questions); and well-being (six questions). The answer options for each question follow an ordinal scale with score ranging from zero to four points (never = 0; once or twice = 1; sometimes = 2; often = 3; every day or almost every day = 4). The total score is obtained from the sum of scores of all questions, ranging from 0 to 52. The higher the score, the more negative the perception of parents/caregivers regarding the impact of oral conditions on the quality of life of their children [2].

The impact of children's oral conditions on the quality of life of their families was assessed using the Brazilian version of the Family Impact Scale (FIS) [18]. The FIS consists of 14 items, divided into four domains: parents'/family members' occupation, parents'/family members' emotions, family conflict, and financial burdens. Questions refer only to the frequency of events in the previous three months. Items have five answer options for each question and follow an ordinal scale with score ranging from zero to four points (never = 0; once or twice = 1; sometimes = 2; often = 3; every day or almost every day = 4). The total score is obtained from the sum of scores of all items, ranging from 0 to 56. The higher the score, the more negative the impact of children's oral disorders on their family environment [3].

Socioeconomic and Demographic Variables

Parent/caregiver socioeconomic and demographic information was collected through a self-administered questionnaire that requested the following information: sex, child's age, mother's age, father's age, mother's education (≤ 8 years / > 8 years) and father's education (≤ 8 years / > 8 years), monthly family

income (≤ 5 x Brazilian minimum wage, corresponding to social classes D and E / > 5 x Brazilian minimum wage, corresponding to social classes A, B, and C [19]), and number of individuals in the family.

Calibration Exercise

Dental caries experience was assessed by a single experienced and calibrated examiner, a Pediatric Dentistry specialist. Data analysis involved calculating the intra-examiner Kappa coefficient (k = 0.97). The examiner was considered capable of carrying out the study based on the Kappa coefficient [20].

Clinical Oral Examination

Dental condition data from all children participating in the study were collected. Children were individually examined under artificial light, sitting in a dental chair. To conduct the exam, researchers used, in addition to personal protective equipment and a clinical mirror (Prisma, São Paulo, SP, Brazil).

The clinical parameters evaluated were dental caries experience and severe dental caries experience, estimated utilizing DMF-T and dmf-t indexes, in which decayed, missing, and filled permanent and deciduous teeth were recorded [21]. Dental caries experience was categorized as: free of dental caries (DMF-T/dmf-t = 0), dental caries experience (DMF-T/dmf-t ≥ 1); severe dental caries was categorized as absence of severe dental caries (DMF-T/dmf-t < 6) and presence of severe dental caries (DMF-T/dmf-t ≥ 6) [22].

Data Analysis

Collected data were analyzed using the Statistical Package for the Social Sciences (SPSS for Windows, version 21.0, SPSS Inc., Chicago, IL, USA). The Kolmogorov-Smirnov test demonstrated that the total P-CPQ score and the total FIS score exhibited non-normal distribution. Pearson's chi-square test, Fisher's exact test, and linear trend tests were used to assess the association between P-CPQ and total FIS scores (dependent variables), socioeconomic and demographic data and clinical indicators (independent variables). For this analysis, the total P-CPQ and the total FIS scores were dichotomized based on their median values, giving rise to a qualitative dependent variable (low impact and high impact) for each questionnaire. In the bivariate analysis, independent variables that presented a significance level of $p<0.25$ with dependent variables were incorporated into the final Poisson regression model. For this final model, the significance level adopted was $p < 0.05$.

Results

Of the 105 children participating in the study, 50 (47.5%) were girls and 55 (52.4%) were boys with a mean age of 7.2 years. Regarding caregivers interviewed, 20 were fathers, 75 were mothers, and 10 were grandparents. Table 1 shows the socioeconomic and demographic characteristics of the sample and the prevalence of caries experience (79%) and severe dental caries experience (68.6%) in children.

Table 1. Socioeconomic and demographic conditions and oral characteristics of the sample.

Variables	N	%
Sex		
Female	50	47.6
Male	55	52.4
Age		
3-7 Years Old	58	55.2
8-12 Years Old	47	44.8

Mother's Age		
23-35 Years Old	51	48.6
36-50 Years Old	47	44.8
Mother's Education		
≤ 8 Years	37	35.2
> 8 Years	66	62.9
Father's Age		
20-38 Years Old	48	45.7
39-73 Years Old	42	40.0
Father's Education		
≤ 8 Years	49	46.7
> 8 Years	47	44.8
Number of Individuals in the Family		
2-4 Individuals	71	67.6
5-9 Individuals	29	27.6
Family Income		
< 5 Brazilian Minimum Wages	92	87.6
> 5 Brazilian Minimum Wages	9	8.6
Caries Experience		
Absent	22	21.0
Present	83	79.0
Severe Dental Caries		
Absent (DMF-T/dmf-t<6)	33	31.4
Present (DMF-T/dmf-t≥6)	72	68.6

Table 2 shows the descriptive distribution of total scores and P-CPQ and FIS domains observed in the sample. The P-CPQ score ranged from zero to 25, with a median of 5. The FIS score ranged from zero to 28, with a median of 4.

Table 2. Median, interquartile interval and variance for the total P-CPQ score, total FIS score and each section.

Variables	Number of Questions	Median (Min.-Max.)	Interquartile Interval	Range Possible	Range Observed
Total P-CPQ Score	13	5 (0-25)	9	0-52	0-25
Oral Symptoms	3	1 (0-7)	3	0-12	0-7
Functional Limitations	4	2 (0-11)	4	0-16	0-11
Well-being	6	1 (0-15)	4	0-24	0-15
Total FIS Score	14	4 (0-28)	4	0-56	0-28
Parent Family Activity	5	2 (0-9)	3	0-20	0-9
Parental Emotions	4	0 (0-10)	2	0-16	0-10
Family Conflit	4	0 (0-12)	0	0-16	0-12
Financial Burden	1	0 (0-2)	9	0-4	0-2

Min.: Minimum; Max.: Maximum.

Table 3 shows the bivariate analyses of socioeconomic and demographic indicators and clinical conditions variables associated with total P-CPQ score and total FIS score. Variables mother's education (p=0.10), father's education (p=0.01), number of individuals in the family (p=0.01), and severe dental caries experience (p=0.12) presented p<0.25 in association with total P-CPQ score and were incorporated into the final Poisson regression model. Variables mother's education (p=0.14), income (p=0.07), dental caries experience (p=0.23), and severe dental caries experience (p=0.01) presented p<0.25 in association with total FIS score and were incorporated into the final Poisson regression model.

Final adjusted multivariate models showed that parents/caregivers of children with severe dental caries when compared with parents/caregivers of children without severe dental caries were 1.22 times more likely of presenting negative perception regarding OHRQoL of their children (PR=1.22; CI=1.05-1.42) and

regarding the impact of the oral health of their children on the quality of life of family members (PR=1.22; CI=1.05-1.41). Likewise, parents/caregivers of children with a family income of less than five minimum wage had were 1.32 times more likely of presenting negative perception regarding the impact of the oral health of their children on the quality of life of family members compared to parents/caregivers of children with family income greater than or equal to five minimum wage (PR=1.32; CI=1.08-1.61) (Table 4).

Table 3. Bivariate analysis between parent/caregiver perception on the impact of oral conditions on the quality of life of children and their family and socioeconomic and demographic characteristics and clinical indicators.

Variables	P-CPQ			FIS		
	Low Impact N (%)	High Impact N (%)	p-value	Low Impact N (%)	High Impact N (%)	p-value
Sex						
Female	24 (48.0)	26 (52.0)	0.43*	29 (58.0)	21 (42.0)	0.84*
Male	31 (56.4)	24 (43.6)		30 (54.5)	25 (45.5)	
Age						
3-7 Years Old	28 (48.3)	30 (51.7)	0.43*	31 (53.4)	27 (46.6)	0.43*
8-12 Years Old	27 (57.4)	20 (42.6)		28 (59.6)	19 (40.4)	
Mother's Age						
23-35 Years Old	27 (52.9)	24 (47.1)	0.84*	26 (51.0)	25 (49.0)	0.42*
36-50 Years Old	26 (55.3)	21 (44.7)		28 (59.6)	19 (40.4)	
Mother's Education						
≤ 8 Years	15 (40.5)	22 (59.5)	0.10*	17 (45.9)	20 (54.1)	0.14*
> 8 Years	38 (57.6)	28 (42.4)		41 (62.1)	25 (37.9)	
Father's Age						
20-38 Years Old	28 (58.3)	20 (41.7)	0.39*	30 (62.5)	18 (37.5)	0.39*
39-73 Years Old	20 (47.6)	22 (52.4)		22 (52.4)	20 (47.6)	
Father's Education						
≤ 8 Years	19 (38.8)	30 (61.2)	0.01*	28 (57.1)	21 (42.9)	0.83*
> 8 Years	31 (66.0)	16 (34.0)		28 (59.6)	19 (40.4)	
Family Income						
≤ 5 Brazilian Minimum Wages	28 (58.3)	20 (41.7)	0.39*	48 (52.2)	44 (47.8)	0.07**
> 5 Brazilian Minimum Wages	20 (47.6)	22 (52.4)		6 (66.7)	3 (33.3)	
Number of Individuals in the Family						
2-4 Individuals	19 (38.8)	30 (61.2)	0.01*	43 (60.6)	28 (39.4)	0.50*
5-9 Individuals	31 (66.0)	16 (34.0)		15 (51.7)	14 (48.3)	
Caries Experience						
Absent	48 (52.2)	44 (47.8)	0.40**	15 (68.2)	7 (31.8)	0.23*
Present	6 (66.7)	3 (33.3)		44 (53.4)	39 (47.0)	
Severe Dental Caries						
Absent (DMF-T/dmf-t<6)	43 (60.6)	28 (39.4)	0.12*	43 (57.2)	21 (32.8)	0.01*
Present (DMF-T/dmf-t≥6)	12 (41.4)	17 (58.6)		16 (39.0)	25 (61.0)	

*Pearson's Chi-square; **Fisher's exact test; ***Linear by linear.

Table 4. Poisson regression for the association between total PCP-Q score, total FIS score and independent variables.

Variables	P-CPQ		FIS	
	Adjusted PR (CI)	p-value	Adjusted PR (CI)	p-value
Mother's Education				
≤ 8 Years	1.03 (0.88–1.86)	0.66	1.07 (0.97–1.50)	0.29
> 8 Years	1		1	
Father's Education				
≤ 8 Years	1.10 (0.96–1.27)	0.52	-	-
> 8 Years	1			
Number of Individuals in the Family				
2-4 Individuals	1	0.15	-	-

5-9 Individuals	1.05 (0.90–1.21)			
Severe Dental Caries				
Absent (DMF-T/dmf-t<6)	1	0.01*	1	0.01*
Present (DMF-T/dmf-t≥6)	1.22 (1.05–1.42)		1.22 (1.05–1.41)	
Family Income				
< 5 Brazilian Minimum Wages	-	-	1.32 (1.08–1.61)	0.01*
> 5 Brazilian Minimum Wages			1	
Caries Experience				
Absent	-	-	1.00 (0.83–1.20)	0.94
Present			1	

PR: Prevalence Ratio; CI: Confidence Interval; *Poisson Regression.

Discussion

This confirmatory study presents results about the relationship between dental caries experience socioeconomic and demographic factors and OHRQoL of children receiving dental care in a dentistry school clinic and their families. The identification of factors that could affect the OHRQoL of children can assist dental professionals in decision-making regarding the need to prioritize more urgent actions and interventions for certain individuals [5]. The family plays a central role in promoting children's oral health [7]. Thus, also assessing the impact of the child's oral health on their family environment [4,5,7] and the relationship with the family's socioeconomic condition [10,14,23] enables an approach more directed at the weaknesses related to the oral health of this population. In this regard, studies that integrate individual determinants have been suggested to guide strategies to reduce health inequalities [12,14]. Furthermore, public health policies, such as improvement of access to health service and social support, should be implemented to minimize health inequalities at individual and macro-regional levels, improving OHRQoL throughout life [23].

Some limitations of the present study can be pointed out, such as those inherent to cross-sectional studies. In addition, the study uses a sample of patients and their relatives in a dentistry school clinic. In general, people seeking care will have more oral health problems and are predominantly low-income families, meaning that external validity is affected. The results await replication with a more generalized population. On the other hand, once the investigation was done on the Department of Pediatric Dentistry at the Federal University of Juiz de Fora, these findings are relevant for the Pediatric Dentistry Clinics. The results of this study can support clinical organization and its priorities, considering external validity for the department. Among strengths of the research, the fact that the sample size supports the statistical analyses performed, clinical measures being recorded by experienced, trained, and calibrated examiners and OHRQoL being measured using a validated instrument stand out.

The present study showed no difference between perception of parents/caregivers of children with and without dental caries experience concerning OHRQoL and in relation to the impact of the oral health of children on the quality of life of family members. Thus, there is a possibility that parents/caregivers consider dental caries as an inevitable part of childhood or a condition that they are able to control [24-26]. In addition, caregivers have limited abilities to recognize dental caries at initial stages and greater ability to recognize an oral health problem when it becomes more evident or manifests itself in the form of pain [27,28]. Thus, the impact on children's OHRQoL is only perceived by parents/caregivers when the disease is in advanced stages, such as in cases of severe dental caries, capable of causing changes in the daily lives of children and their families [8,9,29].

Severe dental caries in children was associated with the capacity of their parents/caregivers to perceive a negative impact in relation to their OHRQoL. It is suggested that this perception is due to the

capacity of severe dental caries in children to cause reactions such as pain, infection, dysfunction in the stomatognathic system, restriction of daily activities, aesthetic dissatisfaction, as well as impairment in learning, communication, and recreation [8,9,29]. The results also showed an association between children with severe dental caries and their parents/caregivers perceiving a negative impact of their oral health on the quality of life of family members. As parents/caregivers are the main support network for children, the severe dental caries can also have a negative impact on the family, resulting in sleepless nights, lost workdays, or time and cost of access to dental care, in addition to causing suffering to the caregiver and financial impact on the family [4]. Similar findings have been obtained in previous studies that assessed the impact of severe dental caries on the OHRQoL of preschoolers [8,9].

The relationship between socioeconomic factors and oral health is well documented in literature [10,23]. Previous studies on the Brazilian population have linked low level of income with higher intake of sugary foods, less access to health services, and poorer oral hygiene standards [12]. However, the results on the relationship between OHRQoL and socioeconomic factors are conflicting [14]. In the present study, family income below five Brazilian minimum wages was associated with negative impact of children's oral health only on the quality of life of their family members. There was no association between socioeconomic level and the perception of parents/caregivers in relation to their children's OHRQoL. Studies suggest that quality of life measures may reflect the expectations of individuals who have adapted to a particular life situation or the local environment in which they live [25,26].

Dental caries can be prevented and our results emphasize that greater efforts must be made for this, even when this pathology is in its initial stages. Periodic visits to the dentist and oral health education measures, taking into account the reality of each family, should be encouraged. The persistence of disparities in oral health requires efforts to target preventive actions at the most disadvantaged communities through policies that are accessible to all and appropriate to the reality of each family.

Conclusion

Severe dental caries in children was associated with a negative impact on their OHRQoL and on the quality of life of family members, according to the perception of parents/caregivers. Children's oral health was also associated with a negative impact on the quality of life of family members in children with low family income.

Authors' Contributions

KRJC	https://orcid.org/0000-0003-3144-0570	Investigation, Data Curation and Writing - Original Draft.
APJR	https://orcid.org/0000-0003-4824-6352	Investigation, Data Curation and Writing - Original Draft.
CFC	https://orcid.org/0000-0002-3173-2904	Methodology and Writing - Review and Editing.
FARS	https://orcid.org/0000-0002-0552-0414	Methodology and Writing - Review and Editing.
KLD	https://orcid.org/0000-0001-5037-5466	Methodology and Writing - Review and Editing.
SMP	https://orcid.org/0000-0002-3968-1638	Conceptualization, Methodology and Writing - Review and Editing.
FCM	https://orcid.org/0000-0002-7138-2670	Methodology and Writing - Review and Editing.
RAR	https://orcid.org/0000-0001-6472-5965	Conceptualization, Methodology, Writing - Review and Editing and Supervision.

All authors declare that they contributed to critical review of intellectual content and approval of the final version to be published.

Financial Support

This study was supported by the Federal University of Juiz de Fora, the Brazilian Coordination of Higher Education, Ministry of Education (CAPES), the Research Foundation of the State of Minas Gerais (FAPEMIG) and the National Council for Scientific and Technological Development (CNPQ), Brazil.

Conflict of Interest

The authors declare no conflicts of interest.

Data Availability

The data used to support the findings of this study can be made available upon request to the corresponding author.

References

[1] Glick M, Williams DM, Kleinman DV, Vujicic M, Watt RG, Weyant RJ. A new definition for oral health developed by the FDI World Dental Federation opens the door to a universal definition of oral health. Am J Orthod Dentofacial Orthop 2017; 151(2):229-31. https://doi:10.1016/j.ajodo.2016.11.010

[2] Jokovic A, Locker D, Stephens M, Kenny D, Tompson B, Guyatt G. Measuring parental perceptions of child oral health-related quality of life. J Public Health Dent 2003; 63(2):67-72. https://doi:10.1111/j.1752-7325.2003.tb03477.x

[3] Locker D, Jokovic A, Stephens M, Kenny D, Tompson B, Guyatt G. Family impact of child oral and oro-facial conditions. Community Dent Oral Epidemiol 2002; 30(6):438-48. https://doi: 10.1034/j.1600-0528.2002.00015.x

[4] Firmino RT, Gomes MC, Vieira-Andrade RG, Martins CC, Paiva SM, Granville-Garcia AF. Case-control study examining the impact of oral health problems on the quality of life of the families of preschoolers. Braz Oral Res 2016; 30(1):e121. https://doi.org/10.1590/1807-3107bor-2016.vol30.0121

[5] Nora ÂD, Rodrigues CS, Rocha RO, Soares FZM, Braga MM, Lenzi TL. Is caries associated with negative impact on oral health-related quality of life of pre-school children? A systematic review and meta-analysis. Pediatr Dent 2018; 15(7):403-11.

[6] Souza JG, Martins AM, Silveira MF, Jones KM, Meirelles MP. Impact of oral clinical problems on oral health-related quality of life in Brazilian children: a hierarchical approach. Int J Paediatr Dent 2017; 27(1):66-78. https://doi.org/10.1111/ipd.12229

[7] Bittencourt JM, Martins LP, Paiva SM, Pordeus IA, Martins-Júnior PA, Bendo CB. Early childhood caries and oral health-related quality of life of Brazilian children: Does parents' resilience act as moderator? Int J Paediatr Dent 2021; 31(3):383-93. https://doi.org/10.1111/ipd.12727

[8] Granville-Garcia AF, Gomes MC, Perazzo MF, Martins CC, Abreu MHNG, Paiva SM. Impact of caries severity/activity and psychological aspects of caregivers on oral health-related quality of life among 5-years-old children. Caries Res 2018; 52(6):570-79. https://doi.org/10.1159/000488210

[9] Gomes MC, Pinto-Sarmento TC, Costa EM, Martins CC, Granville-Garcia AF, Paiva SM. Impact of oral health conditions on the quality of life of preschool children and their families: a cross-sectional study. Health Qual Life Outcomes 2014; 12:55. https://doi.org/10.1186/1477-7525-12-55

[10] Moghaddam LF, Vettore MV, Bayani A, Bayat AH, Ahounbar M, Armoon B, et al. The Association of Oral Health Status, demographic characteristics and socioeconomic determinants with Oral health-related quality of life among children: a systematic review and Metaanalysis. BMC Pediatr 2020; 20(1):489. https://doi.org/10.1186/s12887-020-02371-8

[11] Paula JS, Leite IC, Almeida AB, Ambrosano GM, Pereira AC, Mialhe FL. The influence of oral health conditions. socioeconomic status and home environment factors on schoolchildren's self-perception of quality of life. Health Qual Life Outcomes 2012; 10(1):6. https://doi.org/10.1186/1477-7525-10-6

[12] Ardenghi TM, Piovesan C, Antunes JLF. Inequalities in untreated dental caries prevalence in preschool children in Brazil. Rev Saúde Pública 2013; 47(3):129-37. https://doi:10.1590/s0034-8910.2013047004352

[13] Schwendicke F, Dorfer CE, Schlattmann P, Foster Page L, Thomson WM. Paris S. Socioeconomic inequality and caries: a systematic review and meta-analysis. J Dent Res 2015; 94(1):10-8. https://doi.org/10.1177/0022034514557546

[14] Kumar S, Kroon J, Lalloo R. A systematic review of the impact of parental socio-economic status and home environment characteristics on children's oral health related quality of life. Health Qual Life Outcomes 2014; 12:41. https://doi.org/10.1186/1477-7525-12-41

[15] Cochran WG. Sampling Techniques. 2nd. ed. New York: John Wiley and Sons; 1963.

[16] Fernández MR, Goettems ML, Demarco FF, Corrêa MB. Is obesity associated to dental caries in Brazilian schoolchildren? Braz Oral Res 2017; 31:e83. https://doi.org/10.1590/1807-3107bor-2017.vol31.0083

[17] Goursand D, Ferreira MC, Pordeus IA, Mingoti SA, Veiga RT, Paiva SM. Development of a short form of the Brazilian Parental-Caregiver Perceptions Questionnaire using exploratory and confirmatory factor analysis. Qual Life Res 2013; 22(2):393-402. https://doi.org/10.1007/s11136-012-0145-3

[18] Goursand D, Paiva SM, Zarzar PM, Pordeus IA, Allison PJ. Family Impact Scale (FIS): psychometric properties of the Brazilian Portuguese language version. Eur J Paediatr Dent 2009; 10(3):141-6.

[19] Associação Brasileira de Empresa de Pesquisas (ABEP). Critério Brasil 2015 e atualização da distribuição de classes para 2016. Available from: http://www.abep.org/criterio-brasil. [Accessed on March 12, 2019]. [In Portuguese].

[20] Cohen J. A coefficient of agreement for nominal scale. Educ Psycho Measure 1960; 20(1):37-46. https://doi.org/10.1177/001316446002000104

[21] World Health Organization (WHO). Oral Health Surveys. 5th ed. Geneva: World Health Organization; 2013:137p. Available from: http://www.who.int/oral_health/publications/9789241548649/en/. [Accessed on March 12, 2019]

[22] Freire MDCM, Daher A, Costa LR, Corrêa-Faria P, de Brito LC, Bönecker MJS, et al. Caries severity declined besides persistent untreated primary teeth over a 22-year period: Trends among children in Goiânia. Brazil. Int J Paediatr Dent 2019; 29(2):129-37. https://doi.org/10.1111/ipd.12451

[23] Knorst JK, Sfreddo CS, Meira GF, Zanatta FB, Vettore MV, Ardenghi TM. Socioeconomic status and oral health-related quality of life: A systematic review and meta-analysis Community Dent Oral Epidemiol 2021; 49(2):95-102. https://doi.org/10.1111/cdoe.12616

[24] Chaffee BW, Rodrigues PH, Kramer PF, Vítolo MR, Feldens CA. Oral health-related quality-of-life scores differ by socioeconomic status and caries experience. Community Dent Oral Epidemiol 2017; 45(3):216-24. https://doi.org/10.1111/cdoe.12279

[25] Albino J, Tiwari T, Henderson WG, Thomas JF, Braun PA, Batliner TS. Parental psychosocial factors and childhood caries prevention: Data from an American Indian population. Community Dent Oral Epidemiol 2018; 46(4):360-8. https://doi.org/10.1111/cdoe.12376

[26] Karki AJ, Thomas DR, Chestnutt IG. Why has oral health promotion and prevention failed children requiring general anaesthesia for dental extractions? Community Dent Health 2011; 28(4):255-8.

[27] Gomes MC, Pinto-Sarmento TCDA, Costa EMMDB, Martins CC, Granville-Garcia AF, Paiva SM. Impact of oral health conditions on the quality of life of preschool children and their families: a cross-sectional study. Health Qual Life Outcomes 2014; 12(1):1-19. https://doi.org/10.1186/1477-7525-12-55.

[28] Fernandes IB, Pereira TS, Souza DS, Ramos-Jorge J, Marques LS, Ramos-Jorge ML. Severity of dental caries and quality of life for toddlers and their families. Pediatr Dent 2017; 39(2):118-23.

[29] Corrêa-Faria P, Paixão-Gonçalves S, Paiva SM, Martins-Júnior PA, Vieira-Andrade RG, Marques LS, et al. Dental caries, but not malocclusion or developmental defects, negatively impacts preschoolers' quality of life. Int J Paediatr Dent 2016; 26(3):211-9. https://doi.org/10.1111/ipd.12190