JOANA RAMOS-JORGE

IMPACTO DA CÁRIE DENTÁRIA NA QUALIDADE DE VIDA DE CRIANÇAS PRÉ-ESCOLARES E DE SUAS FAMÍLIAS

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IMPACTO DA CÁRIE DENTÁRIA NA QUALIDADE DE VIDA DE CRIANÇAS PRÉ-ESCOLARES E DE SUAS FAMÍLIAS

Tese apresentada ao Colegiado do Programa de Pós-Graduação em Odontologia da Faculdade de Odontologia da Universidade Federal de Minas Gerais, como requisito parcial para obtenção do título de Doutor em Odontologia, área de concentração em Odontopediatria.

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Tese intitulada "*Impacto da cárie dentária na qualidade de vida de crianças pré-escolares e de suas famílias*", área de concentração em **Odontopediatria**, apresentada por **Joana Ramos Jorge**, para obtenção do grau de **Doutor em Odontologia**, **APROVADA** pela Comissão Examinadora constituída pelos seguintes professores:

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Belo Horizonte, 25 de fevereiro de 2013.

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Ata da Comissão Examinadora para julgamento da Tese de Doutorado em Odontologia, área de concentração em **Odontopediatria**, da candidata **Joana Ramos Jorge**.

Aos 25 de fevereiro de 2013, às 14:00 h, na sala de Pós-Graduação (3418) da Faculdade de Odontologia, reuniu-se a Comissão Examinadora, composta pelos professores Dr. Saul Martins de Paiva, Dra. Isabela Almeida Pordeus, Dr. Mauro Henrique Nogueira Guimarães de Abreu, Dra. Carolina de Castro Martins, Dr. Luciano José Pereira e Dr. Marcos Ribeiro Moyses. O Professor Dr. Saul Martins de Paiva, Orientador da Tese, na qualidade de Presidente da sessão, apresentou a Comissão Examinadora e declarou abertos os trabalhos. À candidata foi dado o tempo de até 50 (cinquenta) minutos para fazer a exposição oral sobre o seu trabalho **"Impacto da cárie dentária na qualidade de vida de crianças pré-escolares e de suas famílias"**. Encerrada a exposição, foi iniciada a arguição, dentro do limite de tempo de 30 (trinta) minutos, pelos Professores Dr. Mauro Henrique Nogueira Guimarães de Abreu, Dra. Carolina de Castro Martins, Dr. Luciano José Pereira e Dr. Marcos Ribeiro Moyses, com limite de 30 (trinta) minutos para a resposta. Terminadas as arguições, o Presidente suspendeu os trabalhos por 10 minutos para que os examinadores pudessem decidir pelo resultado a ser dado à candidata. A Comissão Examinadora opta pela aprovação da candidata. Para constar, lavrou-se a presente ata, que vai assinada por mim, Dr. Saul Martins de Paiva, Presidente e pelos demais membros desta comissão examinadora. Belo Horizonte, 25 de fevereiro de 2013.

Dr. Saul Martins de Paiva
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LISTA DE ABREVIATURAS

OMS – *Organização Mundial de Saúde*

ICDAS – *International Caries Detection and Assessment System*

ECOHIS – *Early Childhood Oral Health Impact Scale*

SOHO-5 – *Scale of Oral Health Outcomes for 5-year-old children*

CPQ – *Child Perceptions Questionnaire*

ECC – *Early Childhood Caries*

S-ECC – *Severe Early Childhood Caries*

WHO – *World Health Organization*

ECL – *Early Caries Lesions*

OHRQoL – *Oral Health Related Quality of Life*

CIS – *Child Impact Section*

FIS – *Family Impact Section*

LAA – *Activity Lesion Assessment*

TDI – *Traumatic Dental Injuries*

SPSS – *Statistical Package for the Social Sciences*

PUFA – *Pulpal involvement, Ulceration due to trauma, Fistula and Abcess*

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RESUMO

Impacto da cárie dentária na qualidade de vida de crianças pré-escolares e de suas famílias

RESUMO

As consequências da cárie dentária na vida das crianças incluem dor, diminuição do apetite, dificuldades de mastigação, perda de peso, dificuldades para dormir, mudanças de comportamento e baixo rendimento escolar. O objetivo deste estudo transversal de base populacional foi avaliar o impacto de diferentes estágios de progressão, de atividade de cárie dentária e da distribuição das lesões na cavidade bucal na qualidade de vida de crianças pré-escolares e seus pais/cuidadores na cidade de Diamantina, Minas Gerais. Uma amostra aleatória de 451 crianças de 3 a 5 anos de idade foi submetida a um exame clínico para avaliar a cárie dentária usando um sistema internacional de avaliação e detecção de cárie - *International Caries Detection and Assessment System* (ICDAS). Os pais das crianças foram convidados a responder dois questionários: um sobre qualidade de vida relacionada à saúde bucal - *Oral Health Related Quality of Life* (OHRQoL) das crianças utilizando o *Early Childhood Oral Health Impact Scale* (ECOHIS) e outro sobre as características e condições sociodemográficas e econômicas das crianças e suas famílias. Análise descritiva, qui-quadrado, *Mann-Whitney* e modelos de regressão de *Poisson* hierarquicamente ajustados foram utilizados. A prevalência de cárie precoce na infância foi de 51,2%. Dessas, a maioria das crianças (60,6%) apresentou lesões severas. Houve uma diferença significativa entre o estágio de progressão da cárie e OHRQoL, em termos de impacto na criança e na família. Estágios de progressão mais avançados de cárie dentária, como lesões com dentina visível, cavidade extensa e resto radicular foram associados ao impacto negativo na qualidade de vida. Esse resultado foi observado tanto em dentes anteriores quanto posteriores. Essa associação também foi verificada em relação à idade e à escolaridade da mãe. Concluiu-se que lesões de cárie em estágios mais avançados de progressão foram associados a

uma pior qualidade de vida em crianças pré-escolares e seus pais/cuidadores, independetemente de sua distribuição na cavidade bucal.

Palavras-chave: cárie dentária, cárie dentária de início precoce, criança, pré-escolar, qualidade de vida, QVRSB, ICDAS II

ABSTRACT

Impact of dental caries on quality of life of preschoolers and their families

ABSTRACT

The consequences of tooth decay in children include pain, diminished appetite, difficulty chewing, weight loss, difficulty sleeping, behavioral changes and poor scholastic performance. The aim of the present population-based cross-sectional study was to assess the impact of different stages of caries progression, caries activity and distribution in the oral cavity on the quality of life of preschool children and their parents/caregivers in the city of Diamantina, state of Minas Gerais, Brazil. A total of 451 randomly selected children aged three to five years were submitted to a clinical exam for the assessment of dental caries using the International Caries Detection and Assessment System. Two questionnaires were administered to parents/caregivers: one on the oral health-related quality of life (OHRQoL) of the children (Early Childhood Oral Health Impact Scale) and one on socio-demographic and economic characteristics of the children and families. Data analysis involved descriptive statistics, the chi-square test, Mann-Whitney test and hierarchically adjusted Poisson regression models. The prevalence of early childhood caries was 51.2%. The majority of children with tooth decay (60.6%) had severe carious lesions. A significant association was found between caries progression stage and the OHRQoL of both the child and family. More advanced stages of progression (distinct cavity with visible dentin, extensive cavity and root remnant) in anterior and/or posterior teeth exerted a negative impact on quality of life. Moreover, the negative impact on quality of life was associated with the age of the child and mother's schooling. In conclusion, dental caries in more advanced stages of progression were associated with a poorer quality of life among preschoolers and their families, regardless of the distribution in the oral cavity.

Keywords: dental caries, early childhood caries, preschooler, quality of life, OHRQoL, ICDAS II

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CONSIDERAÇÕES INICIAIS

CONSIDERAÇÕES INICIAIS

A cárie dentária é uma doença bucal de etiologia multifatorial, modulada por fatores genéticos, comportamentais e ambientais (Reisine e Psoter, 2001; Petersen *et al*., 2005). Fatores socioeconômicos têm sido associados tanto com a experiência de cárie quanto com a sua distribuição entre crianças pré-escolares e escolares (Pereira *et al*., 2007; Traebert *et al*., 2009). O entendimento da influência de variáveis demográficas, do estilo de vida e de condições sociais na instalação e progressão da cárie dentária pode contribuir para melhorias no tratamento preventivo e restaurador dessa doença (Petersen *et al*., 2005).

Apesar do declínio da prevalência de cárie dentária a partir dos anos 1970, seu controle ainda é um desafio para a saúde pública (Petersen *et al*., 2005; Dye *et al*., 2007), afetando uma proporção considerável da população. Além disso, nota-se crescente polarização dessa doença (Sweeney *et al*., 1999), fato decorrente das desigualdades sociais em saúde bucal (Sabbah *et al*., 2007), levando a uma maior prevalência de cárie dentária em algumas minorias (Antunes *et al*., 2004).

Para o exame da cárie dentária em estudos epidemiológicos, frequentemente, adota-se como critério de diagnóstico a presença de lesões dentárias cavitadas, uma vez que os examinadores podem não detectar com segurança a presença de lesão de cárie em outros estágios (OMS, 1997). Entretanto, a inclusão de lesões não cavitadas no diagnóstico da cárie é necessária, pois estas podem ser controladas por meio de técnicas não invasivas, reduzindo os custos de tratamento (Pitts e Fyffe, 1988; Ismail *et al.*, 1992; Fyffe *et al.*, 2000; Pitts, 2004; Assaf *et al.*, 2006). Além disso, a introdução de um critério que inclui lesões não cavitadas tem a finalidade

de melhorar a sensibilidade para o diagnóstico da cárie dentária em estudos epidemiológicos (Assaf *et al*., 2006).

Assim, o sistema internacional de avaliação e detecção da cárie dentária (ICDAS - *International Caries Detection and Assessment System*) foi desenvolvido para uso em pesquisa clínica, prática clínica e estudos epidemiológicos (Pitts, 2004). Este índice foi aprimorado e, atualmente, é denominado ICDAS II (Ismail *et al*., 2007). De acordo com Braga *et al*. (2010), o uso dos critérios ICDAS II pode melhorar o desempenho do exame clínico visual, sendo possível a avaliação da presença, severidade e atividade das lesões de cárie.

Este método de detecção é ainda considerado recente e por isso poucos estudos foram concluídos. Em recente busca realizada no *PubMed* foram encontrados 95 artigos que utilizavam o critério ICDAS. Dentre esses artigos, a maioria abordou a confiabilidade e aplicabilidade desse sistema em estudos epidemiológicos e também a comparação com outros métodos diagnósticos.

Em estudo realizado na cidade de Amparo (SP, Brasil), verificou-se que o exame clínico bucal realizado de acordo com os critérios do ICDAS II, além de fornecer informações sobre lesões não cavitadas, é capaz de gerar dados que podem ser comparados aos dados provenientes de exames clínicos bucais que utilizam o critério OMS (Braga *et al*., 2009a). Além disso, esse método foi superior para o diagnóstico de lesões cavitadas e não cavitadas em molares decíduos quando comparado à interpretação radiográfica e ao *Diagnodent pen* (Braga *et al*., 2009b).

Apesar de não ser uma doença fatal, a cárie dentária pode levar à ocorrência de dor, perda de sono, interferências na fala, na alimentação, nas relações sociais e na autoestima. Portanto, há um prejuízo no desempenho das atividades diárias, o que caracteriza um impacto negativo na qualidade de vida dos indivíduos (Patel *et al*., 2007).

Nos últimos anos observou-se mudanças importantes na forma como os profissionais de saúde avaliam tanto a saúde geral como a bucal. Atualmente, a saúde é estudada com uma abordagem mais ampla, que inclui a percepção do paciente em relação ao impacto da saúde na sua qualidade de vida, não considerando apenas o julgamento profissional. Esta nova abordagem requer o uso de instrumentos apropriados para medir a qualidade de vida (Jabarifar *et al*., 2010).

O conceito de qualidade de vida relacionada à saúde bucal se refere ao impacto que a saúde bucal ou a doença tem sobre o desempenho de atividades diárias do indivíduo, o bem-estar ou qualidade de vida (Slade, 1997). Dificuldades para falar, sorrir, alimentar e desempenhar atividades físicas, bem como impactos psicológicos são consequências comuns das condições bucais adversas.

Considerando-se que os pais são responsáveis por garantir o bem-estar das crianças, é importante explorar as suas percepções sobre a saúde bucal de seus filhos. Essas percepções podem afetar os cuidados dentários preventivos que as crianças recebem em casa e também a utilização de serviços profissionais odontológicos (Filstrup *et al*., 2003). Além disso, a percepção dos pais sobre a saúde bucal de seus filhos pode contribuir para o entendimento de algumas das razões pelas quais as crianças não recebem atendimento odontológico de que necessitam. Estas considerações são especialmente importantes para crianças pré-escolares porque a sua limitação para verbalizar suas emoções e angústias aumenta a sua dependência dos adultos (Talekar *et al*., 2005).

Em 2007 foi publicado a escala de impacto da saúde bucal em crianças com idade pré-escolar (*Early Childhood Oral Health Impact Scale – ECOHIS*) (Pahel *et al*., 2007). Esse instrumento foi validado e utilizado em diversos países, inclusive no Brasil (Tesch *et al*., 2008;

Scarpelli *et al*., 2011; Martins-Júnior *et al*., 2012). Mais recentemente, foi desenvolvida uma escala de avaliação da qualidade de vida relacionada à saúde bucal em crianças de 5 anos (*Scale of Oral Health Outcomes for 5-year-old-children – SOHO-5*). Esse instrumento contém um questionário para coleta de informações com os pais e com as crianças (Tsakos *et al*., 2012).

Os estudos demonstram que a cárie dentária é a condição bucal que mais afeta negativamente a qualidade de vida de crianças pré-escolares (Wong *et al*., 2011; Abanto *et al*., 2011). Assim, é importante que se avalie os estágios das lesões de cárie dentária não tratada, bem como os dentes acometidos, que afetam a qualidade de vida de crianças pré-escolares e suas famílias para definição de prioridades dos programas de saúde bucal. Além disso, o reconhecimento dessas lesões pelos pais/responsáveis e o acesso a tratamento odontológico deve ser investigado.

Este estudo foi desenvolvido junto ao Programa de Pós-Graduação em Odontologia da Faculdade de Odontologia da Universidade Federal de Minas Gerais. Diante da importância da publicação de pesquisas para o desenvolvimento científico, esta tese foi estruturada na forma de artigo.

MANUSCRITO 1

Periódico: ***Community Dentistry and Oral Epidemiology***

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Impact of untreated advanced dental caries on quality of life of preschool children: different stages of progression and activity

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Running title: untreated advanced dental caries and quality of life

Keywords: dental caries, early childhood caries, preschool children, oral health-related quality of life

Abstract

Objective: The aim of the present population-based cross-sectional study was to evaluate the impact of different stages of dental caries progression and activity on oral health-related quality of life (OHRQoL) among preschool children and their parents/caregivers.

Methods: A randomly selected sample of 499 Brazilian preschool children aged three to five years underwent a clinical oral examination for the assessment of dental caries using the ICDAS II criteria. Parents/caregivers were asked to answer two questionnaires: one on the OHRQoL of the children (ECOHIS) and another on the demographic and socioeconomic characteristics of the children and families. Statistical analysis involved descriptive statistics, the chi-square test, Mann-Whitney test and hierarchically adjusted Poisson regression models.

Results: The prevalence of early childhood caries was 51.2%. The majority of teeth with caries exhibited severe decay (60.6%). A significant association was found between the progression stage and OHRQoL in terms of impact on both the child and family ($p<0.001$). More advanced stages of dental caries progression, such as active lesions within visible dentin ($p<0.001$), extensive active and inactive cavity without pulp exposure or fistula ($p<0.001$ and $p=0.001$, respectively), extensive cavity with pulp exposure and absence of fistula ($p=0.003$) and root remnant ($p=0.002$), were associated with a negative impact on quality of life.

Conclusion: Carious lesions in more advanced stages of progression were associated with a negative impact on the quality of life of preschoolers and their parents/caregivers.

Introduction

Early Childhood Caries (ECC) is a multifactor disease that affects children in preschool age [1]. The prevalence of ECC is reported to be as high as 70% in developing countries as well as underprivileged populations in developed countries [2]. In Brazil, the most recent epidemiological survey reports that 53.4% of five-year-old children have dental caries [3]. This survey used the index recommended by the World Health Organization [4] as the diagnostic criteria for the determination of dental caries. Employing the WHO criteria for early carious lesions in the detection of dental caries, a Brazilian study found a higher prevalence rate (69%) among 351 children aged three and four years [5].

The consequences of ECC on the quality of life of children include pain, decreased appetite, chewing difficulties, weight loss, sleeping difficulties, changes in behavior and a poor scholastic performance [6-11]. In preschool children, this investigation is performed with the assistance of parents or caregivers, as children younger than six years of age may not remember events accurately in a time interval greater than 24 hours [12] and may have limitations regarding the verbalization of emotions and anguish [13]. In 2007, researchers of the University of North Carolina at Chapel Hill developed the Early Childhood Oral Health Impact Scale (ECOHIS) to be administered to parents and caregivers of preschool children. This questionnaire is practical for use in epidemiological surveys [14] and has been translated and validated in Brazilian Portuguese [15-17].

Studies carried out in China [18] and Brazil [11,19,20] using the ECOHIS report that ECC has a negative impact on the quality of life of preschool children and their parents. These studies also demonstrate that the impact is even greater in the presence of severe ECC. The most

frequent consequences reported were pain in the teeth, mouth or jaws, difficulty eating some foods and difficulty drinking hot or cold beverages. Other investigations have been conducted to assess the clinical consequences of untreated cavitated lesions and the impact on the quality of life of children aged six and seven years [21,22]. However, studies generally fail to distinguish lesions in involving the enamel or dentin with or without pulp involvement. Thus, it is not yet known at what stage of progression carious lesions exert a negative impact on the quality of life of preschool children.

There is a current focus on the impact of untreated cavitated lesions and their severity on preschool children. Indeed, caries may be detected in the early stages, in which restorative treatment is not necessary. The International Caries Detection and Assessment System (ICDAS) allows the standardization and diagnosis of dental caries in different settings and situations [23]. The integration of criteria from other caries detection and diagnostic systems involving noncavitated enamel lesions and the staging of the disease process [24-27] has led to the current system denominated ICDAS II [28]. The use of a sensitive system, such as the ICDAS II, can provide important clinical information in the investigation of oral health-related quality of life (OHRQoL).

The aim of the present study was to evaluate the impact of different stages of progression and activity of untreated dental caries on OHRQoL among preschool children and their parents/caregivers.

Materials and Methods

Study population

A population-based cross-sectional study was conducted involving preschool children. The inclusion criteria age between three and five years, regular enrolment in a preschool/daycare center in the city of Diamantina, Brazil, and parents/guardians fluent in Brazilian Portuguese who live with the child at least 12 hours per day. The exclusion criteria were current orthodontic treatment, systemic disease, having all carious lesions treated satisfactorily and the presence of tartar.

The calculation of sample size was performed using a 37.8% prevalence rate of impact from ECC on the quality of life of preschool children [19], a 95% confidence interval and 5% standard error. The minimum sample was defined as 346 preschool children. A 1.2 correction factor was applied to enhance the precision and an additional 84 children were added to compensate for possible losses, resulting in a sample of 499 preschool children. To ensure representativity, the sample was stratified based on the type of institution (public or private). The sample distribution was proportional to the total population enrolled in private and public preschools in the city.

Pilot Study

A pilot study was carried out at a public preschool prior to the data collection of the main investigation to test the methodology and determine the understanding of the questionnaires on the part of parents/caregivers. The pilot study was conducted on a sample of 46 preschoolers (3 to 5 years of age) and their parents/caregivers, who were not included in the main study. The results demonstrated the need to include an evaluation of physiological tooth mobility as a possible confounding variable.

Data collection – assessment of impact on child's OHRQoL and socio-demographic information

Parents/caregivers were asked to answer the Brazilian version of the ECOHIS [17] and fill out a form addressing socio-demographic information, such as mother's schooling (years of study), whether the mother worked outside the home, monthly household income (categorized based on the Brazilian minimum wage = US$304.38), duration of salary (in weeks), family provider, number of individuals who depend on the income. The ECOHIS was used to assess the negative impact of the progression stage and activity of dental caries on the quality of life of the preschool children. This questionnaire is composed of 13 items distributed in a Child Impact Section (CIS) and Family Impact Section (FIS). The first section has four domains: symptoms, function, psychology and self-image/social interaction. The FIS has two domains: parental distress and family function. The scale has five response options for recording how often an event has occurred in the child's life. The score for each domain is calculated through a simple sum of the scores of each item. The CIS and FIS scores are calculated through a simple sum of the scores on all items in each section, ranging from 0 to 36 (CIS) and 0 to 16 (FIS). The total score ranges from 0 to 52, with higher scores denoting greater oral health impact and poorer OHRQoL.

Data collection – child's oral examination

The clinical oral examination of the children was performed by single, previously calibrated dentist at a public preschool. During the calibration exercise, inter-examiner and intra-examiner Kappa values were greater than 0.8 for all oral conditions evaluated. The examination was carried out after brushing performed by the dentist, with the aid of a head lamp (PETZL®,

Tikka XP, Crolles, France), mouth mirrors (PRISMA, São Paulo, SP, Brazil), WHO probes (Golgran Ind. e Com. Ltda., São Paulo, SP, Brazil) and dental gauze for drying the teeth. During the examination, the children remained lying on a portable stretcher.

The ICDAS II criteria and Activity Lesion Assessment (ALA), which measures visual appearance, local susceptibility to plaque buildup and surface texture [29], were used for the determination of dental caries. In the present study, the presence of dental caries was established by the following: distinct visual change in enamel – ICDAS code 2 (active and inactive), localized enamel breakdown – ICDAS code 3 (active and inactive), underlying dentin shadow – ICDAS code 4 (active and inactive), distinct cavity within visible dentin – ICDAS code 5 (active and inactive), extensive cavity within visible dentin – ICDAS code 6, without pulp exposure (active and inactive), with pulp exposure (with absence or presence of fistula) and root remnants. The first visual change in enamel (ICDAS code 1, when there is no pigmentation) is detected only after drying with compressed air. As drying was performed with dental gauze in the present study, the decision was made to exclude the evaluation of this condition. When the characteristic pigmentation of this stage of carious lesion was detected on any face with the tooth either wet or dried with gauze, the tooth was coded as “sound”.

Malocclusion, traumatic dental injury (TDI) and physiological tooth mobility were evaluated as possible confounding variables. Malocclusion was recorded in the presence of anterior open bite, posterior open bite, increased overjet, deep bite, anterior crossbite or posterior crossbite. The clinical diagnosis of TDI was performed using the criteria proposed by Andreasen [30] and the assessment of tooth discoloration. Physiological tooth mobility was considered only when the tooth was nearing exfoliation. All confounding variables were categorized as absent or present.

Data analysis

Statistical analysis was performed using the SPSS 20.0 program for Windows (SPSS Inc, Chicago, IL, USA). Descriptive analysis (including frequency distribution) was performed for overall mean ECOHIS scores. Scores for the individual domains were analyzed for differences between oral conditions and socioeconomic and demographic factors. Dental caries was classified by the worse condition of each tooth (if a tooth had one face with an active white spot and another with a dentin lesion, the latter was recorded). The Kolmogorov-Smirnov test was used to evaluate the normality of the distribution of the quantitative variables. The nonparametric Mann-Whitney test was used. The independent variables included characteristics of the child (gender and age), socio-demographic characteristics (mother's schooling, whether the mother worked outside the home, duration of work, household income, number of individuals who depend on this income, duration of salary, family provider, type of preschool (public or private), access of family and child to physician and dentist and clinical oral conditions (ICDAS II, malocclusion, TDI and physiological tooth mobility). The dependent variable was impact from oral conditions on quality of life of the preschooler (total ECOHIS score).

The variables were grouped into a hierarchy of categories ranging from distal determinants to proximal determinants [31,32]. These categories included characteristics of the child, socioeconomic factors and oral clinical conditions (in that order). For each level, Poisson regression analysis with robust variance was performed to correlate the overall mean ECOHIS score with each clinical oral condition, socioeconomic factor and characteristic of the child. This analysis was performed to exclude variables with a p-value of < 0.20. Only explanatory variables with a p-value of < 0.05 after adjustment for variables on the same or prior levels of determinants were selected for the final models. In these analyses, the outcome was employed as a count

outcome, as performed elsewhere [11,19,33]. Rate ratios (RR) and 95% confidence intervals (95% CI) were calculated.

Ethical considerations

This study received approval from the Human Research Ethics Committee of the *Universidade Federal de Minas Gerais* (Belo Horizonte, Brazil). All parents received information regarding the objectives of the study and signed a statement of informed consent.

Results

A total of 499 preschool children were initially enrolled in the study, 451 (90.4%) of whom participated through to the end of the study. The main reason for losses was the absence of a questionnaire filled out by the parents. Mean age (standard deviation) of the preschool children was 4.25 (0.83) years; 53.9% were female. The prevalence of untreated caries was 51.2%. A total of 60.6% of the teeth with caries exhibited severe decay. Malocclusion, TDI and physiological tooth mobility were present in 28.4%, 17.5% and 2.0% of the preschool children, respectively.

The majority of parents/caregivers reported no impact on quality of life (52.8%) (i.e., ECOHIS score of 0). Parents reported more impacts related to the child (42.8%) than the family (29.3%). The highest total ECOHIS score was 46. Maximum ECOHIS scores were reported on both the CIS and FIS. Table 1 displays the distribution of the responses to each ECOHIS item in each domain. On the CIS, the greatest impacts were recorded for items related to pain, difficulty eating and drinking, irritability, trouble sleeping and smiling. In the FIS, the most frequently reported items were “felt guilty” and “been upset”.

Table 2 displays the mean difference among oral health conditions for the overall ECOHIS and each domain of the questionnaire. A significant difference was found in the impact on both child's and family's quality of life associated to different stages of progression and activity of carious lesions.

The univariate analysis considering the characteristics of preschool children and socioeconomic and demographic factors revealed that impact on quality of life was associated with age of the child, household income, type of school and access to health care. Regarding clinical oral conditions, nearly all variables of the ICDAS II were associated with a greater prevalence rate of impact (Table 3).

In the final multivariate model, a negative impact on quality of life was associated with the age of the child and a lower educational level of mother. More advanced stages of caries were associated with an increased negative impact on the quality of life of the children. Among inactive lesions, only extensive cavity without pulp exposure exhibited an increased negative impact on quality of life (RR = 3.68; 95% CI: 1.74 to 7.81; p = 0.001).

Discussion

The present study evaluated the negative impact of different stages of progression and activity of dental caries on the quality of life of preschoolers and their families. The study design was planned so that the results could contribute to clinical decision making regarding the treatment of preschool children and the establishment of priorities in public oral health.

Few studies have been carried out with a representative sample to assess the impact of dental caries on the quality of life of preschool children [18-20]. Other studies have been

conducted with specific populations, such as children with cerebral palsy cerebral [34], HIV+ [35] and those who seek treatment at dental schools [11].

The present study found a 51.2% prevalence rate of untreated dental caries diagnosed using the criteria of the ICDAS II. Previous Brazilian studies using these criteria report higher prevalence rates [22,36]. However, the studies cited involved children aged six and seven years. The prevalence rate in the present investigation is similar to that reported in a previous study conducted in the same city [19], but the study cited only assessed cavitated lesions. As the present study employed an index capable of identifying early stages of dental caries, a higher prevalence rate was expected. The similarity between these investigations may have occurred due to the fact that the study cited was carried out on a population with a high prevalence of dental caries. Moreover, the selection methods were different, as the present study involved children enrolled at preschools and the study cited involved a sample recruited during vaccination campaigns. Another difference resides in the fact that 51.7% of the families in the present study had an income of two times the minimum wage or less, whereas this rate was 85.8% in the sample of the study cited.

Although it has been suggested that examiners may not adequately detect early caries [4], studies have demonstrated that the inclusion of a clinical examination can enhance the sensitivity of the diagnosis [37,38]. Another study concluded that the inclusion of an activity assessment in caries epidemiological surveys has little impact on the prevalence of dental caries considering both noncavitated and cavitated lesions [39]. The presence of biofilm (plaque) is a factor that may contribute toward a false diagnosis of early dental caries. To minimize this effect, the examiner removed biofilm from free and interproximal faces with a toothbrush and dental floss prior to each examination.

The mean ECOHIS score reflects the association between the presence of dental caries in different stages of progression and the impact on quality of life. The prevalence of impact on the child's quality of life (CIS) in the present study (42.8%) was lower than that reported in a previous study involving children and parents who sought treatment at a dental school (69.3%) [11]. It is likely that parents/caregivers who seek dental treatment for their children have previously perceived oral conditions and their consequences. Among the children who had negative impact on quality of life, the most frequently reported impacts regarded pain, difficulty eating some foods and drinking hot or cold beverages, trouble sleeping, irritation and the avoidance of smiling. These reports were associated with nearly every stage of progression of dental caries. In the FIS, the *parent distress* domain was the most reported. These results are consistent with other studies addressing this issue [11,18,19,22].

Due to the interference of others risk factors working together in the investigation carried out in the present study, it is important to consider possible correlations with confounding factors [40,41]. Thus, TDI, malocclusion and physiological tooth mobility were identified as potentially confounding variables. The need to assess physiological tooth mobility was verified by parents' reports in the pilot study and the importance of this assessment is evidenced by the significant association with a negative impact on quality of life ($p = 0.006$). Despite not being associated with an impact on quality of life in the univariate analysis, TDI remained the final Poisson regression model ($p < 0.001$), proving to be an important confounding variable. Moreover, this finding demonstrates the use of the ECOHIS as an assessment tool regarding the impact of TDI on the quality of life of preschoolers and their families.

The age of the child influenced the ECOHIS score, which is in agreement with findings described in a previous Brazilian study [19]. The finding that older children have a greater

chance of experiencing a negative impact on quality of life seems to stem from the fact that older children have caries in more advanced stages of decay and also have a greater capacity to communicate to parents the effect of oral health conditions on their quality of life [42].

Regarding the stages of progression and activity of dental caries, the univariate analysis demonstrated that only inactive localized enamel breakdown was not significantly associated with a negative impact on quality of life. However, only more advanced stages of progression remained in the final Poisson regression model. This result is in agreement with findings reported in a study carried out in the city of Brasília (Brazil), which evaluated dental caries using the criteria of the ICDAS II and the PUFA/pufa index (Pulp involvement, Ulceration due to trauma, Fistula and Abscess) [22]. Among the more advanced untreated carious lesions, only extensive cavity with pulp exposure and presence of fistula did not remain in the final Poisson regression model. This may have occurred due to the low prevalence of this condition (0.7%). The significant association between lesions in the early stage of progression and a negative impact on quality of life found in the univariate analysis likely occurred because a large portion of lesions in these stages were found in children who also exhibited more advanced stages of progression.

The present study has the limitations of a cross-sectional, epidemiologic study and it is therefore not possible to determine causality among the variables analyzes. Thus, longitudinal studies are needed to furnish more consistent information and assess the long-term effects of dental caries and treatment on the quality of life of preschool children. Another limitation regards the lack of the detection of the first visual change in enamel (ICDAS code 1). In this respect, the ICDAS II is an important tool for the diagnosis of the history of lesions, contributing further scientific evidence regarding the association between dental caries and OHRQoL.

Caries in more advanced stages of decay were associated with a negative impact on quality of life among preschool children and their families. Traumatic dental injury was also associated with a poorer quality of life. Families with a higher income and younger children reported a better oral health-related quality of life.

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Table 1. Distribution of ECOHIS responses in survey of parents in population-based sample (n = 451).

Impacts	Never or hardly ever n (%)	Occasionally, often or very often n (%)	Don´t know* n (%)
Child impacts section			
Symptoms domain - SD			
Oral/dental pain	320 (71.0)	131 (29.0)	0 (0.0)
Function domain - FD			
Difficulty drinking	399 (88.5)	52 (11.5)	0 (0.0)
Difficulty eating	369 (81.8)	82 (18.2)	0 (0.0)
Difficulty pronouncing words	412 (91.4)	38 (8.4)	1 (0.2)
Missed preschool or school	425 (94.4)	24 (5.2)	2 (0.4)
Psychological domain - PD			
Trouble sleeping	396 (87.8)	55 (12.2)	0 (0.0)
Irritable or frustrated	369 (82.7)	77 (16.2)	5 (1.1)
Self-image / social interaction domain - SSD			
Avoided smiling or laughing	385 (85.4)	66 (14.6)	0 (0.0)
Avoided talking	414 (91.8)	37 (8.2)	0 (0.0)
Family impacts section			
Parent distress domain - PDD			
Been upset	352 (78.0)	99 (22.0)	0 (0.0)
Felt guilty	344 (76.3)	107 (23.7)	0 (0.0)
Family function domain – FFD			
Taken time off from work	407 (90.2)	44 (9.8)	0 (0.0)
Financial impact	429 (95.1)	22 (4.9)	0 (0.0)

Table 2. Mean scores on ECOHIS domains according to different oral clinical conditions.

Oral clinical conditions	n (%)	SD	FD	PD	SSD	PDD	FFD	Mean ECOHIS score
Distinct visual change in enamel								
Active								
= 0	345(76.5)	0.55(1.08)	0.87(1.99)	0.41(1.12)	0.41(1.31)	0.70(1.60)	0.26(0.86)	3.09(6.18)
≥ 1	106(23.5)	1.52(1.36)	2.62(3.24)	2.08(2.40)	1.39(2.22)	2.92(3.06)	0.97(1.93)	10.69(10.56)
p-value		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Inactive								
= 0	333(73.8)	0.60(1.08)	1.12(2.40)	0.58(1.48)	0.40(1.26)	0.96(2.02)	0.38(1.07)	3.83(7.20)
≥ 1	118(26.2)	1.28(1.43)	1.74(2.58)	1.41(2.02)	1.32(2.24)	1.96(2.66)	0.57(1.59)	7.82(9.68)
p-value		<0.001	0.012	<0.001	<0.001	<0.001	0.154	<0.001
Localized enamel breakdown								
Active								
= 0	356 (78.9)	0.59(1.12)	1.07(2.14)	0.62(1.48)	0.57(1.58)	1.10(2.18)	0.38(1.19)	4.13(7.58)
≥ 1	95 (21.1)	1.49(1.31)	2.07(3.29)	1.47(2.13)	0.91(1.75)	1.67(2.44)	0.62(1.36)	7.68(9.34)
p-value		<0.001	0.029	<0.001	0.002	0.004	0.015	<0.001
Inactive								
= 0	425 (94.2)	0.73(1.21)	1.23(2.43)	0.78(1.68)	0.64(1.63)	1.17(2.22)	0.44(1.26)	4.73(8.10)
≥ 1	26 (5.8)	1.62(1.17)	2.15(2.75)	1.12(1.63)	0.65(1.49)	2.04(2.53)	0.19(0.57)	7.27(8.01)
p-value		<0.001	0.029	0.058	0.738	0.012	0.537	0.018
Underlying dentin shadow								
Active								
= 0	405 (89.8)	0.65(1.15)	1.13(2.34)	0.66(1.63)	0.54(1.49)	1.06(2.12)	0.35(1.00)	4.14(7.73)
≥ 1	46 (10.2)	1.89(1.30)	2.61(3.04)	2.00(1.59)	1.52(2.37)	2.61(2.78)	1.13(2.37)	11.33(8.48)
p-value		<0.001	<0.001	<0.001	<0.001	<0.001	0.015	<0.001
Inactive								
= 0	451 (100)	0.78(1.22)	1.28(2.46)	0.80(1.67)	0.64(1.62)	1.22(2.24)	0.43(1.23)	4.88(8.10)
≥ 1	0 (0.0)	-	-	-	-	-	-	-
p-value		*	*	*	*	*	*	*
Distinct cavity with visible dentin								
Active								
= 0	343 (76.1)	0.32(0.80)	0.69(1.71)	0.34(0.99)	0.26(1.01)	0.69(1.72)	0.33(1.17)	2.56(5.34)
≥ 1	108 (23.9)	2.22(1.22)	3.18(3.36)	2.25(2.42)	1.87(2.41)	2.90(2.84)	0.75(1.36)	12.24(10.64)
p-value		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Inactive								
= 0	440 (97.6)	0.75(1.22)	1.26(2.46)	0.75(1.63)	0.60(1.58)	1.18(2.23)	0.43(1.23)	4.69(7.99)
≥ 1	11 (2.4)	1.82(0.98)	2.09(2.34)	2.73(2.28)	2.55(2.20)	2.91(2.42)	0.45(1.21)	12.27(9.32)
p-value		0.001	0.076	<0.001	<0.001	0.005	0.801	0.002
Extensive cavity								
Without pulp exposure								
Active								
=0	356 (78.9)	0.37(0.89)	0.53(1.36)	0.26(0.91)	0.20(0.80)	0.57(1.45)	0.23(0.81)	2.10(4.39)
≥1	95 (21.1)	2.29(1.11)	4.10(3.44)	2.80(2.27)	2.32(2.57)	3.67(2.92)	1.17(2.03)	15.29(10.13)
p-value		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Inactive								
= 0	445 (98.7)	0.76(1.22)	1.25(2.44)	0.76(1.62)	0.59(1.55)	1.17(2.21)	0.42(1.21)	4.66(7.91)
≥ 1	6 (1.3)	2.33(0.51)	3.67(2.42)	4.00(2.36)	4.67(2.06)	5.00(1.09)	1.50(1.97)	20.67(7.20)
p-value		0.001	0.003	<0.001	<0.001	<0.001	0.015	<0.001
With pulp exposure and absence of fistula								
= 0	432 (95.8)	0.72(1.18)	1.17(2.34)	0.72(1.60)	0.59(1.57)	1.06(2.07)	0.33(0.99)	4.31(7.59)
≥ 1	19 (4.2)	2.21(1.40)	3.95(3.44)	2.63(2.31)	1.84(2.26)	5.00(2.77)	2.74(2.92)	17.68(8.99)
p-value		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001

Table 2. Continuation.

With pulp exposure and presence of fistula								
= 0	448 (99.3)	0.77(1.22)	1.25(2.36)	0.78(1.64)	0.61(1.55)	1.20(2.22)	0.42(1.22)	4.74(7.80)
≥ 1	3 (0.7)	1.50(1.91)	7.00(8.18)	4.00(4.00)	5.33(4.62)	4.67(4.16)	2.00(2.00)	25.00(23.25)
p-value		0.139	0.059	0.032	0.004	0.045	0.010	0.105
Root remnant								
=0	435(96.5)	0.69(1.14)	1.08(2.21)	0.65(1.45)	0.53(1.49)	1.07(2.10)	0.39(1.19)	4.21(7.33)
>1	16(3.5)	3.06(1.12)	6.75(2.69)	4.94(2.17)	3.69(2.15)	5.38(2.03)	1.63(1.63)	22.88(7.42)
P-value		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Traumatic dental injury								
Absence	372 (82.5)	0.77(1.20)	1.37(2.55)	0.81(1.70)	0.67(1.71)	1.31(2.33)	0.41(1.24)	5.03(8.41)
Presence	79 (17.5)	0.80(1.33)	0.90(1.96)	0.72(1.58)	0.51(1.12)	0.78(1.77)	0.51(1.21)	4.13(6.47)
P-value		0.842	0.143	0.696	0.707	0.091	0.440	0.728
Malocclusion								
Absence	323 (71.6)	0.89(1.26)	1.21(2.39)	0.72(1.48)	0.66(1.63)	1.21(2.20)	0.33(1.13)	4.87(8.06)
Presence	128 (28.4)	0.48(1.06)	1.47(2.62)	1.00(2.07)	0.60(1.62)	1.25(2.36)	0.70(1.43)	4.88(8.24)
P-value		<0.001	0.329	0.352	0.368	0.858	0.003	0.371
Physiological tooth mobility								
Absence	442 (98.0)	0.76(1.21)	1.25(2.43)	0.79(1.66)	0.62(1.60)	1.20(2.23)	0.41(1.21)	4.74(7.99)
Presence	9 (2.0)	1.44(1.51)	3.00(3.20)	1.44(2.18)	1.56(2.65)	2.44(2.96)	1.56(1.94)	11.44(11.27)
P-value		0.111	0.011	0.170	0.031	0.063	0.008	0.059

Values expressed as mean (standard deviation); Mann-Whitney test

SD = symptoms domain (score ranges from 0 to 5); FD = function domain (score ranges from 0 to 0 to 16); PD = psychological domain (score ranges from 0 to 8); SSD = self-image/social interaction domain (score ranges from 0 to 8); PDD = parent distress domain (score ranges from 0 to 8); FFD = family function domain (score ranges from 0 to 8)

Table 3. Univariate analysis of associations between oral clinical conditions, characteristics of children, socio-demographic and economic factors in relation to overall ECOHIS.

Covariates	n (%)	Robust RR	p-value
Characteristics of child			
Gender			
Female	243(53.9)	1	
Male	208(46.1)	0.90 (0.66-1.23)	0.519
Age			
3 years	114(25.2)	1	
4 years	109(24.2)	2.56(2.04-4.96)	0.001
5 years	228(50.6)	3.18(1.49-4.41)	<0.001
Socio-demographic and economic factors – level 1			
Educational level of mother			
> 8 years	156(34.6)	1	
4 to 8 years	169(37.5)	1.70(1.16-2.50)	0.007
<4 years	126(27.9)	1.40(0.92-2.11)	0.111
Mother works outside the home			
Yes	329(72.9)	1	
No	122(27.1)	0.99(0.69-1.43)	0.981
Hours/day mother works outside the home			
Not work	122(27.1)	1	
≤8 hours	243(53.9)	0.78 (0.55-1.09)	0.150
>8 hours	86(19)	0.86(0.57-1.29)	0.476
Household income			
> 3 times the minimum salary	80(17.7)	1	
3 times the minimum salary	138(30.6)	2.48(1.41-4.38)	0.002
≤ 2 times the minimum salary	233(51.7)	3.06(1.81-5.17)	<0.001
Duration of salary			
>2 weeks	151(33.5)	1	
1 to 2 weeks	125(27.7)	1.37(0.91-2.05)	0.132
<1 week	175(38.8)	1.57(1.07-2.31)	0.021
Number of individuals living on income			
≤3	151(33.5)	1	
4	144(31.9)	0.73(0.51-1.06)	0.101
>4	156(34.6)	0.94(0.65-1.35)	0.735
Family provider			
Father and mother	80(17.7)	1	
Only father	162(35.9)	1.75(1.00-3.02)	0.046
Only mother	184(40.8)	2.20(1.31-3.69)	0.003
Grandparents or uncles	25(5.5)	0.83(0.28-2.44)	0.738
Type of school (child)			
Private	35(7.8)	1	
Public	416(92.2)	4.22(2.15-8.29)	<0.001
Easy access of family to medical care			
Yes	242(53.7)	1	
No	209(46.3)	2.82(2.07-3.84)	<0.001
Easy access of family to dental care			
Yes	177(39.2)	1	
No	274(60.8)	2.33(1.63-3.34)	<0.001
Access of child to dental care			
Yes	169(37.5)	1	
No	282(62.5)	1.78(1.27-2.50)	0.001
Child visited the dentist			
Yes	165(36.6)	1	
No	286(63.4)	0.83(0.60-1.15)	0.263

Table 3. Continuation.

Oral clinical conditions – level 2			
Distinct visual change in enamel			
Active			
= 0	345(76.5)	1	
≥ 1	106(23.5)	3.46(2.61-4.58)	<0.001
Inactive			
= 0	333(73.8)	1	
≥ 1	118(26.2)	2.04(1.51-2.76)	<0.001
Localized enamel breakdown			
Active			
= 0	356(78.9)	1	
≥ 1	95(21.1)	1.86(1.36-2.53)	<0.001
Inactive			
= 0	425(94.2)	1	
≥ 1	26(5.8)	1.54(0.98-2.40)	0.059
Underlying dentin shadow			
Active			
= 0	405(89.8)	1	
≥ 1	46(10.2)	2.73(2.06-3.62)	<0.001
Inactive			
= 0	451(100.0)	1	
≥ 1	-	-	*
Distinct cavity with visible dentin			
Active			
= 0	343(76.1)	1	
≥ 1	108(23.9)	4.79(3.64-6.30)	<0.001
Inactive			
= 0	440(97.6)	1	
≥ 1	11(2.4)	2.61(1.66-4.13)	<0.001
Extensive cavity			
Without pulp exposure			
Active			
= 0	356(78.9)	1	
≥ 1	95(21.1)	7.30(5.66-9.41)	<0.001
Inactive			
= 0	445(98.7)	1	
≥ 1	6(1.3)	4.43(3.28-5.98)	<0.001
With pulp exposure and absence of fistula			
= 0	432(95.8)	1	
≥ 1	19(4.2)	4.10(3.10-5.41)	<0.001
With pulp exposure and presence of fistula			
= 0	448(99.3)	1	
≥ 1	3(0.7)	5.27(2.20-12.62)	<0.001
Root remnant			
= 0	435(96.5)	1	
≥ 1	16(3.5)	5.43(4.34-6.79)	<0.001
Traumatic dental injury			
Absence	372(82.5)	1	
Presence	79(17.5)	0.82(0.56-1.20)	0.820
Malocclusion			
Absence	323(71.6)	1	
Presence	128(28.4)	1.00(0.71-1.41)	1.000
Physiological tooth mobility			
Absence	442(98)	1	
Presence	9(2.0)	2.41(1.29-4.51)	0.006

RR = Rate Ratio, calculated by Wald chi-square test

Table 4. Final Poisson regression model for covariates associated with overall ECOHIS.

Covariates	Robust RR (95%CI)	p-value
Characteristics of child		
Age		
3 years	1	
4 years	2.56(1.46-4.49)	0.001
5 years	3.19(2.04-4.98)	<0.001
Gender		
Female	1	
Male	1.01(0.74-1.37)	0.944
Socio-demographic and economic factors – level 1		
Educational level of mother		
>11 years	1	
>8 to 11 years	4.05(1.89-8.66)	<0.001
≤ 8 years	4.76(2.24-10.13)	<0.001
Easy access to medical care		
Yes	1	
No	2.40(1.75-3.28)	<0.001
Child's age		
3 years	1	
4 years	2.97(1.75-5.05)	<0.001
5 years	3.30(2.13-5.10)	<0.001
Oral clinical conditions – level 2		
Distinct cavity with visible dentin		
Active		
= 0	1	
≥ 1	1.74(1.29-2.34)	<0.001
Extensive cavity		
Without pulp exposure		
Active		
= 0	1	
≥ 1	4.28(3.05-6.01)	<0.001
Inactive		
= 0	1	
≥ 1	3.68(1.74-7.81)	0.001
With pulp exposure and absence of fistula		
= 0	1	
≥ 1	1.57(1.16-2.12)	0.003
Root remnant		
= 0	1	
≥ 1	1.52(1.17-1.98)	0.002
Traumatic dental injury		
Absence	1	
Presence	1.70(1.26-2.28)	<0.001
Child's age		
3 years	1	
4 years	1.76(1.12-2.79)	0.015
5 years	1.73(1.10-2.71)	0.018
Educational level of mother		
>11 years	1	
>8 to 11 years	2.79(1.32-5.92)	0.019
≤ 8 years	2.51(1.16-5.40)	0.007

RR = Rate Ratio, calculated by Wald chi-square test; model adjusted for significant variables in final model of previous levels

MANUSCRITO 2

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Impact of dental caries on quality of life of preschool children: emphasis on distribution in the oral cavity and stages of progression

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Running title: Distribution and progression of dental caries and impact on quality of life

Keywords: dental caries, preschool children, oral health-related quality of life

Abstract

Purpose: The aim of the present population-based cross-sectional study was to evaluate the impact of untreated dental caries on the quality of life of preschool children and their parents/caregivers, with an emphasis on distribution in the oral cavity and stage of progression.

Methods: A randomly selected sample of Brazilian preschool children aged three to five years underwent a clinical oral examination for the assessment of dental caries using the ICDAS II criteria. Parents/caregivers were asked to answer two questionnaires: one on the oral health-related quality of life (OHRQoL) of the children (ECOHIS) and another on the demographic and socioeconomic characteristics of the families. Statistical analysis involved descriptive statistics, the chi-square test, Mann-Whitney test and hierarchically adjusted Poisson regression models.

Results: A total of 451 preschoolers participated in the study. The prevalence of dental caries was 51.2%. The majority carious lesions exhibited severe decay (60.6%) and were found in both anterior and posterior teeth. A significant association was found between caries progression stage and the OHRQoL of both the child and family. The final Poisson model revealed negative impacts on quality of life from more advanced stages of dental caries. In posterior teeth: distinct cavity with visible dentin (RR=1.50; 95%CI=1.18-1.92; p=.001); extensive cavity without pulp exposure or fistula (RR=3.20; 95%CI=2.30-4.46; p<.001); extensive cavity with pulp exposure and absence of fistula (RR=1.78; 95%CI=1.31-2.41; p<.001); root remnant (RR=1.47; 95%CI=1.07-1.2.03; p=.018). In anterior teeth: extensive cavity without pulp exposure or fistula (RR=1.45; 95%CI=1.04-2.03; p=.027); extensive cavity with pulp exposure and absence of fistula (RR=1.52; 95%CI=1.08-2.14; p=.016); extensive cavity with pulp exposure and presence of fistula (RR=4.58; 95%CI=2.93-7.16; p<.001); and root remnant (RR=2.16; 95%CI=1.56-3.00; p<.001).

Conclusion: Carious lesions in more advanced stages of progression in anterior and posterior teeth were associated with a negative impact on the quality of life of preschoolers and their parents/caregivers.

Introduction

Measures of oral health-related quality of life (OHRQoL) have been used as a complement to the assessment of treatment needs in oral health as well as the prioritization of care and the evaluation of the outcomes of treatment strategies [1]. In recent years, there has been growing emphasis on the assessment of the impact of oral conditions on the quality of life of preschoolers. Such investigations have been facilitated by the advent of the Early Childhood Oral Health Impact Scale (ECOHIS), which is administered to parents/caregivers of preschool children. This questionnaire is practical for use in epidemiological surveys [2]. Moreover, it has been translated into Portuguese and validated for use on the Brazilian population [3-5].

Dental caries is the oral condition most often associated with a negative impact on the quality of life of preschoolers [6,7], the consequences of which include pain, decreased appetite, chewing difficulties, weight loss, sleeping difficulties, changes in behavior and a poor scholastic performance [6,8-12]. Studies carried out in China [13] and Brazil [6,7,14] using the ECOHIS report that dental caries has a negative impact on the quality of life of preschool children and their parents/caregivers. This impact is even greater in the presence of severe dental caries (6 or more lesions). The most frequent consequences are pain in the teeth, mouth or jaws, difficulty eating some foods and difficulty drinking hot or cold beverages [6,14]. However, little is known regarding whether the degree of impact is related to the location of the affected teeth (anterior or posterior).

There is current focus on the impact of cavitated lesions on quality of life, as the DMFT/dmft (damaged, missing and filled teeth in the permanent and primary dentition, respectively) index is often used for the diagnosis of dental caries. However, caries may be

detected in early stages, in which restorative treatment is not necessary. The International Caries Detection and Assessment System (ICDAS) allows the standardization and diagnosis of dental caries in different settings and situations [15]. The integration of criteria from other caries detection and diagnostic systems involving non-cavitated enamel lesions and the staging of the disease process [16-19] has led to the current system, denominated ICDAS II [20].

The combined use of the ICDAS II criteria for the detection of dental caries, the investigation of the distribution of carious lesions in the oral cavity (anterior and posterior) and measures of the impact on quality of life can provide important information for clinical decision making and the establishment of priorities for the treatment of dental caries in preschool children. The aim of the present study was to evaluate the impact of untreated caries on the quality of life of preschool children and their parents/caregivers, with an emphasis on distribution in the oral cavity and stages of progression.

Methods

Prior to the data collection of the main study, a pilot study was carried out at a public preschool to test the methods and determine the understanding of the questionnaires on the part of parents/caregivers. The pilot study was conducted on a sample of 46 preschoolers (3 to 5 years of age) and their parents/caregivers, who were not included in the main study. The results demonstrated the need to include an evaluation of physiological tooth mobility as a possible confounding variable.

Sample

A population-based cross-sectional study was conducted involving preschool children. The inclusion criteria were age between three and five years, enrolment in a preschool/daycare

center in the city of Diamantina, Brazil, and parents/guardians fluent in Brazilian Portuguese who live with the child at least 12 hours per day. The exclusion criteria were current orthodontic treatment, systemic disease, having all carious lesions treated satisfactorily and the presence of tartar.

The sample size calculation was performed using a 37.8% prevalence rate of impact from early childhood caries on the quality of life of preschool children [14], a 95% confidence interval and 5% standard error. The minimum sample was defined as 346 preschool children. A 1.2 correction factor was applied to enhance the precision and an additional 84 children were added to compensate for possible losses, resulting in a sample of 499 preschool children. To ensure representativity, the sample was stratified based on the type of institution (public or private) and the distribution of the sample was proportional to the total population enrolled in private and public preschools in the city.

Data collection – assessment of impact on child's OHRQoL and socio-demographic information

Parents/caregivers were asked to answer the Brazilian version of the ECOHIS [5] and fill out a form addressing socio-demographic information, such as mother's schooling (years of study), whether the mother worked outside the home, monthly household income (categorized based on the Brazilian minimum wage - US$304.38), duration of salary (in weeks), family provider, number of individuals who depend on the income. The ECOHIS was used to assess the negative impact of the progression stage of dental caries in different groups of teeth on the quality of life of the preschool children. This questionnaire is composed of 13 items distributed in a Child Impact Section (CIS) and Family Impact Section (FIS). The first section has four

domains: symptoms, function, psychology and self-image/social interaction. The FIS has two domains: parental distress and family function. The scale has five response options for recording how often an event has occurred in the child's life. The total score ranges from 0 to 52, with higher scores denoting greater oral health impact and poorer OHRQoL.

Data collection – oral examination

The clinical oral examination of the children was performed by single, previously calibrated dentist at a public preschool. During the calibration exercise, inter-examiner and intra-examiner Kappa values were greater than 0.8 for all oral conditions evaluated. The examination was carried out after brushing performed by the dentist, with the aid of a head lamp (PETZL®, Tikka XP, Crolles, France), mouth mirrors (PRISMA, São Paulo, SP, Brazil), WHO probes (Golgran Ind. e Com. Ltda., São Paulo, SP, Brazil) and dental gauze for drying the teeth. During the examination, the children remained lying on a portable stretcher.

The ICDAS II criteria were used for the determination of dental caries (Table 1). The first visual change in enamel (ICDAS code 1, when there is no pigmentation) is detected only after drying with compressed air. As drying was performed with dental gauze in the present study, the decision was made to exclude the evaluation of this condition. When the characteristic pigmentation of this stage of carious lesion was detected on any face with the tooth either wet or dried with gauze, the tooth was coded as "sound".

Malocclusion, traumatic dental injury (TDI) and physiological tooth mobility were evaluated as possible confounding variables. Malocclusion was recorded in the presence of anterior open bite, posterior open bite, increased overjet, deep bite, anterior crossbite or posterior crossbite. The clinical diagnosis of TDI was performed using the criteria proposed by Andreasen

[21] and the assessment of tooth discoloration. Physiological tooth mobility was considered only when the tooth was nearing exfoliation. All confounding variables were categorized as absent or present.

Data analysis

Statistical analysis was performed using the SPSS 20.0 program for Windows (SPSS Inc, Chicago, IL, USA). Descriptive analysis (including frequency distribution) was performed for overall mean ECOHIS scores. Scores for the individual domains were analyzed for differences between oral conditions and socioeconomic and demographic factors. Dental caries was classified by the worse condition of each tooth (if a tooth had one face with an active white spot and another with a dentin lesion, the latter was recorded). The Kolmogorov-Smirnov test was used to evaluate the normality of the data distribution of the quantitative variables. The nonparametric Mann-Whitney test was used. The independent variables were characteristics of the child (gender and age), socio-demographic characteristics (mother's schooling, whether the mother worked outside the home, duration of work, household income, number of individuals who depend on this income, duration of salary, family provider, preschool public or private) and clinical oral conditions (dental caries, malocclusion, TDI and physiological tooth mobility). The presence and progression stage of dental caries were evaluated on anterior (primary incisors and canines) and posterior (primary molars) teeth. The dependent variable was impact from oral conditions on quality of life of the preschooler (total ECOHIS score). For the initial analyses, the sample was grouped into children free of caries, those with only lesions on anterior teeth, those with only lesions on posterior teeth and those with lesions on both anterior and posterior teeth. Comparisons were made among groups for each item on the ECOHIS. Based on the Bonferroni correction, p-values equal to or less than 0.016 were considered significant. The Bonferroni

correction is used to address the problem of multiple comparisons based on the notion that if an experimenter is testing *n* dependent or independent hypotheses on a set of data, one way of maintaining the error rate is to test each individual hypothesis at a statistical significance level of *1/n* times what it would be if only one hypothesis were tested. Thus, if one wants the significance level for the whole family of tests to be at most *α,* the Bonferroni correction would involving testing each individual test at a significance level of *α/n*. Statistically significant simply means that a given result is unlikely to have occurred by chance assuming the null hypothesis is correct (i.e., no difference among groups, no effect of treatment, no relation among variables) [22]. Thus, the significance value adopted (p =.016) is the result of .05/3 [α=.05; 3 multiple comparisons for each group (caries free group: 1- caries free vs. only anterior teeth, 2- caries free vs. only posterior teeth, 3- caries free vs. anterior and posterior teeth; only anterior group: 1- only anterior teeth vs. caries free, 2- only anterior teeth vs. only posterior teeth, 3- only anterior teeth vs. anterior and posterior teeth; only posterior group: 1- only posterior teeth vs. caries free, 2- only posterior teeth vs. only anterior teeth, 3- only posterior teeth vs. anterior and posterior teeth; anterior and posterior group: 1- anterior and posterior teeth vs. caries free, 2- anterior and posterior teeth vs. only anterior teeth, 3- anterior and posterior teeth vs. only posterior teeth)].

For the following analyses, the presence of carious lesions on anterior and posterior teeth was considered regardless of the aforementioned groups to allow Poisson analysis. Thus, the variables were grouped into a hierarchy of categories ranging from distal determinants to proximal determinants [23,24]. These categories included characteristics of the child, socioeconomic factors and oral clinical conditions (in that order). For each level, Poisson regression analysis with robust variance was performed to correlate the overall mean ECOHIS score with each clinical oral condition, socioeconomic factor and characteristic of the child. This

analysis was performed to exclude variables with a p-value < .20. Only explanatory variables with a p-value < .05 after adjustment for variables on the same or prior levels of determinants were selected for the final models. Rate ratios (RR) and 95% confidence intervals (95% CI) were calculated.

Ethical considerations

This study received approval from the Human Research Ethics Committee of the *Universidade Federal de Minas Gerais* (Belo Horizonte, Brazil). All parents/caregivers received information regarding the objectives of the study and signed a statement of informed consent.

Results

A total of 499 preschool children were initially enrolled in the study, 451 (90.4%) of whom participated through to the end of the study. The main reason for losses was the absence of a questionnaire filled out by the parents. Mean age (standard deviation) of the preschool children was 4.25 (0.83) years; 53.9% were female. The prevalence of dental caries was 51.2%. A total of 60.6% of the teeth with caries exhibited severe decay (Table 2). Malocclusion, TDI and physiological tooth mobility were present in 28.4%, 17.5% and 2.0% of the preschool children, respectively.

The majority of parents/caregivers reported no impact on quality of life (52.8%) (ECOHIS score = 0). Parents reported more impacts related to the child (42.8%) than the family (29.3%). The highest total ECOHIS score was 46. Maximum ECOHIS scores were reported on both the CIS and FIS. Table 3 displays the distribution of the means for each ECOHIS item in each domain and the overall ECOHIS score. On the CIS, the greatest mean impacts were recorded for items related to pain, irritability, difficulty eating, trouble sleeping and smiling and

difficulty drinking. On the FIS, the most frequently reported items were “felt guilty” and “been upset”. The highest means occurred in the group with carious lesions on both anterior and posterior teeth. The overall ECOHIS score in this group also differed significantly from that of the other groups.

Table 4 displays scores for the overall ECOHIS and each domain of the questionnaire according to oral health conditions (location of teeth with carious lesions, stage of progression, TDI, malocclusion and physiological tooth mobility). Carious lesions in different stages of progression on anterior and posterior teeth were significantly associated with impact on both the child’s and family’s quality of life.

Regarding characteristics of the preschool children and socioeconomic and demographic factors, the univariate analysis revealed that impact on quality of life was associated with age of the child, mother’s schooling, household income and type of school. Regarding clinical oral conditions, nearly all variables of the ICDAS II for both anterior and posterior teeth were associated with a greater prevalence rate of impact (Table 5).

In the final multivariate model, a negative impact on quality of life was associated with the age of the child and mother’s schooling. More advanced stages of caries on both the anterior and posterior teeth were associated with an increased negative impact on the quality of life of the children. Among severe lesions, “distinct cavity with visible dentin” in the anterior teeth and “extensive cavity with pulp exposure and presence of fistula” in the posterior teeth did not remain in the final model.

Discussion

The scientific community has proposed a number of measures for the diagnosis of dental caries, which have allowed carious lesions to be detected in the early stages of progression. Despite the decline in prevalence rates, dental caries continues to be a challenge in the public health realm [25]. Dental care at an early age constitutes an important strategy aimed at reducing the cost of treatment [26] and has contributed toward the longitudinal monitoring of early dental caries prior to the decision for restorative intervention. The need for restorative treatment can lead to the establishment of a repetitive restorative cycle [27], which raises treatment costs [28].

The monitoring of the early stages of progression requires the assessment of a dentist. However, this is not a common occurrence among preschool children. Indeed, a Brazilian study found that only 13.3% of a sample of 1092 children aged zero to five years had visited the dentist at least once [29]. This low rate of access to dental treatment may have contributed to the greater prevalence of severe tooth decay (60.6%) in comparison to less advanced stages of progression in the present study.

The prevalence of dental caries was 51.2% among the preschoolers analyzed herein and 51.9% of these children had lesions in both the anterior and posterior teeth. The negative impact on quality of life among such children was greater than that among children with carious lesions only on the anterior or posterior teeth. Moreover, 83.4% of the children with caries on anterior and posterior teeth had more severe decay, whereas the largest portion of the other two groups had caries in less advanced stages of progression. Thus, the use of the ICDAS II for the detection of carious lesions provided important clinical information in the investigation of OHRQoL.

A recent Brazilian study determined the negative impact of tooth decay in anterior teeth on the quality of life of schoolchildren using the Child Perceptions Questionnaire 11-14 (CPQ11-

14), reporting greater impacts on the “oral symptoms” and “social well-being” domains [30]. The present investigation is the first study to assess the impact of dental caries on the quality of life of preschoolers in terms distribution in the oral cavity and stage of progression. This study design was planned based on the hypothesis that the distribution of carious lesions may influence the perceptions of parents/caregivers regarding OHRQoL, which may, in turn, affect the decision to seek dental care and may influence both clinical decision making and the establishment of treatment priorities. An ideal design to test this hypothesis would be a longitudinal study or a cross-sectional study that enabled comparisons between groups with dental caries in a single stage of progression in only one region of the mouth. However, such designs are impractical – the former for ethical reasons and the latter due to the difficulty of establishing the appropriate sample.

Carious lesions in different stages of progression on anterior and posterior teeth were significantly associated with impact on both the child’s and family’s quality of life. In general, more advanced stages of caries progression were associated with higher mean scores on the overall ECOHIS and each subscale of the questionnaire. Regarding the location and stage of progression, the univariate analysis revealed that only extensive cavities with pulp exposure and fistula in posterior teeth were not associated with impact on quality of life. Moreover, only carious lesions in more advanced stages of progression remained in the final Poisson model. This result is in agreement with findings reported in a study carried out in the city of Brasília (Brazil), which evaluated dental caries using the criteria of the ICDAS II and the PUFA/pufa (Pulp involvement, Ulceration due to trauma, Fistula and Abscess) index [31].

Among the more advanced untreated carious lesions, distinct cavity with visible dentin on anterior teeth and extensive cavity with pulp exposure and the presence of fistula did not

remain in the final Poisson regression model. The former situation may have occurred because cavities are more frequent below the point of contact on proximal surfaces and near the gingival tissue on smooth surfaces [32], which hampers visualization and the recognition of these lesions in anterior teeth. In contrast, posterior teeth have smooth proximal surfaces and often exhibit lesions in pits and fissures [32], which are more easily visualized. However, studies assessing the recognition of caries by parents/caregivers are needed to lend support to this hypothesis.

Both TDI and physiological tooth mobility remained in the final model. These findings demonstrate the relevance of evaluating these aspects as confounding variables and underscore the importance of the prevention and treatment of TDI in preschool children. Although a physiological process, the present study demonstrates that physiological tooth mobility may be associated with a negative impact on the quality of life of children. Pediatric dentists should be aware of this when making clinical decisions. However, the criteria for the detection of physiological tooth mobility should be improved to facilitate future studies.

Besides clinical conditions associated with OHRQoL, child's age and mother's schooling remained in the final model. The age of the child affected the ECOHIS score, which is in agreement with findings described in a previous Brazilian study [14]. The finding that older children have a greater chance of experiencing a negative impact on quality of life seems to stem from the fact that these individuals have caries in more advanced stages of decay and also have a greater capacity to communicate to parents the effect of oral health conditions on their quality of life [33].

The relationship between education level and oral health is well established in adults. The evidence shows that a lower level of education is strongly associated with a poorer oral health

status [34,35]. Studies involving preschool children often investigate the education level of the parents. However, among the previous studies that have used a hierarchical approach in the data analysis, parents' schooling has not remained in the final model. This may be related to differences between samples or the use of socio-demographic and economic variables with the same measurement purpose. The results found in the present study draws attention to the social determinants of oral health and the need for the empowerment of the population, which are fundamental to improving health and, consequently, OHRQoL.

Conclusion

Regardless of the distribution in the oral cavity, dental caries in more advanced stages of progression were associated with a negative impact on the quality of life of preschoolers and their families. TDI and physiological tooth mobility were also associated with a poorer quality of life. Better OHRQoL was reported in younger children and families in which the mother had a higher level of schooling.

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Table 1. ICDAS code, dental terms and lay terms.

ICDAS code	ICDAS criteria	
0	Sound enamel	
1	Visual changes in enamel	Early stage decay
2	Distinct visual changes in enamel	
3	Localized enamel breakdown	Established decay
4	Underlying dark shadow from dentin	
5	Distinct cavity with visible dentin	Severe decay
6	Extensive distinct cavity with visible dentin	

Table 2. Number of children with dental caries (n = 231) considering most advanced progression stage of lesions in only anterior teeth, only posterior teeth or both anterior and posterior teeth.

Group of teeth	**Only anterior n (%)**	**Only posterior n (%)**	**Anterior and posterior n (%)**
Stage of dental caries			
Early stage decay	14 (40)	37 (48.7)	7 (5.8)
Established decay	7 (20)	13 (17.1)	13 (10.8)
Severe decay	14 (40)	26 (34.2)	100 (83.4)
Total	35 (100)	76 (100)	120 (100)

Table 3. Distribution and comparison of mean scores for each item and overall ECOHIS among children without caries, those with caries only on anterior teeth, those with caries only on posterior teeth and those with caries on anterior and posterior teeth.

Impacts	**Caries free n=220**	**Only anterior n= 35**	**Only posterior n=76**	**Anterior and posterior n=120**	**Kruskal-Wallis test**
Child Impact Section					
Symptoms Domain – SD					
Oral/dental pain	0.16(0.53)^{A}	1.00(1.35)^{B}	0.63(1.11)^{B}	1.93(1.33)^{B}	<.001
Function Domain – FD					
Difficulty drinking	0.07(0.39)^{A}	0.23(0.55)^{B}	0.16(0.49)^{B}	0.97(1.08)^{C}	<.001
Difficulty eating	0.16(0.59)^{A}	0.37(0.73)^{B}	0.24(0.67)^{A,B}	1.26(1.30)^{C}	<.001
Difficulty pronouncing words	0.31(0.87)^{A}	0.31(0.93)^{A}	0.05(0.22)^{B}	0.49(0.77)^{C}	<.001
Missed preschool or school	0.01(0.15)^{A}	0.03(0.17)^{A,B}	0.09(0.37)^{B}	0.60(0.93)^{C}	<.001
Psychological Domain – PD					
Trouble sleeping	0.10(0.40)^{A}	0.03(0.17)^{A}	0.13(0.50)^{A}	1.04(1.30)^{B}	<.001
Irritable or frustrated	0.10(0.41)^{A}	0.14(0.43)^{A}	0.14(0.48)^{A}	1.32(1.29)^{B}	<.001
Self-image/Social interaction Domain – SSD					
Avoided smiling or laughing	0.07(0.37)^{A}	0.23(0.65)^{B}	0.20(0.59)^{B}	1.09(1.39)^{C}	<.001
Avoided talking	0.03(0.20)^{A}	0.11(0.32)^{B}	0.07(0.30)^{A,B}	0.86(1.20)^{C}	<.001
Family Impact Section					
Parent Distress Domain – PDD					
Been upset	0.19(0.63)^{A}	0.74(1.09)^{B}	0.29(0.69)^{A,B}	1.48(1.56)^{C}	<.001
Felt guilt	0.19(0.64)^{A}	0.57(0.92)^{B}	0.34(0.80)^{A,B}	1.63(1.51)^{C}	<.001
Family Function Domain – FFD					
Taken time off from work	0.22(0.77)^{A}	0.20(0.58)	0.04(0.25)^{A}	0.53(0.99)^{B}	<.001
Financial impact	0.06(0.34)^{A}	0.03(0.17)^{A}	0.07(0.30)^{A}	0.38(0.95)^{B}	<.001
Overall ECOHIS	1.65(3.65)^{A}	3.40(4.30)^{B}	2.42(4.38)^{A}	12.77(10.95)^{C}	<.001

Data expressed as mean (standard deviation); Different superscript letters denote statistically significant differences ($p < .016$).

Table 4. Mean scores on ECOHIS domains according to location of carious lesions (anterior and/or posterior) and stage of progression.

ECOHIS domains	n(%)	SD	FD	PD	SSD	PDD	FFD	Mean ECOHIS score
Oral clinical conditions								
Distinct visual change in enamel								
Anterior								
=0	326(72.3)	0.44(0.96)	0.69(1.72)	0.34(1.04)	0.29(1.07)	0.65(1.57)	0.26(0.84)	2.61(5.38)
≥1	125(27.7)	1.66(1.40)	2.82(3.30)	1.98(2.33)	1.58(2.32)	2.71(2.95)	0.88(1.83)	10.79(10.65)
p-value		<.001	<.001	<.001	<.001	<.001	<.001	<.001
Posterior								
=0	343(76.1)	0.60(1.10)	1.01(2.15)	0.51(1.30)	0.44(1.33)	0.91(1.94)	0.38(1.18)	3.69(6.97)
≥1	108(23.9)	1.34(1.40)	2.17(3.10)	1.72(2.29)	1.28(2.21)	2.21(2.80)	0.60(1.37)	8.64(10.10)
p-value		<.001	<.001	<.001	<.001	<0.001	.010	<.001
Localized enamel breakdown								
Anterior								
=0	390(86.5)	0.63(1.14)	1.11(2.33)	0.69(1.62)	0.61(1.61)	1.12(2.20)	0.41(1.24)	4.29(7.78)
≥1	61(13.5)	1.72(1.29)	2.39(2.96)	1.51(1.85)	0.87(1.68)	1.87(2.41)	0.54(1.17)	8.59(9.15)
p-value		<.001	<.001	<.001	.037	.001	.085	<.001
Posterior								
=0	386(85.6)	0.69(1.19)	1.21(2.35)	0.77(1.69)	0.63(1.67)	1.17(2.25)	0.44(1.28)	4.59(8.02)
≥1	65(14.4)	1.29(1.29)	1.74(2.99)	0.98(1.56)	0.72(1.30)	1.55(2.23)	0.35(0.89)	6.60(8.40)
p-value		<.001	.427	.072	.012	.049	.761	.007
Underlying dentin shadow								
Anterior								
=0	440(97.6)	0.76(1.21)	1.27(2.46)	0.78(1.67)	0.61(1.58)	1.16(2.19)	0.41(1.19)	4.73(8.00)
≥1	11(2.4)	1.55(1.44)	1.82(2.44)	1.45(1.97)	1.82(2.64)	3.64(2.94)	1.09(2.42)	10.91(9.91)
p-value		.026	.235	.098	.044	<.001	.226	.002
Posterior								
=0	418(92.7)	0.67(1.15)	1.12(2.32)	0.69(1.62)	0.56(1.51)	1.10(2.16)	0.36(1.06)	4.24(7.73)
≥1	33(7.3)	2.09(1.35)	3.33(3.16)	2.18(1.72)	1.76(2.41)	2.73(2.72)	1.27(2.44)	12.91(8.50)
p-value		<.001	<.001	<.001	<.001	<.001	.006	<.001
Distinct cavity with visible dentin								
Anterior								
=0	392(86.9)	0.58(1.10)	0.98(2.11)	0.59(1.44)	0.46(1.35)	0.96(2.04)	0.37(1.18)	3.83(7.27)
≥1	59(13.1)	2.12(1.16)	3.31(3.49)	2.17(2.36)	1.88(2.52)	2.98(2.70)	0.85(1.47)	11.81(9.83)
p-value		<.001	<.001	<.001	<.001	<.001	<.001	<.001
Posterior								
=0	378(83.8)	0.52(1.02)	0.95(2.17)	0.51(1.35)	0.45(1.41)	0.93(2.00)	0.39(1.22)	3.48(6.63)
≥1	73(16.2)	2.14(1.29)	3.00(3.10)	2.27(2.30)	1.66(2.19)	2.75(2.77)	0.63(1.26)	12.10(10.80)
p-value		<.001	<.001	<.001	<.001	<.001	.014	<.001
Extensive cavity								
Without pulp exposure								
Anterior								
=0	411(91.1)	0.62(1.12)	0.95(1.96)	0.58(1.40)	0.41(1.31)	1.00(2.00)	0.35(1.14)	3.77(6.77)
≥1	40(8.9)	2.40(0.98)	4.70(4.05)	3.08(2.41)	2.58(2.86)	3.53(3.19)	1.23(1.76)	16.28(11.39)
p-value		<.001	<.001	<.001	<.001	<.001	<.001	<.001
Posterior								
=0	373(82.7)	0.46(0.97)	0.66(1.61)	0.34(0.99)	0.25(0.95)	0.67(1.60)	0.24(0.80)	2.55(5.17)
≥1	78(17.3)	2.32(1.13)	4.26(3.47)	2.99(2.41)	2.54(2.58)	3.86(2.92)	1.35(2.17)	16.01(10.13)
p-value		<.001	<.001	<.001	<.001	<.001	<.001	<.001
With pulp exposure and absence of fistula								
Anterior								
=0	448(99.3)	0.76(1.21)	1.26(2.45)	0.78(1.66)	0.63(1.60)	1.20(2.22)	0.42(1.23)	4.78(8.00)
≥1	3(0.7)	3.00(1.00)	4.33(2.08)	3.33(2.31)	3.33(3.05)	4.67(3.05)	0.00(0.00)	19.00(13.11)
p-value		.004	.007	.003	.010	.005	<.001	.012

Table 4. Continuation.

Posterior								
=0	433(96.0)	0.71(1.17)	1.16(2.34)	0.70(1.57)	0.57(1.54)	1.06(2.09)	0.35(1.05)	4.28(7.51)
≥1	18(4.0)	2.33(1.33)	4.28(3.35)	3.11(2.40)	2.33(2.56)	5.06(2.58)	2.44(2.79)	19.11(8.91)
p-value		<.001	<.001	<.001	<.001	<.001	<.001	<.001
With pulp exposure and presence of fistula								
Anterior								
=0	450(99.8)	0.77(1.21)	1.25(2.36)	0.78(1.64)	0.63(1.59)	1.21(2.22)	0.43(1.23)	4.78(7.87)
≥1	1(0.2)	0.00(0.00)	0.00(0.00)	0.00(0.00)	0.00(0.00)	0.00(0.00)	0.00(0.00)	0.00(0.00)
p-value		.045	.029	.023	.007	.033	.022	.061
Posterior								
=0	449(99.6)	0.77(1.21)	1.28(2.45)	0.79(1.66)	0.63(1.61)	1.21(2.24)	0.43(1.23)	4.83(8.03)
≥1	2(0.4)	2.00(2.82)	3.00(4.24)	3.00(4.24)	2.50(3.53)	3.00(4.24)	1.00(1.41)	14.50(20.50)
p-value		.348	.371	.255	.158	.347	.187	.511
Root remnant								
Anterior								
=0	439(97.3)	0.73(1.19)	1.10(2.20)	0.67(1.42)	0.54(1.48)	1.08(2.08)	0.37(1.14)	4.35(7.40)
≥1	12(2.7)	2.50(1.17)	7.83(2.62)	5.58(2.93)	4.42(2.19)	6.42(1.67)	2.58(2.27)	24.17(9.45)
p-value		<.001	<.001	<.001	<.001	<.001	<.001	<.001
Posterior								
=0	438(97.1)	0.71(1.17)	1.11(2.22)	0.66(1.43)	0.54(1.49)	1.09(2.11)	0.37(1.16)	4.33(7.47)
≥1	13(2.9)	2.92(0.86)	7.08(3.09)	5.62(2.14)	4.00(2.23)	5.54(2.47)	2.31(2.05)	23.15(7.63)
p-value		<.001	<.001	<.001	<.001	<.001	<.001	<.001
Traumatic dental injury								
Absence	372(82.5)	0.77(1.20)	1.37(2.55)	0.81(1.70)	0.67(1.71)	1.31(2.33)	0.41(1.24)	5.03(8.41)
Presence	79 (17.5)	0.80(1.33)	0.90(1.96)	0.72(1.58)	0.51(1.12)	0.78(1.77)	0.51(1.21)	4.13(6.47)
p-value		.842	.143	.696	.707	.091	.440	.728
Malocclusion								
Absence	323(71.6)	0.89(1.26)	1.21(2.39)	0.72(1.48)	0.66(1.63)	1.21(2.20)	0.33(1.13)	4.87(8.06)
Presence	128(28.4)	0.48(1.06)	1.47(2.62)	1.00(2.07)	0.60(1.62)	1.25(2.36)	0.70(1.43)	4.88(8.24)
p-value		<.001	.329	.352	.368	.858	.003	.371
Physiological tooth mobility								
Absence	442(98.0)	0.76(1.21)	1.25(2.43)	0.79(1.66)	0.62(1.60)	1.20(2.23)	0.41(1.21)	4.74(7.99)
Presence	9 (2.0)	1.44(1.51)	3.00(3.20)	1.44(2.18)	1.56(2.65)	2.44(2.96)	1.56(1.94)	11.44(11.27)
p-value		.111	.011	.170	.031	.063	.008	.059

Values expressed as mean (standard deviation); Mann-Whitney test.

SD = symptoms domain (score ranges from 0 to 5); FD = function domain (score ranges from 0 to 0 to 16); PD = psychological domain (score ranges from 0 to 8); SSD = self-image/social interaction domain (score ranges from 0 to 8); PDD = parent distress domain (score ranges from 0 to 8); FFD = family function domain (score ranges from 0 to 8).

Table 5. Univariate analysis of associations among location of carious lesions, progression stage, characteristics of child and socio-demographic and economic factors according to overall ECOHIS score.

Covariates	n (%)	Robust RR	p-value
Characteristics of child			
Gender			
Female	243(53.9)	1	
Male	208(46.1)	0.90 (0.66-1.23)	.519
Age			
3 years	114(25.2)	1	
4 years	109(24.2)	2.56(2.04-4.96)	.001
5 years	228(50.6)	3.18(1.49-4.41)	<.001
Socio-demographic and economic factors – level 1			
Mother's schooling			
> 11 years	39(27.9)	1	
>8 to 11 years	286(63.4)	6.37(3.04)	<.001
≤8 years	126(8.6)	5.86(2.73)	<.001
Mother works outside home			
Yes	329(72.9)	1	
No	122(27.1)	0.99(0.69-1.43)	.981
Hours/day mother works outside home			
Does not work	122(27.1)	1	
≤8 hours	243(53.9)	0.78 (0.55-1.09)	.150
>8 hours	86(19)	0.86(0.57-1.29)	.476
Household income			
> 3 times the minimum salary	80(17.7)	1	
3 times the minimum salary	138(30.6)	2.48(1.41-4.38)	.002
≤ 2 times the minimum salary	233(51.7)	3.06(1.81-5.17)	<.001
Duration of salary			
>2 weeks	151(33.5)	1	
1 to 2 weeks	125(27.7)	1.37(0.91-2.05)	.132
<1 week	175(38.8)	1.57(1.07-2.31)	.021
Number of people living on income			
≤3	151(33.5)	1	
4	144(31.9)	0.73(0.51-1.06)	.101
>4	156(34.6)	0.94(0.65-1.35)	.735
Family provider			
Father and mother	80(17.7)	1	
Only father	162(35.9)	1.75(1.00-3.02)	.046
Only mother	184(40.8)	2.20(1.31-3.69)	.003
Grandparents or uncles	25(5.5)	0.83(0.28-2.44)	.738
Type of school			
Private	35(7.8)	1	
Public	416(92.2)	4.22(2.15-8.29)	<.001
Oral clinical conditions – level 2			
Distinct visual change in enamel			
Anterior			
=0	326(72.3)	1	
≥1	125(27.7)	4.14(3.12-5.49)	<.001
Posterior			
=0	343(76.1)	1	
≥1	108(23.9)	2.34(1.74-3.15)	<.001
Localized enamel breakdown			
Anterior			
=0	390(86.5)	1	
≥1	61(13.5)	2.00(1.45-2.75)	<.001
Posterior			
=0	386(85.6)	1	
≥1	65(14.4)	1.44(1.01-2.05)	.043
Underlying dentin shadow			

Table 5. Continuation.

Anterior			
=0	440(97.6)	1	
≥1	11(2.4)	2.31(1.35-3.94)	.002
Posterior			
=0	418(92.7)	1	
>1	33(7.3)	3.04(2.29-4.03)	<.001
Distinct cavity with visible dentin			
Anterior			
=0	392(86.9)	1	
≥1	59(13.1)	3.08(2.32-4.08)	<.001
Posterior			
=0	378(83.8)	1	
≥1	73(16.2)	3.47(2.63-4.59)	<.001
Extensive cavity			
Without pulp exposure			
Anterior			
=0	411(91.1)	1	
≥1	40(8.9)	4.32(3.28)	<.001
Posterior			
=0	373(82.7)	1	
≥1	78(17.3)	6.29(4.90-8.06)	<.001
With pulp exposure and absence of fistula			
Anterior			
=0	448(99.3)	1	
≥1	3(0.7)	3.97(2.06-7.66)	<.001
Posterior			
=0	433(96.0)	1	
≥1	18(4.0)	4.46(3.42-5.82)	<.001
With pulp exposure and presence of fistula			
Anterior			
=0	450(99.8)	1	
≥1	1(0.2)	9.61(8.26-11.19)	<.001
Posterior			
=0	449(99.6)	1	
≥1	2(0.4)	3.00(0.74-12.10)	.123
Root remnant			
Anterior			
=0	439(97.3)	1	
≥1	12(2.7)	5.55(4.26-7.24)	<.001
Posterior			
=0	438(97.1)	1	
≥1	13(2.9)	5.34(4.22-6.76)	<.001
Traumatic dental injury			
Absence	372(82.5)	1	
Presence	79 (17.5)	0.82(0.56-1.20)	.820
Malocclusion			
Absence	323(71.6)	1	
Presence	128(28.4)	1.00(0.71-1.41)	1.000
Physiological tooth mobility			
Absence	442(98.0)	1	
Presence	9 (2.0)	2.41(1.29-4.51)	.006

RR = Rate Ratio, calculated by Wald chi-square test.

Table 6. Final Poisson regression model for covariates associated with overall ECOHIS.

Covariates	Robust RR(95%IC)	p-value
Characteristics of child		
Age		
3 years	1	
4 years	2.56(1.46-4.49)	.001
5 years	3.19(2.04-4.98)	<.001
Gender		
Female	1	
Male	1.01(0.74-1.37)	.944
Socio-demographic and economic factors – level 1		
Mother's schooling		
>11 years	1	
>8 to 11 years	7.21(3.44-15.13)	<.001
≤ 8 years	6.23(2.87-13.50)	<.001
Child's age		
3 years	1	
4 years	2.89(1.69-4.95)	<.001
5 years	3.35(2.15-5.21)	<.001
Oral clinical conditions – level 2		
Distinct cavity with visible dentin		
Posterior		
= 0	1	
≥ 1	1.50(1.18-1.92)	.001
Extensive cavity		
Without pulp exposure		
Anterior		
= 0	1	
≥ 1	1.45(1.04-2.03)	.027
Posterior		
= 0	1	
≥ 1	3.20(2.30-4.46)	<.001
With pulp exposure and absence of fistula		
Anterior		
= 0	1	
≥ 1	1.52(1.08-2.14)	.016
Posterior		
= 0	1	
≥ 1	1.78(1.31-2.41)	<.001
With pulp exposure and presence of fistula		
Anterior		
= 0	1	
≥ 1	4.58(2.93-7.16)	<.001
Root remnant		
Anterior		
= 0	1	
≥ 1	2.16(1.56-3.00)	<.001
Posterior		
= 0	1	
≥ 1	1.47(1.07-2.03)	.018
Traumatic dental injury		
Absence	1	
Presence	1.43(1.03-1.99)	.032
Physiological tooth mobility		
Absence	1	
Presence	2.02(1.22-3.35)	.006
Child's age		
3 years	1	
4 years	1.41(0.90-2.23)	.134
5 years	1.83(1.21-2.77)	.004
Mother's schooling		
>11 years	1	
>8 to 11 years	3.34(1.63-6.86)	.001
≤ 8 years	2.82(1.36-5.83)	.005

RR = Rate Ratio, calculated by Wald chi-square test; model adjusted for significant variables in final model of previous levels.

CONSIDERAÇÕES FINAIS

CONSIDERAÇÕES FINAIS

A saúde bucal é, frequentemente, avaliada por profissionais através de exames clínicos bucais, com o objetivo de determinar a presença ou ausência de doença (Gherunpong *et al*., 2004). Atualmente, dentro de uma abordagem holística, o impacto das alterações bucais na vida das pessoas tem sido valorizado, não restringindo somente à avaliação do dano local (Antunes *et al*., 2011).

Recentemente, crianças pré-escolares tem recebido maior atenção em relação à avaliação da qualidade de vida relacionada à saúde bucal, uma vez que podem apresentar limitações decorrentes das alterações bucais. A cárie dentária de início precoce ainda é considerada um desafio para a saúde pública e, o último levantamento de saúde bucal realizado no Brasil, o SB Brasil 2010, verificou que 80% dos dentes decíduos cariados não foram tratados (Brasil, 2011).

A temporalidade de permanência dos dentes decíduos na cavidade bucal de crianças pode ser um fator que contribui para a crença de que problemas bucais na infância não geram consequências às crianças. Assim, os resultados de estudos que avaliam a qualidade de vida em crianças pré-escolares contribuem tanto para a definição de prioridades de tratamento odontológico quanto para desenvolvimento de estratégias de saúde pública bucal.

As alterações bucais, passíveis de prevenção e tratamento, estão, frequentemente, associadas ao baixo nível socioeconômico e cultural, que é uma condição que não pode ser modificada por profissionais de saúde. Nesse sentido, estudos que avaliam a percepção de famílias de baixa renda em relação à saúde bucal podem contribuir para o desenvolvimento de programas de saúde específicos para essa população.

Além disso, a avaliação da associação entre a distribuição das lesões de cárie dentária na cavidade bucal e o impacto na qualidade de vida pode fornecer informações importantes para a

definição de estratégias e prioridades de tratamento. Na clínica infantil, frequentemente, o Odontopediatra opta por iniciar o tratamento restaurador em dentes anteriores com o objetivo de estimular a percepção da criança e da família em relação aos benefícios do tratamento. Os resultados desse estudo contribuem para o questionamento dessa conduta clínica.

Assim, além da divulgação de resultados em periódicos científicos, é fundamental o envio de relatórios ou ofícios para órgãos competentes nos diversos domínios governamentais.

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APÊNDICES

APÊNDICE A

Carta de apresentação dirigida aos pais/responsáveis de crianças que estudam em pré-escola particular

Prezado pai, mãe ou responsável,

meu nome é Joana Ramos Jorge, sou dentista formada aqui em Diamantina. Atualmente, faço doutorado na Faculdade de Odontologia da Universidade Federal de Minas Gerais. Estou desenvolvendo um estudo para avaliar as consequências da cárie dentária na vida das crianças e de suas famílias. Esses dados ajudarão a reforçar a importância de um atendimento infantil nas unidades de atendimento odontológico e também entender o motivo de crianças apresentarem uma alta taxa de dentes cariados e não tratados. Frequentemente, a criança que estuda em escola particular tem acesso a dentista e não tem as mesmas carências que uma criança de escola pública. Assim, vocês nos ajudarão a entender melhor essas diferenças e, por isso, mesmo que o seu filho não tenha cárie é importante que você participe. Para participar, e permitir a participação de seu filho, é necessário que você assine o termo de consentimento (autorização para participação), colocando o seu nome e o nome da criança. Além disso, você poderá nos ajudar respondendo os questionários, um procedimento que gastará poucos minutos. Após a devolução do envelope para a professora, vou à escola para fazer um exame de cárie dentária nas crianças, cujos pais autorizaram a participação. Caso seu filho tenha alguma lesão de cárie não tratada ou outra alteração bucal que requer tratamento, você receberá um relatório sobre a necessidade de procurar um dentista.

Reforço que esta investigação tem como único objetivo a busca do conhecimento que será revertido em benefícios para a população.

Agradeço sua atenção,

Joana Ramos Jorge

APÊNDICE B

Carta de apresentação dirigida aos pais/responsáveis de crianças que estudam em pré-escola pública

Prezado pai, mãe ou responsável,

meu nome é Joana Ramos Jorge, sou dentista formada aqui em Diamantina. Atualmente, faço doutorado na Faculdade de Odontologia da Universidade Federal de Minas Gerais. Estou desenvolvendo um estudo para avaliar as consequências da cárie dentária na vida das crianças e de suas famílias. Esses dados ajudarão a reforçar a importância de um atendimento infantil nas unidades de atendimento odontológico e também entender o motivo de crianças apresentarem uma alta taxa de dentes cariados e não tratados. Vocês nos ajudarão a entender melhor esses motivos, por isso, é importante que você participe. Para participar, e permitir a participação de seu filho, é necessário que você assine o termo de consentimento (autorização para participação), colocando o seu nome e o nome da criança. Além disso, você poderá nos ajudar respondendo os questionários, um procedimento que gastará poucos minutos. Após a devolução do envelope para a professora, vou à escola para fazer um exame de cárie dentária nas crianças, cujos pais autorizaram a participação. Caso seu filho tenha alguma lesão de cárie não tratada ou outra alteração bucal que requer tratamento, você receberá um relatório sobre a necessidade de procurar um dentista e também receberá um encaminhamento para tratamento na Faculdade de Odontologia desta cidade.

Agradeço sua atenção,

Joana Ramos Jorge

APÊNDICE C

Termo de Consentimento Livre e Esclarecido

Eu,
_____
(pai, mãe ou responsável), concordo e autorizo a participação de meu filho (a) _____ (nome do filho (a)) no estudo "IMPACTO DA CÁRIE DENTÁRIA NA QUALIDADE DE VIDA DE CRIANÇAS PRÉ-ESCOLARES E DE SUAS FAMÍLIAS" que será executado pela doutoranda Joana Ramos Jorge, sob orientação do(a) Prof(a). Dr. Saul Martins de Paiva, do Programa de Pós-Graduação em Odontologia, UFMG. Concordo e autorizo com a utilização dos dados coletados desde que seja mantido o sigilo de sua identificação conforme normas do Comitê de Ética em Pesquisa desta Universidade. Autorizo ainda a realização de fotografias dos dentes e da cavidade bucal da criança, para utilização como material didático para aulas expositivas, apresentação em eventos científicos ou para publicação de artigo em revista científica da área da saúde, nacional e/ou internacional.

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APÊNDICE D

Ficha – exame clínico

Escola: _____ Nome:_____ Sala:_____ Turno: _____Idade: _____ Ficha: _____

Examinador: _____ Anotador: _____ Data do exame: ____/____/____

Código Dental

S- saudável
U - Não erupcionado
E – exfoliado
X – perdido por cárie
Dentes anteriores (6-59 meses)/Posteriores (6-71 meses)
T –perdido por trauma
R - resto radicular
N – não aplicável
C – cárie
P - exposição pulpar
F - fístula

Código ICDAS - lesões

0 – hígido
2 –não cavitada (seca e úmida)
3 – ruptura localizada no esmalte
4 – sombra cinzenta de dentina
5 – cavidade com dentina visível
6 – cavidade extensa

Código de atividade

1 – não ativa
2 - ativa

Código restauração

1 – selante parcial
2 – selante completo
3 – rest. da cor do dente
4 - amálgama
5 - coroa de aço
6 – coroa de ouro
7 - rest. perdida
8 - rest. temporária
9 - outra

Código dente	55			54			53			52			51		
	Les	Ativ	Res	Les	Ativ	Res	Les	Ativ	Res	Les	Ativ	Res	Les	Ativ	Res
Mesial															
Oclusal															
Distal															
Vestib															
Lingual															

Código dente	65			64			63			62			61		
	Les	Ativ	Res	Les	Ativ	Res	Les	Ativ	Res	Les	Ativ	Res	Les	Ativ	Res
Mesial															
Oclusal															
Distal															
Vestib															
Lingual															

Código dente	75			74			73			72			71		
	Les	Ativ	Res	Les	Ativ	Res	Les	Ativ	Res	Les	Ativ	Res	Les	Ativ	Res
Mesial															
Oclusal															
Distal															
Vestib															
Lingual															

Código dente	85			84			83			82			81		
	Les	Ativ	Res	Les	Ativ	Res	Les	Ativ	Res	Les	Ativ	Res	Les	Ativ	Res
Mesial															
Oclusal															
Distal															
Vestib															
Lingual															

Maloclusão

[ ] Mordida aberta anterior

[ ] Mordida aberta posterior

[ ] *Overjet* aumentado

[ ]Mordida profunda

[ ] Mordida cruzada anterior

[ ] Mordida cruzada posterior

Traumatismo

[ ] Fratura de esmalte

[ ] Fratura de esmalte/dentina sem envolvimento pulpar

[ ] Fratura de esmalte/dentina com envolvimento pulpar

[ ] Deslocamento dentário

[ ] Descoloração

Mobilidade dentária

[ ] Sim

[ ] Não

APÊNDICE E

Formulário para o preenchimento de dados sociodemográficos e econômicos encaminhado aos pais/responsáveis

Formulário – Investigação das condições socioeconômicas e percepção de cárie dentária

1) **Escolaridade da mãe:**

a) Analfabeta
b) Ensino fundamental incompleto
c) Ensino fundamental completo
d) Ensino médio incompleto
e) Ensino médio completo
f) Ensino superior incompleto
g) Ensino superior completo

2) **A mãe trabalha fora?**

__ Sim
__ Não

3) **Quantas horas por dia?**

__ Até 4 horas/dia
__ De 4 a 8 horas/dia
__ Mais de 8 horas/dia

4) **Renda familiar:**

__ Sem rendimento
__ Até ½ salário mínimo
__ De ½ a 1 salário mínimo
__ De 1 a 2 salários mínimos
__ 2 a 3 salários mínimos
__ 4 a 5 salários mínimos
__ De 5 a 10 salários mínimos
__ De 10 a 15 salários mínimos

__ De 15 a 20 salários mínimos

__ Mais de 20 salários mínimos

5) Quantas pessoas vivem dessa renda?_____

6) Quanto tempo o seu salário dura?

__ até 1 semana

__ de 1 a 2 semanas

__ 2 a 3 semanas

__ 3 a 4 semanas

__ Mais de 4 semanas

7) Tipo de escola da criança:

__ Pública

__ Particular

8) Maior responsável pelo sustento da família (parentesco com a criança): _____

9) A família tem fácil acesso ao médico?

__ Sim

__ Não

10) A família tem fácil acesso ao dentista?

__ Sim

__ Não

11) Seu filho (a) tem acesso ao dentista?

__ Sim

__ Não

12) Seu filho (a) já foi ao dentista?

__ Sim

__ Não

13) Seu filho (a) tem cárie dentária?

__ Sim

__ Não

ANEXOS

ANEXO A

Autorização da Secretaria Municipal de Educação

Prefeitura de Diamantina
Secretaria de Educação
Uma cidade de todos para todos!
Administração 2009 - 2012

PREFEITURA MUNICIPAL DE DIAMANTINA

SECRETARIA MUNICIPAL DE EDUCAÇÃO

AUTORIZAÇÃO

Autorizo **Joana Ramos Jorge,** aluna do Programa de Pós-Graduação em Odontologia da Universidade Federal de Minas Gerais, a realizar nos CMEIs (Centro Municipais de Educação Infantil) – sede, o estudo intitulado "Impacto da Carie Dentária na Qualidade de Vida de Crianças Pré-escolres".

Diamantina, 19 de Setembro de 2011.

Urácia Melissa de Lima
Coordenadora da Educação Infantil

Urácia Melissa de Lima
Coord. da Educação Infantil

Prefeitura Municipal de Diamantina
CNPJ: 17.754.136/0001-90
Secretaria Municipal de Educação

ANEXO B

Parecer de aprovação do Comitê de Ética em Pesquisa da UFMG

UNIVERSIDADE FEDERAL DE MINAS GERAIS

Plataforma Brasil

PARECER CONSUBSTANCIADO DO CEP

DADOS DO PROJETO DE PESQUISA

Título da Pesquisa: Impacto da cárie dentária na qualidade de vida de crianças pré-escolares e de suas famílias

Pesquisador: Saul Martins de Paiva

Área Temática:

Versão: 2

CAAE: 09066012.3.0000.5149

Instituição Proponente: Faculdade de Odontologia (UFMG)

DADOS DO PARECER

Número do Parecer: 177.684

Data da Relatoria: 03/12/2012

Apresentação do Projeto:

Esse estudo de base populacional será do tipo transversal com uma amostra representativa de crianças pré-escolares na faixa etária de 36 a 71 meses, residentes na cidade de Diamantina - MG.

Para a realização do cálculo amostral será utilizado como referência a prevalência de cárie dentária encontrada no estudo piloto. O cálculo amostral obedecerá à fórmula proposta por Kirkwood e Stern, 2003.

O processo de treinamento e calibração dos examinadores consta de duas etapas.Inicialmente, para a calibração dos examinadores será realizado o treinamento teórico a respeito dos critérios utilizados pelo ICDAS II. Nesta etapa, haverá leitura desses critérios e sua aplicação em fotografias de dentes decíduos sem ou com lesões de cárie dentária em seus diversos estágios de desenvolvimento. Após esta etapa será realizado o exame clínico de 50 crianças pelos examinadores e o padrão-ouro (SMP), com o objetivo de realizar a calibração inter-examinador.

Com um intervalo de uma semana, os examinadores realizarão um segundo exame clínico em 30 das 50 crianças participantes da calibração para avaliar a concordância intra-examinador. Estudo pilotoUm estudo piloto será desenvolvido previamente ao estudo principal com o objetivo de avaliar a metodologia elaborada para a realização do estudo.O estudo piloto será realizado em uma pré-escola da rede pública de ensino da cidade de Diamantina. Para a coleta dos dados serão utilizados: o formulário contendo dados sócio-demográficos; o Questionário sobre a Qualidade de Vida Relacionada à Saúde Bucal de Crianças na Idade Pré-escolar (ECOHIS - Early Childhood Oral Health Impact Scale; o exame clínico.

Todos os instrumentos de pesquisa foram anexados.

Endereço: Av. Presidente Antônio Carlos,6627 2º Ad SI 2005
Bairro: Unidade Administrativa II **CEP:** 31.270-901
UF: MG **Município:** BELO HORIZONTE
Telefone: 3134-0945 **Fax:** 3134-0945 **E-mail:** coep@prpq.ufmg.br; coep@reitoria.ufmg.br

ANEXO B

Parecer de aprovação do Comitê de Ética em Pesquisa da UFMG

UNIVERSIDADE FEDERAL DE MINAS GERAIS

Objetivo da Pesquisa:

Objetivo Primário:

Verificar a associação entre o estágio da lesão de cárie dentária e o impacto na qualidade de vida.

Objetivo Secundário:

- Avaliar o estágio da lesão de cárie dentária que é percebido pelos pais.- Verificar a associação entre escolaridade da mãe e presença de cárie dentária, bem como o seu estágio de evolução

Avaliação dos Riscos e Benefícios:

Estão descritos, bem como sua minimização.

Comentários e Considerações sobre a Pesquisa:

Todas as diligências foram atendidas adequadamente.

Considerações sobre os Termos de apresentação obrigatória:

São apresentados parecer consubstanciado da camara departamental,projeto de pesquisa, folha de rosto, termo de compromisso assinado pelos pesquisadores, instrumentos de coleta de dados e TCLE.

Recomendações:

Conclusões ou Pendências e Lista de Inadequações:

SMJ, sugiro aprovação.

Situação do Parecer:

Aprovado

Necessita Apreciação da CONEP:

Não

Considerações Finais a critério do CEP:

Aprovado conforme parecer.

BELO HORIZONTE, 19 de Dezembro de 2012

Assinador por:
Maria Teresa Marques Amaral
(Coordenador)

Endereço: Av. Presidente Antônio Carlos,6627 2º Ad SI 2005
Bairro: Unidade Administrativa II **CEP:** 31.270-901
UF: MG **Município:** BELO HORIZONTE
Telefone: 3134-0945 **Fax:** 3134-0945 **E-mail:** coep@prpq.ufmg.br; coep@reitoria.ufmg.br

ANEXO C

Instrumento *Early Childhood Oral Health Impact Scale* (ECOHIS)

Questionário sobre a Qualidade de Vida Relacionada à Saúde Bucal de Crianças em idade pré-escolar

Problemas com dentes, boca, ou maxilares (ossos da boca) e seus tratamentos, podem afetar o bem-estar e a vida diária das crianças e suas famílias. Para cada uma das seguintes questões perguntadas pelo entrevistador, por favor, indique no quadro de opções de respostas a que melhor descreve as experiências da sua criança ou a sua própria. Considere toda a vida da sua criança, desde o nascimento até agora, quando responder cada pergunta.

1. Sua criança já sentiu dores nos dentes, na boca ou nos maxilares (ossos da boca)?
( )Nunca ( ) Quase nunca ( ) Às vezes ( ) Com freqüência ( ) Com muita freqüência ( ) Não sei

2. Sua criança já teve dificuldade em beber bebidas quentes ou frias devido a problemas com os dentes ou tratamentos dentários?
( )Nunca ( ) Quase nunca ( ) Às vezes ( ) Com freqüência ( ) Com muita freqüência ( ) Não sei

3. Sua criança já teve dificuldade para comer certos alimentos devido a problemas com os dentes ou tratamentos dentários?
( )Nunca ( ) Quase nunca ( ) Às vezes ( ) Com freqüência ( ) Com muita freqüência ( ) Não sei

4. Sua criança já teve dificuldade de pronunciar qualquer palavra devido a problemas com os dentes ou tratamentos dentários?
( )Nunca ( ) Quase nunca ( ) Às vezes ( ) Com freqüência ( ) Com muita freqüência ( ) Não sei

5. Sua criança já faltou à creche, jardim de infância ou escola devido a problemas com os dentes ou tratamentos dentários?
( )Nunca ( ) Quase nunca ( ) Às vezes ( ) Com freqüência ( ) Com muita freqüência ( ) Não sei

6. Sua criança já teve dificuldade em dormir devido a problemas com os dentes ou tratamentos dentários?
( )Nunca ( ) Quase nunca ( ) Às vezes ( ) Com freqüência ( ) Com muita freqüência ( ) Não sei

7. Sua criança já ficou irritada devido a problemas com os dentes ou tratamentos dentários?
( )Nunca ( ) Quase nunca ( ) Às vezes ( ) Com freqüência ( ) Com muita freqüência ( ) Não sei

8. Sua criança já evitou sorrir ou rir devido a problemas com os dentes ou tratamentos dentários?
( )Nunca ( ) Quase nunca ( ) Às vezes ( ) Com freqüência ( ) Com muita freqüência ( ) Não sei

9. Sua criança já evitou falar devido a problemas com os dentes ou tratamentos dentários?
( )Nunca ( ) Quase nunca ( ) Às vezes ( ) Com freqüência ( ) Com muita freqüência ( ) Não sei

10. Você ou outra pessoa da família já ficou aborrecida devido a problemas com os dentes ou tratamentos dentários de sua criança?
( )Nunca ( ) Quase nunca ( ) Às vezes ( ) Com freqüência ( ) Com muita freqüência ( ) Não sei

11. Você ou outra pessoa da família já se sentiu culpada devido a problemas com os dentes ou tratamentos dentários de sua criança?
( )Nunca ( ) Quase nunca ( ) Às vezes ( ) Com freqüência ( ) Com muita freqüência ( ) Não sei

12. Você ou outra pessoa da família já faltou ao trabalho devido a problemas com os dentes ou tratamentos dentários de sua criança?
( )Nunca ( ) Quase nunca ( ) Às vezes ( ) Com freqüência ( ) Com muita freqüência ( ) Não sei

13. Sua criança já teve problemas com os dentes ou fez tratamentos dentários que causaram impacto financeiro na sua família?
( )Nunca ( ) Quase nunca ( ) Às vezes ( ) Com freqüência ( ) Com muita freqüência ( ) Não sei

ANEXO D

Normas de publicação no periódico *Community Dentistry and Oral Epidemiology*

1. GENERAL

The aim of *Community Dentistry and Oral Epidemiology* is to serve as a forum for scientifically based information in community dentistry, with the intention of continually expanding the knowledge base in the field. The scope is therefore broad, ranging from original studies in epidemiology, behavioral sciences related to dentistry, and health services research through to methodological reports in program planning, implementation and evaluation. Reports dealing with people of all age groups are welcome.

The journal encourages manuscripts which present methodologically detailed scientific research findings from original data collection or analysis of existing databases. Preference is given to new findings. Confirmation of previous findings can be of value, but the journal seeks to avoid needless repetition. It also encourages thoughtful, provocative commentaries on subjects ranging from research methods to public policies. Purely descriptive reports are not encouraged, nor are behavioral science reports with only marginal application to dentistry.

Knowledge in any field only advances when research results and policies are held up to critical scrutiny. To be consistent with that view, the journal encourages scientific debate on a wide range of subjects. Responses to research results and views expressed in the journal are always welcome, whether in the form of a manuscript or a commentary. Prompt publication will be sought for these submissions. Book reviews and short reports from international conferences are also welcome, and publication of conference proceedings can be arranged with the publisher.

Please read the instructions below carefully for details on the submission of manuscripts, the journal's requirements and standards as well as information concerning the procedure after acceptance of a manuscript for publication in *Community Dentistry and Oral Epidemiology*. Authors are encouraged to visit Wiley-Blackwell Author Services for further information on the preparation and submission of articles and figures.

2. ETHICAL GUIDELINES

Community Dentistry and Oral Epidemiology adheres to the below ethical guidelines for publication and research.

2.1. Authorship and Acknowledgements

Authorship: Authors submitting a manuscript do so on the understanding that the manuscript have been read and approved by all authors and that all authors agree to the submission of the manuscript to the Journal.

Community Dentistry and Oral Epidemiology adheres to the definition of authorship set up by The International Committee of Medical Journal Editors (ICMJE). According to the ICMJE

criteria, authorship should be based on 1) substantial contributions to conception and design of, or acquisition of data or analysis and interpretation of data, 2) drafting the article or revising it critically for important intellectual content and 3) final approval of the version to be published. Authors should meet conditions 1, 2 and 3.

It is a requirement that all authors have been accredited as appropriate upon submission of the manuscript. Contributors who do not qualify as authors should be mentioned under Acknowledgements.

Acknowledgements: Under acknowledgements please specify contributors to the article other than the authors accredited and all sources of financial support for the research.

2.2. Ethical Approvals

In all reports of original studies with humans, authors should specifically state the nature of the ethical review and clearance of the study protocol. Informed consent must be obtained from human subjects participating in research studies. Some reports, such as those dealing with institutionalized children or mentally retarded persons, may need additional details of ethical clearance.

Experimental Subjects: experimentation involving human subjects will only be published if such research has been conducted in full accordance with ethical principles, including the World Medical Association Declaration of Helsinki (version 2008) and the additional requirements, if any, of the country where the research has been carried out.

Manuscripts must be accompanied by a statement that the experiments were undertaken with the understanding and written consent of each subject and according to the above mentioned principles.

All studies should include an explicit statement in the Material and Methods section identifying the review and ethics committee approval for each study, if applicable. Editors reserve the right to reject papers if there is doubt as to whether appropriate procedures have been used.

Ethics of investigation: Manuscripts not in agreement with the guidelines of the Helsinki Declaration as revised in 1975 will not be accepted for publication.

2.3 Clinical Trials

Clinical trials should be reported using the CONSORT guidelines available at **http://www.consort-statement.org**. A CONSORT checklist should also be included in the submission material.

Community Dentistry and Oral Epidemiology encourages authors submitting manuscripts reporting from a clinical trial to register the trials in any of the following free, public clinical trials registries: www.clinicaltrials.gov, http://clinicaltrials.ifpma.org/clinicaltrials,

http://isrctn.org/. The clinical trial registration number and name of the trial register will then be published with the manuscript.

2.4 Observational and Other Studies

Observational studies such as cohort, case-control and cross-sectional studies should be reported consistent with guidelines like STROBE.Meta analysis for systematic reviews should be reported consistent with guidelines like QUOROM and MOOSE. These guidelines can be accessed at www.equator-network.org

2.5 Appeal of Decision

The decision on a manuscript is final and cannot be appealed.

2.6 Permissions

If all or parts of previously published illustrations are used, permission must be obtained from the copyright holder concerned. It is the author's responsibility to obtain these in writing and provide copies to the Publishers.

2.7 Copyright Assignment

Authors submitting a manuscript do so on the understanding that the work and its essential substance have not been published before and is not being considered for publication elsewhere. The submission of the manuscript by the authors means that the authors automatically agree to assign exclusive copyright to Wiley-Blackwell if and when the manuscript is accepted for publication. The work shall not be published elsewhere in any language without the written consent of the publisher. The articles published in this journal are protected by copyright, which covers translation rights and the exclusive right to reproduce and distribute all of the articles printed in the journal. No material published in the journal may be stored on microfilm or videocassettes or in electronic database and the like or reproduced photographically without the prior written permission of the publisher.

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Any authors wishing to send their paper OnlineOpen will be required to complete the payment form available from our website at:

https://authorservices.wiley.com/bauthor/onlineopen_order.asp
Prior to acceptance there is no requirement to inform an Editorial Office that you intend to publish your paper OnlineOpen if you do not wish to. All OnlineOpen articles are treated in the same way as any other article. They go through the journal's standard peer-review process and will be accepted or rejected based on their own merit.

3. SUBMISSION OF MANUSCRIPTS

Manuscripts should be submitted electronically via the online submission site http://mc.manuscriptcentral.com/cdoe. The use of an online submission and peer review site enables immediate distribution of manuscripts and consequentially speeds up the review process. It also allows authors to track the status of their own manuscripts. Complete instructions for submitting a manuscript are available online and below. Further assistance can be obtained from the Editorial Assistant, Beverly Ellis, beverly.ellis@adelaide.edu.au

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The Editorial Assistant is Beverly Ellis: beverly.ellis@adelaide.edu.au

3.1. Getting Started

• Launch your web browser (supported browsers include Internet Explorer 6 or higher, Netscape 7.0, 7.1, or 7.2, Safari 1.2.4, or Firefox 1.0.4) and go to the journal's online Submission Site: http://mc.manuscriptcentral.com/cdoe
• Log-in or click the 'Create Account' option if you are a first-time user.

• If you are creating a new account.

- After clicking on 'Create Account', enter your name and e-mail information and click 'Next'. Your e-mail information is very important.

- Enter your institution and address information as appropriate, and then click 'Next.'

- Enter a user ID and password of your choice (we recommend using your e-mail address as your user ID), and then select your area of expertise. Click 'Finish'.

• If you have an account, but have forgotten your log in details, go to Password Help on the journals online submission system http://mc.manuscriptcentral.com/cdoe and enter your e-mail address. The system will send you an automatic user ID and a new temporary password.
• Log-in and select 'Corresponding Author Center.'

3.2. Submitting Your Manuscript

• After you have logged in, click the 'Submit a Manuscript' link in the menu bar.
• Enter data and answer questions as appropriate. You may copy and paste directly from your manuscript and you may upload your pre-prepared covering letter.
• Click the 'Next' button on each screen to save your work and advance to the next screen.
• You are required to upload your files.
- Click on the 'Browse' button and locate the file on your computer.

- Select the designation of each file in the drop down next to the Browse button.
- When you have selected all files you wish to upload, click the 'Upload Files' button.
• Review your submission (in HTML and PDF format) before sending to the Journal. Click the 'Submit' button when you are finished reviewing.

3.3. Manuscript Files Accepted

Manuscripts should be uploaded as Word (.doc) or Rich Text Format (.rtf) files (not write-protected) plus separate figure files. GIF, JPEG, PICT or Bitmap files are acceptable for submission, but only high-resolution TIF or EPS files are suitable for printing. The files will be automatically converted to HTML and a PDF document on upload and will be used for the review process. The text file must contain the entire manuscript including title page, abstract, text, references, tables, and figure legends, but no embedded figures. Figure tags should be included in the file. Manuscripts should be formatted as described in the Author Guidelines below.

3.4. Suggest Two Reviewers

Community Dentistry and Oral Epidemiology attempts to keep the review process as short as possible to enable rapid publication of new scientific data. In order to facilitate this process, please suggest the names and current email addresses of two potential international reviewers whom you consider capable of reviewing your manuscript.

3.5. Suspension of Submission Mid-way in the Submission Process

You may suspend a submission at any phase before clicking the 'Submit' button and save it to submit later. The manuscript can then be located under 'Unsubmitted Manuscripts' and you can click on 'Continue Submission' to continue your submission when you choose to.

3.6. E-mail Confirmation of Submission

After submission you will receive an email to confirm receipt of your manuscript. If you do not receive the confirmation email within 10 days, please check your email address carefully in the system. If the email address is correct please contact your IT department. The error may be caused by some sort of spam filtering on your email server. Also, the emails should be received if the IT department adds our email server (uranus.scholarone.com) to their whitelist.

3.7. Review Procedures

All manuscripts (except invited reviews and some commentaries and conference proceedings) are submitted to an initial review by the Editor or Associate Editors. Manuscripts which are not considered relevant to the practice of community dentistry or of interest to the readership of *Community Dentistry and Oral Epidemiology* will be rejected without review. Manuscripts presenting innovative hypothesis-driven research with methodologically detailed scientific findings are favoured to move forward to peer review. All manuscripts accepted for peer review

will be submitted to at least 2 reviewers for peer review, and comments from the reviewers and the editor are returned to the lead author.

3.8. Manuscript Status

You can access ScholarOne Manuscripts (formerly known as Manuscript Central) any time to check your 'Author Centre' for the status of your manuscript. The Journal will inform you by e-mail once a decision has been made.

3.9. Submission of Revised Manuscripts

Revised manuscripts must be uploaded within two or three months of authors being notified of conditional acceptance pending satisfactory Minor or Major revision respectively. Locate your manuscript under 'Manuscripts with Decisions' and click on 'Submit a Revision' to submit your revised manuscript. Please remember to delete any old files uploaded when you upload your revised manuscript. Revised manuscripts must show changes to the text in either bold font, coloured font or highlighted text.

3.10 Conflict of Interest

Community Dentistry & Oral Epidemiology requires that sources of institutional, private and corporate financial support for the work within the manuscript must be fully acknowledged, and any potential grant holders should be listed. Acknowledgements should be brief and should include information concerning conflict of interest and sources of funding. It should not include thanks to anonymous referees and editors.

3.11 Editorial Board Submissions

Manuscripts authored or co-authored by the Editor (in Chief) or by members of the Editorial Board are evaluated using the same criteria determined for all other submitted manuscripts. The process is handled confidentially and measures are taken to avoid real or reasonably perceived conflict of interest.

4. MANUSCRIPT FORMAT AND STRUCTURE

4.1. Page Charge

Articles exceeding 7 published pages are subject to a charge of USD 300 per additional page. One published page amounts approximately to 5,500 characters (excluding figures and tables).

4.2. Format

Language: All submissions must be in English; both British and American spelling conventions are acceptable. Authors for whom English is a second language must have their manuscript professionally edited by an English speaking person before submission to make sure the English is of high quality. It is preferred that manuscript is professionally edited. A list of independent

suppliers of editing services can be found at http://authorservices.wiley.com/bauthor/english_language.asp. All services are paid for and arranged by the author, and use of one of these services does not guarantee acceptance or preference for publication.

Font: All submissions must be double spaced using standard 12 point font size.

Abbreviations, Symbols and Nomenclature: Authors can consult the following source: CBE Style Manual Committee. Scientific style and format: the CBE manual for authors, editors, and publishers. 6th ed. Cambridge: Cambridge University Press, 1994

4.3. Structure

All manuscripts submitted to *Community Dentistry and Oral Epidemiology* should follow the guidelines regarding structure as below.

Title Page: should include a title of no more than 50 words, a running head of no more than 50 characters and the names and institutional affiliations of all authors of the manuscript should be included.

Abstract: All manuscripts submitted to *Community Dentistry and Oral Epidemiology* should use a structured abstract under the headings: Objectives – Methods – Results – Conclusions.

Main Text of Original Articles should include Introduction, Materials and Methods and Discussion.

Introduction: should be focused, outlining the historical or logical origins of the study and not summarize the results; exhaustive literature reviews are not appropriate. It should close with the explicit statement of the specific aims of the investigation.

Materials and Methods must contain sufficient detail such that, in combination with the references cited, all studies reported can be fully reproduced. As a condition of publication, authors are required to make materials and methods used freely available to academic researchers for their own use.

Discussion: may usually start with a brief summary of the major findings, but repetition of parts of the abstract or of the results sections should be avoided. The section should end with a brief conclusion and a comment on the potential clinical program or policy relevance of the findings. Statements and interpretation of the data should be appropriately supported by original references.

4.4. References

The list of references begins on a fresh page in the manuscript, using the Vancouver format. References should be numbered consecutively in the order in which they are first mentioned in the text. Identified references in the text should be sequentially numbered by Arabic numerals in

parentheses, e.g., (1,3,9). Superscript in-text references are not acceptable in CDOE. For correct style, authors are referred to: International Committee of Medical Journal Editors. Uniform requirements for manuscripts submitted to biomedical journals: writing and editing for biomedical publication. http://www.icmje.org October 2004. For abbreviations of journal names, consult http://www.lib.umich.edu/dentlib/resources/serialsabbr.html

Avoid reference to 'unpublished observations', and manuscripts not yet accepted for publication. References to abstracts should be avoided if possible; such references are appropriate only if they are recent enough that time has not permitted full publication. References to written personal communications (not oral) may be inserted in parentheses in the text.

We recommend the use of a tool such as Reference Manager for reference management and formatting. Reference Manager reference styles can be searched for here: www.refman.com/support/rmstyles.asp

Examples of the Vancouver reference style are given below:

Journals
Standard journal article (List all authors when six or fewer. When seven or more, list first six and add et al.)

Widström E, Linna M, Niskanen T. Productive efficiency and its determinants in the Finnish Public Dental Service. Community Dent Oral Epidemiol 2004;32:31-40.

Corporate author

WHO Collaborating Centre for Oral Precancerous Lesions. Definition of leukoplakia and related lesions: an aid to studies on oral precancer. Oral Surg Oral Med Oral Pathol 1978;46:518-39.

Books and other monographs

Personal author(s)

Fejerskov O, Baelum V, Manji F, Møller IJ. Dental fluorosis; a handbook for health workers. Copenhagen: Munksgaard, 1988:41-3.

Chapter in a book

Fomon SJ, Ekstrand J. Fluoride intake. In: Fejerskov O, Ekstrand J, Burt BA, editors: Fluoride in dentistry, 2nd edition. Copenhagen: Munksgaard, 1996; 40-52.

4.5. Tables, Figures and Figure Legends

Tables are part of the text and should be included, one per page, after the References. All graphs, drawings, and photographs are considered figures and should be sequentially numbered with Arabic numerals. Each figure must be on a separate page and each must have a caption. All

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ANEXO E

Normas de publicação no periódico *Pediatric Dentistry*

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Literature Review: Full-length manuscript not to exceed 2,500 words (including brief unstructured *Abstract*, *Introduction*, the *Review of the Literature* with appropriate subheading, *Discussion*, *Conclusions*, and *Acknowledgments*; excluding references); double spaced; font no smaller than 11-point Times New Roman or Arial; and Tables combined not to exceed a total of 4. Authors desiring to have more Figures or Tables, and agreeing with electronic publication of their manuscript, should indicate this preference. **Authors are encouraged to review these Instructions carefully prior to submitting their manuscripts.**

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Units of measure: Authors should express all quantita-tive values in the International System of Units (**SI units**) unless reporting English units from a cited reference. Figures and tables should use SI units, with any necessary conversion factors given in legends or footnotes. All numbers should be expressed as digits, and percent values should be expressed as whole numbers. Laboratory data values should be rounded to the number of digits that reflects the precision of the results and the sensitivity of the measurement procedure.
Statistical tests: The results of all statistical comparisons should be reported to include the statistical test value and the associated *P*-value and confidence interval, if appropriate. If $P>.01$, the actual value for *P* should be expressed to 2 digits. Non-significant values should not be expressed as "NS" whether or not *P* is significant, unless rounding a significant *P*-value expressed to 3 digits would make it non significant (ie, $P=.049$, not $P=.05$). If $P<.01$, it should be expressed to 3 digits (eg, $P=.003$, not $P<.05$). Actual *P*-values should be expressed unless $P<.001$, in which case they should be so designated. For confidence intervals, the number of digits should equal the number of digits in the point estimate. For example, for an odds ratio of 3.56, the 95% confidence interval should be reported as "1.23, 5.67," not as "1.234, 5.678."
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Journal: Bogert TR, García-Godoy F. Effect of prophylaxis agents on the shear bond strength of a fissure sealant. Pediatr Dent 1992;14:50-1. For journals, list all authors when there are 6 or fewer; when there are 7 or more, list the first 3, then "et al." Page numbers should be elided where possible. For example: 12-8, 191-5, 347-51.

Book: Bixler D. Genetic aspects of dental ano-malies. In: McDonald RE, Avery DR, eds. Den-tistry for the Child and Adolescent. 5th ed. Philadelphia: CV Mosby Co; 1987:90-116. Article, report, or monograph issued by a com-mittee, institution, society, or government agency: Medicine for the public: Women's health research Bethesda, Md.: U.S. Department of Health and Human Services, Public Health Service, National Institutes of Health; 2001. DHHS publication 02-4971.

World Wide Web: Centers for Disease Control and Prevention. Water Fluoridation. Available at: "*http://www.cdc.gov/oralhealth/waterfluoridation /index.htm*". Accessed June 18, 2006. Authors citing material from the World Wide Web must use WebCite (*www.webcitation.org*), a free service for authors who wish to archive their Web references to ensure that cited Web material will remain available to readers in the future. Web citations archived on WebCite will not disappear in the future. Authors should provide direct references to original sources whenever possible. Avoid using abstracts or literature reviews as references. If possible, avoid references to papers accepted but not yet pub-lished. If such a citation is necessary, these papers should be cited as being "In press," and verification that they have been accepted for publication must be provided. Where possible, references of easily accessible material are preferable to dissertations, theses, and other unpublished documents.

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Artigos completos publicados em periódicos

- ✓ Martins-Júnior PA; **Ramos-Jorge J**; Paiva SM; Marques LS; Ramos-Jorge, ML. Validations of the Brazilian version of the Early Childhood Oral Health Impact Scale (ECOHIS). Cadernos de Saúde Pública (ENSP. Impresso), v. 28, p. 367-374, 2012.

- ✓ **Ramos-Jorge J**; Marques LS; Homem MA; Paiva SM; Ferreira MC; Ferreira FO; Ramos-Jorge ML. Degree of dental anxiety in children with and without toothache: prospective assessment. International Journal of Paediatric Dentistry (Online), v. 22, p. 36-41, 2012.

- ✓ **Ramos-Jorge J**; Pordeus IA; Ramos-Jorge ML; Paiva SM. Prospective Longitudinal Study of Signs and Symptoms Associated With Primary Tooth Eruption. Pediatrics (Evanston), v.128, p. 471-476, 2011.

- ✓ Ramos-Jorge ML; **Ramos-Jorge J**; Vieira de Andrade RG; Marques LS. Impact of exposure to positive images on dental anxiety among children: a controlled trial. European Archives of Paediatric Dentistry (Online), v. 195, p. 195-199, 2011.

- ✓ Ramos-Jorge ML; Tataounoff J; Corrêa-Faria P; Alcântara CE; **Ramos-Jorge J**; Marques LS. Non-accidental collision followed by dental trauma: associated factors. Dental Traumatology (Print), v.27, p.442-445, 2011.

- ✓ Ramos-Jorge ML; Vieira-Andrade RG.; Martins-Júnior PA; Cordeiro MMR; **Ramos-Jorge J**; Paiva SM; Marques LS. Level of agreement between self-administered and interviewer-administered CPQ8-10 and CPQ11-14. Community Dentistry and Oral Epidemiology, v.40, p. 201-209, 2011.

- ✓ Moura-Leite F; **Ramos-Jorge J**; Ramos-Jorge ML; Paiva SM; Vale MPP; Pordeus IA. Impact of dental pain on daily living of five-year-old Brazilian preschool children: prevalence and associated factors. European Archives of Paediatric Dentistry (Online), v.12, p.293-297, 2011.

Textos em jornais de notícias/revistas

- ✓ **Ramos-Jorge J**; Pordeus IA; Ramos-Jorge ML; Paiva SM. Primeira dentição não causa febre alta e outros sintomas graves, diz pesquisa. Veja *on line*, 10 ago. 2011.

- ✓ **Ramos-Jorge J**; Pordeus IA; Ramos-Jorge ML; Paiva SM. Teething May Not Be Linked to Fever. WebMD Better information. Better health, 10 ago. 2011.

- ✓ **Ramos-Jorge J**; Pordeus IA; Ramos-Jorge ML; Paiva SM. Baby's Fever May Not Signal Teething. U.S. News Health, 10 ago. 2011.

- ✓ **Ramos-Jorge J**; Pordeus IA; Ramos-Jorge ML; Paiva SM. Teething an unlikely cause of serious symptoms. Reuters, New York, 09 ago. 2011.

- ✓ **Ramos-Jorge J**; Pordeus IA; Ramos-Jorge ML; Paiva SM. Baby's Fever May Not Signal Teething. Yahoo News.

Resumos publicados em anais de congressos

- ✓ **Ramos-Jorge J** ; Ramos-Jorge ML; Martins-Júnior PA ; Corrêa-Faria P; Pordeus IA; Paiva SM. Mothers reports about teething: comparative study between prospective and retrospective data. In: 90th General Session & Exhibition of the IADR, 2012, Foz do Iguaçu, Paraná. General Session & Exhibition of the IADR, 2012.

- ✓ **Ramos-Jorge J**; Pordeus IA ; Ramos-Jorge ML; Paiva SM . Sinais e sintomas associados com a erupção de dentes decíduos: estudo longitudinal. In: 28a Reunião Anual da Sociedade Brasileira de Pesquisa Odontológica, 2011, Águas de Lindóia. Brazilian Oral Research. São Paulo: Universidade de São Paulo, 2011. v.25. p.197-197.

- ✓ Vieira-Andrade RG; Martins-Júnior PA; **Ramos-Jorge J**; Paiva SM; Marques LS; Ramos-Jorge ML. Nível de concordância entre as versões auto-administrada e administrada por entrevista do CPQ8-10 e CPQ11-14. In: 28a Reunião Anual da Sociedade Brasileira de Pesquisa Odontológica, 2011, Águas de Lindóia. Brazilian Oral Research. São Paulo: Universidade de São Paulo, 2011. v.25. p.197-197.

- ✓ **Ramos-Jorge J**; Pordeus IA; Ramos-Jorge ML; Paiva SM. Prospective longitudinal study of symptoms associated to primary tooth eruption. In: 89th General Session & Exhibition of the IADR, 2011, San Diego. IADR General Session, 2011.

- ✓ Corrêa-Faria P; Tataounoff J; Alcântara CEP; **Ramos-Jorge J**; Zarzar PMPA; Marques, LS; Ramos-Jorge ML . Prevalência e fatores etiológicos do traumatismo dentário em escolares de 12 a 15 anos de idade. In: 27º Reunião Anual da Sociedade Brasileira de Pesquisa Odontológica, 2010, Águas de Lindóia. Brazilian Oral Research. São Paulo: Universidade de São Paulo, 2010. v.24. p.185-185.

- ✓ **Ramos-Jorge J**; Miamoto CB; Tataounoff J; Paiva SM; Pereira LJ; Ramos-Jorge ML; Marques LS. Severidade da maloclusão em indivíduos com paralisia cerebral: fatores determinantes. In: 27º Reunião Anual da Sociedade Brasileira de Pesquisa Odontológica, 2010, Águas de Lindóia. Brazilian Oral Research. São Paulo: Universidade de São Paulo, 2010. v.24. p.213-213.

- ✓ Alcântara CEP; Tataounoff J; Corrêa-Faria P; **Ramos-Jorge J**; Zarzar PMPA; Marques, LS; Ramos-Jorge ML. Traumatismo dentário em escolares de 12 a 15 anos de idade: prevalência, tipos de tratamento realizados e necessidade de tratamento. In: 27º Reunião Anual da Sociedade Brasileira de Pesquisa Odontológica, 2010, Águas de Lindóia. Brazilian Oral Research. São Paulo: Universidade de São Paulo, 2010. v.24. p.260-260.

- ✓ Martins-Júnior PA; Almeida L; Lima AO; Silva VS; Marques, LS; **Ramos-Jorge J**; Paiva SM; Ramos-Jorge ML . Impacto da maloclusão na qualidade de vida de crianças entre 8 e 10 anos de idade. In: 27º Reunião Anual da Sociedade Brasileira de Pesquisa Odontológica, 2010, Águas de Lindóia. Brazilian Oral Research. São Paulo: Universidade de São Paulo, 2010. v.24. p.334-334.

- ✓ Paiva PCP; Martins-Júnior PA; Lima AO; Almeida L; Silva VS; **Ramos-Jorge J**; Marques LS; Ramos-Jorge ML . Avaliação do impacto da cárie dentária na qualidade de vida de crianças de 8-10 anos de idade. In: 27º Reunião Anual da Sociedade Brasileira de Pesquisa Odontológica, 2010, Águas de Lindóia. Brazilian Oral Research. São Paulo: Universidade de São Paulo, 2010. v.24. p.370-370.

- ✓ **Ramos-Jorge J**; Moura-Leite F; Ramos-Jorge ML; Paiva SM; Vale MPP; Pordeus IA. Impacto da dor de dente em crianças pré-escolares: um estudo representativo de Belo Horizonte. In: 26 Reunião Anual da SBPqO, 2009, Águas de Lindóia. Brazilian Oral Research. São Paulo: Universidade de São Paulo, 2009. v.23. p.298-298.

Artigos aceitos para publicação

- ✓ **Ramos-Jorge J**; Ramos-Jorge ML; Martins-Júnior PA; Corrêa-Faria P; Pordeus IA; Paiva SM. Mothers reports about teething: comparative study between prospective and retrospective data. Journal of Dentistry for Children (Chicago, Ill. Online), 2013.

Artigos submetidos

- ✓ **Ramos-Jorge J**, Paiva SM, Tataounoff J, Pordeus IA, Marques LS, Ramos-Jorge ML. Impact of treated/untreated traumatic dental injuries on quality of life among Brazilian schoolchildren. Dental Traumatology.