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CÁRIE DENTÁRIA EM PRÉ-ESCOLARES DO SUL DO BRASIL: UMA ANÁLISE DE IDADE-PERÍODO-COORTE

Santa Maria, RS
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Tese apresentada ao Curso de Doutorado do Programa de Pós- Graduação em Ciências Odontológicas, Área de Concentração em Odontologia, ênfase em Odontopediatria, da Universidade Federal de Santa Maria (UFSM, RS), como requisito parcial para obtenção do grau de **Doutora em Ciências Odontológicas.**

Orientador: Prof. Dr. Thiago Machado Ardenghi

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Yassmín Hêllwaht Ramadan

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Dedico este trabalho aos meus pais, Ali Nunes Ramadan e Lia Mara Cavalheiro Ramadan, meus irmãos Shayene Ata Ramadan e Áimann Schariff Ata Ramadan e meus amigos Bruna Brondani e Vitor Leges, que foram fontes de apoio e motivação durante essa caminhada.

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A maior recompensa para o trabalho do homem não é o que ele ganha com isso,
mas o que ele se torna com isso.”
John Ruskin

RESUMO

CÁRIE DENTÁRIA EM PRÉ-ESCOLARES DE UM MUNICÍPIO DO SUL DO BRASIL

AUTORA: Yassmín Hêllwaht Ramadan
ORIENTADOR: Thiago Machado Ardenghi

A prevalência de cárie dentária em crianças pré-escolares é influenciada por fatores individuais e contextuais. Os efeitos da idade, do período e da coorte de nascimento têm sido avaliados de forma individual e pouco se sabe sobre a tendência de cárie dentária em pré-escolares usando modelos combinados de idade-período-coorte. Assim, o objetivo desta tese foi avaliar a prevalência de cárie dentária e a associação com fatores demográficos, socioeconômicos, comportamentais e psicossociais, bem como, avaliar a tendência na prevalência de cárie dentária em crianças pré-escolares, considerando os efeitos de idade-período-coorte (*age-period-cohort effects*). A partir dos dados coletados em 2019, foram avaliados a prevalência de cárie e a associação com fatores sociodemográficos, comportamentais e psicossociais. Das 545 crianças avaliadas, 19, 4% apresentaram cárie dentária em pelo menos um dente (ceo-d≥1), a média de ceo-d foi 0,6(dp:1,7). A análise dos dados utilizou modelos de regressão de Poisson com abordagem hierárquica para estimar a associação entre cárie dentária e variáveis preditoras. Os resultados demonstraram que crianças que viviam somente com o pai ou outro membro familiar, que foram ao dentista e que os pais não percebiam necessidade de tratamento dentário nos filhos permaneceram associadas com maior prevalência de cárie dentária ($p<0,05$). A tendência de cárie foi avaliada utilizando os três períodos de tempo e considerando os efeitos da idade-periodo-coorte. Neste, uma amostra representativa de 1644 crianças pré-escolares de Santa Maria,RS, Brasil, foi selecionada a partir de três levantamentos epidemiológicos realizados nos anos de 2008, 2013 e 2019. Os dados foram analisados utilizando teste qui-quadrado para tendências e análise hierárquica de idade-período-coorte, utilizando o modelo de regressão de Poisson para testar as associações entre variáveis preditoras e cárie dentária. Houve diferença significativa na experiência de cárie considerando os efeitos de idade, período e coorte. O efeito de idade indicou que crianças mais velhas tiveram maior probabilidade de ter cárie dentária, o efeito de coorte mostrou que significativa redução na prevalência de cárie entre aqueles nascidos em 2003 e 2018. Dessa forma, embora seja observado declínio na prevalência de cárie entre crianças pré-escolares, observamos que o nível de cárie aumenta conforme a idade, persistindo as desigualdades na distribuição da doença.

Palavras-chave: Cárie dentária. Crianças. Tendência

ABSTRACT

DENTAL CARIES IN PRE-SCHOOLS CHILDREN IN SOUTHERN BRAZIL

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The prevalence of dental caries in preschool children is influenced by individual and contextual factors. The effects of age, period and birth cohort have been evaluated individually and little is known about the dental caries trend in preschool children using age-period-cohort combined models. Thus, the objective of this thesis was to evaluate the prevalence of dental caries and the association with demographic, socioeconomic, behavioral and psychosocial factors, as well as to evaluate the trend in the prevalence of dental caries in preschool children, considering the age-period effects. -cohort (age-period-cohort effects). From the data collected in 2019, the prevalence of caries and the association with sociodemographic, behavioral and psychosocial factors were evaluated. Of the 545 children evaluated, 19.4% had dental caries in at least one tooth (dmft $\geq$1), the mean dmft value was 0.6 (sd:1.7). Data analysis used Poisson regression models with a hierarchical approach to estimate the association between dental caries and predictor variables. The results showed that children who lived only with their father or another family member, who went to the dentist and whose parents did not perceive the need for dental treatment in their children remained associated with a higher prevalence of dental caries ($p<0.05$). Caries trend was assessed using the three time periods and considering age-period-cohort effects. In this one, a representative sample of 1644 preschool children from Santa Maria, RS, Brazil, was selected from three surveys carried out in the years 2008, 2013 and 2019. Data were analyzed using chi-square test for trends and analysis age-period-cohort hierarchy, using the Poisson regression model to test the associations between predictor variables and dental caries. There was a significant difference in caries experience considering the effects of age, period and cohort. The age effect indicated that older children were more likely to have dental caries, the cohort effect showed a significant reduction in the prevalence of caries among those born in 2003 and 2018. Thus, although a decline in the prevalence of caries among children is observed preschool children, we observed that the level of caries increases with age, with inequalities in the distribution of the disease persisting.

Keywords: Child. Dental caries. Trend.

SUMÁRIO

1 INTRODUÇÃO

A cárie dentária é uma das doenças crônicas mais prevalentes na infância (NEMATOLLAHI, 2007) e assim, considerada um importante problema de saúde pública (KASSEBAUM, 2015). A Organização Mundial de Saúde (OMS) descreve a cárie dentária e as doenças periodontais como doenças pandêmicas que afetam toda a população sem distinção de idade, gênero ou posição socioeconômica (PETERSEN, 2008). Os países em desenvolvimento, que sofrem com a falta de acesso a serviços básicos de saúde bucal e a medidas preventivas efetivas, como a fluoretação das águas de abastecimento público, são os que apresentam maior carga da doença (KASSEBAUM, 2017).

Do ponto de vista biológico, a cárie dentaria é uma doença multifatorial, biofilme-mediada, influenciada pela dieta rica em açúcares e caracterizada pela destruição da estrutura dentária pelos ácidos resultantes da transformação dos açúcares alimentares pelas bactérias presentes no biofilme (PIITS, 2019). Fatores ambientais, comportamentais e psicossociais também são comprovadamente associados ao padrão de ocorrência da doença cárie (PIOVESAN, 2010; ARDENGHI, 2013; EMMANUELLI, 2021). Clinicamente, a cárie manifesta-se através de fases contínuas que, ao longo do tempo, tendem a aumentar sua severidade, variando desde lesões subclínicas, de mancha branca até a perda de estrutura dentária (MACHIULSKIENE, 2020).

O padrão de cárie que acomete crianças na primeira infância, anteriormente denominado “Cárie de Mamadeira” ou “Cárie Precoce na Infância”, teve sua nomenclatura atualizada em 2019, através da Declaração de Bangkok (PITTS, 2019). Neste documento, as antigas nomenclaturas foram substituídas pelo termo Cárie na Primeira Infância (CPI). As antigas nomenclaturas não eram capazes de descrever fidedignamente, visto que a doença não ocorre somente em função do uso da mamadeira e o termo “precoce” subentende temporalidade de algo que de fato ocorrerá e uma vez que a doença é evitável, não é a terminologia mais adequada. Assim, CPI é definida como a presença de uma ou mais superfícies afetadas por cárie (cavitadas ou não cavitadas), perdidas ou restauradas em função de cárie, em qualquer dente decíduo de crianças abaixo dos seis anos de idade (PITTS, 2019). CPI tem significativo impacto na vida dos indivíduos, famílias e sociedade uma vez que a presença da doença está associada a dor, dificuldades na fala e alimentação, pior qualidade de vida relacionada a saúde bucal e maior risco de cárie na dentição permanente (PIOVESAN, 2011, ORTIZ, 2014; GOMES, 2014).

Embora seja prevenível e seus fatores de risco podem, em geral, ser modificados, a alta prevalência da doença indica que este ainda é um desafio de saúde pública (KASSEBAUM, 2015). Em 2010, cárie dentária não tratada foi a condição mais prevalente em dentes permanentes e a 10ª posição em dentes decíduos (KASSEBAUM, 2015). De acordo com *Global Burden of Disease Study* em 2015, 573 milhões de crianças, cerca de 7,8% da população infantil mundial, possuía ao menos um dente com cárie dentária não tratada. (KASSEBAUM, 2017). No Brasil, dados do último levantamento de âmbito nacional, realizado em 2010, demonstraram que as crianças brasileiras abaixo de 5 anos de idade tinham em média 2,43 dentes cariados, perdidos ou restaurados devido à cárie dentária (BRASIL, 2011).

Alguns estudos tem sido feitos no intuito de identificar o padrão de tendência na ocorrência de cárie dentária na população pré-escolar (BONECKER, 2010; KRAMER, 2015; DYE, 2017; SISTANI, 2017). Bonecker *et al* (2010), avaliou a tendência na prevalência e severidade de cárie em pré-escolares de 1-4 anos de Diadema entre os anos de 1997 e 2008. No ano de 1997, 34,9% das crianças apresentavam pelo menos um dente cariado. Em 2004, esse valor reduziu para 22,7% com leve acréscimo no ano de 2008 onde 23,5% das crianças possuíam ao menos um dente cariado, perdido ou restaurado em decorrência da cárie dentária. O ceod médio que era de 2,1 em 1997 diminuiu consideravelmente passando para 1,3 em 2008. O componente cariado foi o principal elemento do índice ceod em todos os anos em questão (BONECKER., 2010). Contrário à estes resultados, Sistani *et al* (2017) identificou, através de uma amostra de 2080 crianças de 3-6 anos de Babol, no Norte do Irã, um aumento de cárie dentária nesta faixa etária, entre os anos de 2007 e 2015.

Todavia, a literatura vem demonstrando declínio na prevalência global da cárie dentária em crianças brasileiras de até cinco anos de idade (BÖNECKER, 2010; KRAMER, 2015; KASSEBAUM, 2017). Em Canoas, um município do sul do Brasil, 2793 crianças menores de seis anos de idade foram avaliadas e verificou-se diminuição na prevalência e severidade da cárie dentária. A prevalência da doença diminuiu de 39,6% nos anos 2000 para 25,9% em 2010. Independentemente da posição socioeconômica, observou-se um declínio na severidade de cárie (*Significant Caries Index- SiC*) que passou de 4,4 em 2000 para 3,4 em 2010. Entretanto, a queda nestes índices não ocorreu de forma igualitária entre os diferentes estratos socioeconômicos populacionais. O grupo pertencente aos segmentos em maior desvantagem socioeconômica reportou menor redução na prevalência e severidade da doença. O Coeficiente Gini, que demonstra a desigualdade na distribuição, indicou uma maior

concentração da doença em um grupo menor de indivíduos em 2010 (Gini=0,84) que em 2000 (Gini= 0,77). E dessa forma, essa desigual redução e distribuição da cárie dentária contribuiu para a ampliação das iniquidades em saúde bucal das crianças de 2000 a 2010 (KRAMER, 2015).

Embora possamos identificar um padrão na ocorrência de cárie como o crescimento dos índices de cárie conforme o envelhecimento das crianças, poucas são as análises que avaliam se essas alterações estão mais relacionadas a idade cronológica, ao período (ano da coleta do exame ou à coorte (ano de nascimento). Os efeitos de idade, período e coorte (*age-period-cohort effects*) se referem a variações temporais no desfecho em questão e trazem resultados diferentes entre si. O efeito da idade refere-se a alterações causadas por processos biológicos, psicológicos e comportamentais próprias do crescimento e desenvolvimento de cada indivíduo. Os efeitos de período, são aqueles determinados por eventos específicos com potencial de causar alterações em toda a população durante um período de tempo específico, como por exemplo, a fluoretação das águas de abastecimento público, uma vez que após a implementação do flúor à água os índices de cárie dentária tiveram significativa redução em toda a população atingida (PETERSEN, 2004). Os efeitos de coorte se referem àqueles fatores que têm influência sobre um grupo de pessoas que compartilha circunstâncias socioculturais semelhantes (coorte) (AHACIC, 2008). Uma coorte pode ser representada, por exemplo por indivíduos que nasceram no mesmo ano ou em um intervalo de tempo determinado. Identificar as diferenças entre os efeitos de idade, período e coorte tem importantes implicações teóricas e para o desenvolvimento de medidas de saúde pública, uma vez que a análise de cada um deles pode melhorar o entendimento e ajuda a identificar fatores sociais e ambientais que podem ser modificados com o intuito de evitar agravos em saúde.

Bernabé e Sheiham (2014) avaliaram a influência relativa dos efeitos da idade, do período e da coorte na tendência de experiência de cárie em dentes permanentes em quatro populações diferentes e verificaram um forte efeito da idade na experiência de cárie, além dos efeitos de período e coorte. Todavia, Kim *et al* (2021) observou em uma população adulta, efeitos da idade e coorte mas não verificou influência do efeito do período sobre a experiência de cárie e outros desfechos de saúde bucal (KIM, 2021). Poucos são os estudos utilizando essa abordagem e, ao nosso conhecimento, este é primeiro a trabalhar com uma população de pré-escolares.

Dessa forma, objetivo desta tese foi avaliar a prevalência de prevalência de cárie dentária e a associação com fatores demográficos, socioeconômicos e comportamentais em

crianças pré-escolares de Santa Maria- RS, Brasil. Além de investigar a tendência na prevalência de cárie dentária considerando os efeitos de idade-período-coorte na população pré-escolar.

2 ARTIGO 1

Artigo intitulado “Prevalence of early childhood caries and associated factors in Brazilian pre-schoolers: a cross-sectional study with a hierarchical approach”. Redigido conforme as normas da revista *Brazilian Dental Journal.* (ANEXO D).

Prevalence of early childhood caries and associated factors in Brazilian pre-schoolers: a cross-sectional study with a hierarchical approach

Short title: Early childhood caries in pre-schoolers

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Prevalence of early childhood caries and associated factors in Brazilian pre-schoolers: a cross-sectional study with a hierarchical approach

Short title: Early childhood caries in pre-schoolers

Abstract

This study aimed to investigate the prevalence of early childhood caries (ECC) and its association with demographic, socioeconomic, behavioral, and psychosocial factors in preschool children aged 0-5 years old in an emerging country. This cross-sectional study was conducted in 2019 during the National Children's Vaccination Day in Santa Maria, a Southern city in Brazil. 545 children aged 0-5 years old were systematically selected and evaluated for ECC through the decayed, missing and filled deciduous teeth (dmft index) in 15 health centres of the city. Demographic, socioeconomic, behavioural, and psychosocial characteristics were measured using a structured questionnaire applied to parents/legal guardians. Poisson regression models with a hierarchical approach, considering the sample weight, were used to estimate the association between children's dental caries and predictors variables. 545 of the 653 children invited to participate in the study were evaluated, resulting in a response rate of 83.5%. Overall, the prevalence of ECC was 19.4% (dmft $\geq$ 1). After adjustment, living only with the father or another family member, having gone to the dentist before or after the first year of life, having routine exams as the reason for the last dental attendance, and the lack of paternal perception regarding the child's need for dental treatment showed a significant association with ECC ($p<0.05$). The prevalence of ECC remains significantly high among children from an emerging country. Demographic, socioeconomic, behavioral, and psychosocial factors continue to influence the development and establishment of the disease.

Keywords: child, cross-sectional studies, dental caries, prevalence, oral health.

Introduction

Dental caries affects about 573 million children under 6 years of age worldwide (1). The pattern of disease that affects this age group is named “early childhood caries” (ECC) and is defined as the presence of one or more decayed (white spot or cavitated lesion), missing (by dental caries), filled surfaces, in any primary tooth of children under 6 years of age (2). Oral colonization by cariogenic bacteria, frequent sugar consumption, lack of toothbrushing, and enamel hypoplasia are the main biological risk factors for ECC (3). This condition can cause pain, difficulty in chewing and speaking, malocclusion, in addition to negative psychosocial impacts on children and their families (4).

Although the global rates of dental caries have declined over the last few decades, mainly in developed countries, socially vulnerable groups are still concentrating the greatest burden of the disease (1). This phenomenon of polarization highlights the inequality in the distribution of the disease. Previous results have shown an association between socioeconomic and demographic factors with the occurrence of dental caries in preschool children (5). A recent systematic review showed that worse socioeconomic conditions, such as low household income, low maternal education, and parental unemployment were associated with higher risk of having at least one decayed, missing, or filled tooth (6). Contributing factors, such as behavioral and psychological characteristics, also influence the development of the disease (3).

Investigating the establishment of diseases and risk factors in early childhood is of paramount importance, since this period is considered decisive for the establishment of the behavioral profile and, consequently, of health in an individual's life (7). Previous results have demonstrated an association between dental caries in primary and permanent dentition. Significant differences in the disease trajectory were observed over 7 years, indicating that children who had developed carious lesions during childhood were at greater risk of developing dental caries in the permanent dentition (8). In addition, new evidence indicates that adverse early childhood experiences have long-term physiological and epigenetic effects on brain development and cognition (7). Thus, identifying the current contributing factors to dental caries in this age group makes it possible to act directly at the focus of the disease and reduce the long-term negative effects, both on oral health and general health.

Although previous studies have evaluated the prevalence of dental caries in Brazilian preschoolers, recognizing the current prevalence of dental caries in early childhood, in addition to contributing factors to its development, is necessary to monitor children's oral condition, establish prevention strategies and minimize the risk of the disease perpetuating

into adolescence and adulthood. In addition, we face a dearth of current epidemiological surveys at the national level, limiting current knowledge about the development and establishment of dental caries. Finally, it is still possible to observe that the latest data published in the region on dental caries in this age group belong to research conducted between 2008 and 2013, representing an epidemiological profile of approximately a decade ago (9). Therefore, the main objective of this study is to assess the prevalence of ECC and its association with demographic, socioeconomic, behavioral, and psychosocial factors in preschool children under 6 years of age in an emerging country. The conceptual hypothesis is that children from worse socioeconomic backgrounds will have a higher prevalence of ECC.

Material and Methods

This study is reported according to STROBE (Strengthening the Reporting of Observational Studies in Epidemiology) guidelines (10).

Ethical considerations

This study was aproved by the Committee of Ethics in Research of the Federal University of Santa Maria (UFSM) (report number 3.505.416). Children were included in the study after their assent and the consent of their parents and/or legal guardians.

Study setting and sample

This cross-sectional study was conducted in 2019 with preschool children aged 0-5 years old living in Santa Maria, a Southern city in Brazil, during the National Children's Vaccination Day. Santa Maria is a medium-size city with fluoridated water supply and an estimated population of 285,159 inhabitants, geographically subdivided into 8 regions. Each region has a health center considered a reference for residents. Of the 28 health centers in the city, 15 centers composed of a dental chair were selected and used as sampling points, to cover the 8 administrative regions. Thus, more than one health center was chosen per region considering the population density of area, resulting in a balanced distribution of centers in all regions of the city. This vaccination program has demonstrated significant reach with adherence rates above 97%.

For the selection of participants, children were systematically selected. Every five children in the queue were invited, along with their parents and/or legal guardians, to participate in the research. If there was a refusal, the sixth child was invited and so on until

there was an acceptance. All children aged 0-5 years were considered eligible, except those with a previous diagnosis of physical and/or mental disorders. The selection process was standardized for the fifteen health centers and followed the same methodology as in previous study (11). The sample size was calculated considering the finite population of approximately 28,000 children under 6 years of age in Santa Maria, a standard error of 5%, a confidence interval of 95% and a prevalence of dental caries of 16.4% (12). Adding 20% to compensate for denials during data collection, the minimum size required was 327 children.

Data collection

Data were collected through oral clinical examinations and application of structured questionnaires in a single day. The research team consisted of 1 examiner and an assistant, totaling 15 examiners and 30 assistants. All examiners were dentists and/or graduate students and the examiners were undergraduate students. The assistants were responsible for inviting the individuals to participate, applying the questionnaire questions to the parents/guardians through a face-to-face interview, and recording the examinations performed by the examiner on the form. The data collection team underwent a training and calibration process. Kappa values corresponding to intra- and inter-examiner reproducibility for the variable dental caries was higher than 0.7.

Clinical examinations were conducted in a private room on a dental chair, and all the biosafety standards were applied. Dental caries was evaluated with the aid of a plain dental mirror and a World Health Organization (WHO) periodontal probe (CPI, “Ball point”), through the decayed, missing, and filled teeth index (dmft), for the deciduous dentition (13). After the evaluation, all participants received individualized oral hygiene instructions. For data analysis, the prevalence of dental caries was obtained by dichotomizing the values obtained in the dmft index. Therefore, children who had dmft = 0 were considered free of dental caries experience, and children who had dmft $\geq$ 1 were classified as having dental caries experience.

Demographic, socioeconomic, behavioral, and psychosocial information were obtained through the application of structured questionnaires to parents and/or legal guardians. Questions referring to sex (girls and boys), age (in years), race, household income, maternal education, and family structure were obtained. Race was measured using the criteria recommended by the Brazilian Institute of Geography and Statistics (IBGE), through the following question: "Which race do you consider your child to be?" - “white”, “black”, “brown”, “indigenous” or “yellow” (14). This variable was later dichotomized into “white” or

“non-white”. The household income was calculated as the sum of all income earned in the family (including pensions, government aid, retirement, etc.) and expressed in *Reais* (R$), the official Brazilian currency (R$1.00 corresponds to approximately $5.27). For the analysis, the variable was worked in a continuous quantitative way. Maternal education was collected in years of schooling and dichotomized into < 8 years and ≥ 8 years of formal education, indicating the completion of primary education in the country. Finally, the family structure was measured according to the parent with whom the child lived, with the following response options: structural ("mother and father") and non-structural ("just the mother" and "just the father or another").

Regarding behavioral and psychosocial variables, the child’s first dental attendance and the reason for the last dental attendance were questioned, as well as the parent’s perception of their child’s need for dental treatment (“yes” and “no”). The age of first dental attendance was measured in years and categorized as "never went to the dentist" and went "up/after to 1 year old". The reason for the last consultation was asked through the following question: "What was the reason for the last dental attendance" - "toothache", "mouth pain", "knocks and falls", "routine", and "others". Subsequently, this variable was categorized into "non-routine" and "routine".

Statistical analysis

Data analysis was performed with STATA 14 (StataCorp. 2014. Stata Statistical Software: Release 14.1. College Station, TX: StataCorp LP). Descriptive analysis was performed to provide basic statistics and characterize the study sample. All descriptive analyzes took the weight of the sample into account, using Stata's “svy” commands for complex data samples.

Poisson regression models were used to estimate the association between children's dental caries and demographic, socioeconomic, and behavioral variables. Poisson regression analysis was also conducted considering the sample weight, based on the conceptual theoretical model proposed by Fisher-Owens et al., 2007 (15). The results are presented in Rate Ratio (RR) and its respective 95% CI. The variables that showed a significant association with the outcome in the previous literature and/or a p value < 0.20 in the unadjusted model were included in the model adjusted by the stepwise forward procedure. Our statistical models were verified using a hierarchical approach. Three models were described: Model 1 - only demographic variables; Model 2 - demographic and socioeconomic variables; Model 3 - addition of behavioral characteristics to Model 2. Variables that

presented p-value ≤.05 after adjustment were retained in the final model. In all models, the goodness of fit was measured using deviance (-2 log probability).

Results

During data collection, 545 of the 653 children invited to participate in the study were evaluated. The reason for non-inclusion was the refusal from 108 parents or legal guardians, resulting in a response rate of 83.5%.

The characteristics of the participants are shown in Table 1. The sample is composed of a greater proportion of boys (51.7%), white race (73.3%), and whose mothers had at least 8 years of formal education (86.0%). The mean age and household income of the sample is 2.85 years (SD [standard deviation] 1.40) and R$ 2,934 (SD 3,164), respectively. Four hundred and five children (76.3%) belonged to structured families (living with their mother and father) and 69.3% of them had never been to the dentist. In addition, the main reason for the last dental attendance corresponded to routine exams (61.6%). Finally, 177 parents (34.9%) perceived some need for dental treatment for their child, and 439 children (80.6%) were free from dental caries (dmft = 0).

Table 2 shows the sample distribution according to the dental caries experience. It is possible to observe that, regardless of sex, race, and maternal education, most participants did not have dental caries. However, 37.5% of the children who lived only with their fathers had a dmft $\geq$ 1. In addition, 52.4% of the participants who presented "routine" as the reason for the last dental attendance had dental caries. Seventy-six children whose parents or legal guardians (42.9%) perceived some need for dental treatment also had dmft $\geq$ 1. Finally, the mean age and household income of children who had dental caries was 3.59 (SD 1.12) and R$2,196 (SD 1,435), respectively.

Table 3 presents the results of the unadjusted Poisson Regression for the analysis of the association between the predictor variables and dental caries experience. In summary, older children, non-white, who lived only with their father or another family member, and who went to the dentist until the 1st year of life had worse proportions of dental caries ($p<0.05$). In addition, participants whose mothers had $\geq$ 8 years of formal education, who attended the last dental attendance due to routine exams, and whose parents did not perceive the need for dental treatment presented a protective factor for the outcome (dmft $\geq$ 1) ($p<0.05$).

Table 4 presents the adjusted association, determined though hierarchical Poisson regression. Model 1 only considered demographic variables (age and race), which remained

significantly associated with the outcome ($p<0.05$). Model 2 considered demographic and socioeconomic variables, resulting in a significantly higher proportion of dental caries for older and non-white children, who lived only with their father or other family member, and who belonged to lower-income families ($p<0.05$). Model 3 considered all model variables, including behavioral characteristics. The following factors remained significantly associated with dental caries: living only with the father or another family member, having gone to the dentist before or after the first year of life, having routine exams as the reason for the last dental attendance, and lack of paternal perception regarding the child's need for dental treatment ($p<0.05$).

Discussion

The present study assessed the prevalence of ECC and its association with demographic, socioeconomic, behavioral, and psychosocial factors in preschool children under 6 years of age in an emerging country. The results shown that the prevalence and distribution of dental caries remain high and inequal in preschool children. Demographic, socioeconomic, behavioral, and psychosocial factors continue to influence the development and establishment of the disease.

Our results showed that the prevalence of ECC (19.4%) was lower than in other cross-sectional studies with similar samples (5,16), including a study previously conducted in the city of Santa Maria (17). This fact could be justified by the positive effect of public health policies applied in the region. However, even with the reduction in prevalence, the occurrence of dental caries at an early age is a factor of attention. Results have shown that one of the main risk factors for dental caries is previous experience of the disease (8). In addition, this disease has a negative impact on well-being and oral health-related quality of life (OHRQoL), as it can cause pain, difficulties in performing daily activities, such as eating and sleeping, and affect children's physical and psychosocial development (12).

Children who lived only with their father or another family member were more likely to have dental caries than those who lived with both their mother and father. A systematic review that evaluated the impact of parent-related factors on dental caries found that the four studies that assessed the effect of family structure (living with both parents/single parent) on dental caries found a significant association like the results of the present study (18). A possible explanation for this scenario is the fact that women are more likely than men to adopt toothbrushing practices according to the recommendations (19). Therefore, children who live in the care of their parents may be at higher risk of developing tooth decay. In addition, men

tend to use dental services less frequently, which can make early diagnosis and preventive measures for dental caries more difficult (19).

The American Academy of Pediatric Dentistry (AAPD) recommends that children's first dental visit should take place within the first six months of life, until the first deciduous tooth erupts and, at the latest, within the first year of life (20). Our results indicate that children who went to the dentist in the first year of life or later were more likely to have caries lesions. Previous literature has shown that higher dmft scores may be associated with dental pain, resulting in the need to seek dental care (9,21). Therefore, our results corroborate the fact that children who go to the dentist are more likely to have dental caries, indicating a curative rather than preventive pattern in current dentistry. This information complements the fact that children who went to the dentist for routine reasons were protected against the occurrence of dental caries, also observed in this study.

The lack of parents' perception of the children's need for dental treatment remained statistically significant even after adjustment. Thus, children whose parents did not perceive the need for dental treatment were protected against the occurrence of dental caries, which agrees with the previous literature (22,23). Parents' perception of their children's oral health can influence the pattern of care and health behaviors and decision-making (24). Therefore, once parents do not perceive the treatment needs, they tend not to seek care. In addition, previous results demonstrated an association between parents' positive perception of their children's oral health status and a lower prevalence of dental caries. In this context, parents' positive perception of their children's oral health was related to routine dental care and greater knowledge about oral hygiene carried out by their children, contributing factors to a lower occurrence of the disease (22,23).

Some methodological issues must be interpreted with caution. The cross-sectional design of the study does not allow us to make a tail-effect inference between predictors and outcome. However, cross-sectional studies are useful in identifying possible risk factors to be confirmed later by longitudinal studies. In addition, studies on the prevalence of oral diseases in this age group are important and add information on oral health since epidemiological surveys outline the disease panorama, which can help in the planning of public measures. Dental caries was evaluated through the dmft index and did not evaluate initial white spot lesions, which may underestimate the real values of disease. Even so, the dmft index is widely used for epidemiological surveys due to its ease of use and lower cost, as it requires fewer resources. Finally, information related to diet was not collected, which possibly influence the outcome evaluated in this study.

Despite the limitations, our study has a representative sample of children in early childhood. Studies in this age group are important for monitoring diseases and identifying possible risk factors that can help in the development of public health strategies that focus on reducing inequalities in oral health among Brazilian preschool children. Dental caries in preschool children shares common risk factors with other chronic diseases, such as obesity and diabetes, which can have an impact throughout an individual's life. Studies that focus on the early childhood age group contribute to the identification of these risk factors, enabling the promotion of healthy habits, as well as identifying the most vulnerable groups.

In conclusion, the prevalence of early childhood caries remains significantly high in preschool children. In addition, demographic, socioeconomic, behavioral, and psychosocial factors influence the occurrence and development of the disease in early childhood. Public health actions can be planned and implemented through knowledge of the current prevalence and distribution of dental caries, enabling a focused action on this target audience to further reduce the occurrence of the disease.

Resumo

Este estudo teve como objetivo investigar a prevalência de cárie precoce na infância (ECC) e sua associação com fatores demográficos, socioeconômicos, comportamentais e psicossociais em pré-escolares com 0 a 5 anos de idade em um país emergente. Este estudo transversal foi realizado em 2019 durante o Dia Nacional de Vacinação Infantil em Santa Maria, cidade do sul do Brasil. 545 crianças de 0 a 5 anos de idade foram sistematicamente selecionadas e avaliadas para ECC através do índice de dentes decíduos cariados, perdidos e obturados (índice ceod) em 15 centros de saúde da cidade. As características demográficas, socioeconômicas, comportamentais e psicossociais foram mensuradas por meio de questionário estruturado aplicado aos pais/responsáveis. Modelos de regressão de Poisson com abordagem hierárquica, considerando o peso amostral, foram utilizados para estimar a associação entre ECC e variáveis preditoras. Foram avaliadas 545 das 653 crianças convidadas a participar do estudo, resultando em uma taxa de resposta de 83,5%. No geral, a prevalência de ECC foi de 19,4% (ceod ≥ 1). Após ajuste, morar apenas com o pai ou outro familiar, ter ido ao dentista antes ou após o primeiro ano de vida, ter exames de rotina como motivo da última consulta odontológica e a falta de percepção dos pais quanto à necessidade de tratamento odontológico do filho(a) apresentou associação significativa com ECC ($p<0,05$). A prevalência de CPI permanece significativamente alta entre crianças de um país

emergente. Fatores demográficos, socioeconômicos, comportamentais e psicossociais continuam a influenciar o desenvolvimento e estabelecimento da doença.

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Table 1. Demographic, socioeconomic, behavioral, and clinical characteristics of the sample (n=545).

Variables	***n****	**(%)**
Sex		
Girls	263	48.3
Boys	282	51.7
Race		
White	394	73.3
Non-white	144	26.7
Maternal education		
< 8 years	74	14.0
≥ 8 years	453	86.0
Responsible person with whom the child resides		
Mother and father	405	76.3
Just the mother	102	19.2
Just the father or another	24	4.5
Dental attendance		
Never went to the dentist	367	69.3
Up/after to 1 year old	163	30.7
Reason for the last dental attendance		
Non-routine	63	38.4
Routine	101	61.6
Parents' perception of their child's need for dental treatment		
Yes	177	34.9
No	330	65.1
Dental caries experience		
Without (dmft = 0)	439	80.6
With (dmft ≥ 1)	106	19.4
	Mean	**SD[a]**
Age (in years)	2.85	1.40
Household income (in Reais – R$)**	2,934	3,164

*Values lower than 545 due to missing data.
**Official Brazilian currency - R$5.27 is equivalent to US$1.00, approximately.
[a]SD – Standard deviation.

Table 2. Sample distribution according to the dental caries experience (n=545).

Variables	Dental caries *n** (%)	
	Without (dmft = 0)	**With (dmft ≥ 1)**
Sex		
Girls	211 (80.2)	52 (19.8)
Boys	228 (80.8)	54 (19.2)
Race		
White	330 (83.3)	66 (16.7)
Non-white	106 (73.6)	38 (26.4)
Maternal education		
< 8 years	52 (70.3)	22 (29.7)
≥ 8 years	375 (82.8)	78 (17.2)
Responsible person with whom the child resides		
Mother and father	333 (82.2)	72 (17.8)
Just the mother	81 (79.4)	21 (20.6)
Just the father or another	15 (62.5)	9 (37.5)
Dental attendance		
Never went to the dentist	313 (85.3)	54 (14.7)
Up/after to 1 year old	115 (70.5)	48 (29.5)
Reason for the last dental attendance		
Non-routine	30 (47.6)	33 (52.4)
Routine	89 (88.1)	12 (11.9)
Parents' perception of their child's need for dental treatment		
Yes	101 (57.1)	76 (42.9)
No	306 (92.7)	24 (7.3)
	Mean (SD)[a]	
	Without (dmft = 0)	**With (dmft ≥ 1)**
Age (in years)	2.67 (1.40)	3.59 (1.12)
Household income (in Reais – R$)**	3,099 (3,413)	2,196 (1,435)

*Values lower than 545 due to missing data.
**Official Brazilian currency - R$5.27 is equivalent to US$1.00, approximately.
[a]SD – Standard deviation.

Table 3. Unadjusted association between children characteristics and dental caries experience determined using multilevel Poisson regression (n=545).

Variables	Dental caries	
	RR[a] Unadjusted (95% CI)[b]	P-value
Sex		0.854
Girls	1	
Boys	0.96 (0.68-1.36)	
Age (in years)	1.52 (1.34-1.72)	<0.01
Race		<0.05
White	1	
Non-white	1.58 (1.11-2.25)	
Maternal education		<0.01
< 8 years	1	
≥ 8 years	0.57 (0.38-0.86)	
Responsible person with whom the child resides		<0.01
Mother and father	1	
Just the mother	1.15 (0.74-1.79)	
Just the father or another	2.10 (1.21-3.66)	
Household income (in Reais – R$)*	0.99 (0.99-0.99)	<0.01
Dental attendance		<0.01
Never went to the dentist	1	
Up/after to 1 year old	2.00 (1.42-2.81)	
Reason for the last dental attendance		<0.01
Non-routine	1	
Routine	0.22 (0.12-0.41)	
Parents' perception of their child's need for dental treatment		<0.01
Yes	1	
No	0.16 (0.11-0.25)	

[a]RR, rate ratio.
[b]CI, confidence interval.
*Official Brazilian currency - R$5.27 is equivalent to US$1.00, approximately.

Table 4. Adjusted association between children characteristics and dental caries experience determined using hierarchical multilevel Poisson regression (n=545).

Variables	Model 1[†]	Model 2[‡]	Model 3[¶]
	RR[a] (95% CI)[b]	RR (95% CI)	RR (95% CI)
Sex			
Girls			
Boys			
Age (in years)	1.51 (1.33-1.72)*	1.60 (1.39-1.84)*	0.96 (0.77-1.19)
Race			
White	1	1	1
Non-white	1.54 (1.10-2.15)*	1.53 (1.06-2.20)*	1.28 (0.84-1.94)
Maternal education			
< 8 years		1	1
≥ 8 years		0.72 (0.48-1.09)	0.71 (0.36-1.41)
Responsible person with whom the child resides			
Mother and father		1	1
Just the mother		1.05 (0.65-1.68)	0.72 (0.37-1.39)
Just the father or another		2.30 (1.30-4.07)*	6.94 (2.36-20.35)*
Household income (in Reais – R$)**		0.99 (0.99-0.99)*	0.99 (0.99-1.00)
Dental attendance			
Never went to the dentist			1
Up/after to 1 year old			1.05 (1.18-9.49)*
Reason for the last dental attendance			1
Non-routine			0.43 (0.20-0.94)*
Routine			
Parents' perception of their child's need for dental treatment			
Yes			1
No			0.20 (0.09-0.43)*

*p value <.05.
[a]RR, rate ratio.
[b]CI, confidence interval.
**Official Brazilian currency - R$5.27 is equivalent to US$1.00, approximately.
† Model 1: adjusted for demographic variables.
‡ Model 2: mutually adjusted for demographic and socioeconomic variables.
¶ Model 3: fully adjusted for demographic, socioeconomic, and behaviors variables.

3 ARTIGO 2

Artigo intitulado “Trends and age-period-cohort effect on dental caries prevalence from 2008 to 2019 among Brazilian pre-school children”. Redigido conforme as normas da revista *Community Dentristry and Oral Epidemiology*. (ANEXO E).

Trends and age-period-cohort effect on dental caries prevalence from 2008 to 2019 among Brazilian pre-school children

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Data Availability Statement

Data available on request from the authors - The data that support the findings of this study are available from the corresponding author upon reasonable request.

Conflict of interest

The authors declare that there is no conflict of interest.

Contributors' Statement

Ms. Ramadan designed the study, designed the data collection instruments, collected the data, drafted and revised the manuscript. Ms. Knorst designed the study, collected the data, drafted and revised the manuscript. Ms. Brondani designed the study, collected data, and revised the manuscript. Ms. Agostini designed the study, performed the data analysis, and revised the

manuscript. Dr. Ardenghi conceptualized and designed the study, coordinated and supervised data collection, and critically reviewed the manuscript. All authors approved the final manuscript as submitted and agree to be responsible for all aspects of the work.

Abstract

Aim: This study aimed to evaluate trends in the prevalence of dental caries in preschool children and associated factors considering the age-period-cohort (APC) effects.

Methods: This is a time series study performed from three cross-sectional studies with pre-school children from southern Brazil in 2008, 2013 and 2019. Dental caries was evaluated by decayed, missing and filled deciduous teeth (dmft index). Demographic, socioeconomic, behavioural and psychosocial variables were also collected. Chi-square test for trends and hierarchical age-period-cohort (HAPC) analysis using the multilevel Poisson regression model for testing the associations between predictor variables and dental caries experience were used.

Results: A total of 1,644 pre-school children participated in all surveys. There was a significant difference in caries experience considering all APC effects. The prevalence of dental caries was 25.0% in 2008, 16.3% in 2013, and 19.4% in 2019. An age effect showed that older children were more likely to experience dental caries. Considering the cohort effect, a significant reduction in caries prevalence from 40.2% to 4.6% was observed among those born in 2003 and 2018. Household income, use of dental services, and parent's perception of child oral health were associated with dental caries experience.

Conclusion: Despite recent declines in dental caries prevalence among preschool children, caries levels increased with age and social inequalities persisted through the years, indicating a need of reviewing the policies to reduce the burden of this oral disease.

Key-words: Brazil; Child; Dental caries; Prevalence; Time series.

Introduction

Despite the decline in global rates observed in recent decades, dental caries is still one of the most prevalent chronic diseases, affecting about 573 million children under six years of age worldwide.[1] In addition to having a negative impact on the physical and social well-being of affected individuals,[2] dental caries has a high economic impact,[3] reflecting widespread social and economic inequalities, particularly in low- and middle-income countries.[4] It is estimated that in 2015, the indirect cost due to caries in deciduous teeth was $0.90 billion.[3] Thus, dental caries is still considered a public health problem and a relevant oral health outcome.

The risk factors for dental caries vary according to individual factors, such as socioeconomic background, psychosocial and behavioural characteristics, as well as environmental factors.[5-9] Previous studies have shown that individuals with socioeconomic disadvantages presented higher levels of dental caries.[5,6] Poor hygiene and diet habits and characteristics related to social capital have also been associated with more burden of the disease.[6-8] Furthermore, has been observed a gradient in the occurrence of dental caries according to the increases of age.[9] Thus, there is a need for monitoring the changes and trends in the prevalence of dental caries considering the chronological age and different periods at time, in order to plan more effective public health strategies for reducing dental caries iniquities.

A possible way of evaluating this aspect is using a time series, where three types of time-related variations can be considered: age, period, and cohort (APC) effects. Understanding the impact of each effect is important for assessing individual and socially related predictors for inequalities in oral health outcomes over time.[10,11] Age effects refer to variation associated with different age groups, representing the developmental changes that occur during life. Period effects refer to variations in the calendar years that affect all age groups simultaneously and are related to cultural and economic changes over a specific time. Cohort effects refer to variation among groups born in different years, representing the effects of formative experiences and early life exposures as related to social and generational changes.[10,11]

Although some studies have evaluated the detailed analysis of changes in dental caries levels considering the APC effects, they considered permanent dentition[12,13] or were performed more than 3 decades ago.[14] Thus, it is important to know the current trend of the disease in primary dentition in order to plan more effective prevention measures, especially for those from social minorities. This aspect is particularly important in early childhood, once caries experience in this phase is a strong predictor of dental caries throughout the life

course.[9] Thus, this study aimed to verify trends in the prevalence of dental caries in preschool children and associated factors considering the age-period-cohort effects.

Methods

Study design and sample

This is a trend study that used data from three cross-sectional studies performed in 2008, 2013 and 2019 with pre-school children (from 0 to 5 years old) in Santa Maria, southern Brazil. This municipally has an estimated population of 285,159 inhabitants, with approximately 28,000 up to 6 years of age, according to the most recent populational census.[15] The Human Development Index of Santa Maria is 0.845, which is higher than the national average (0.761). The city has a fluoridated water supply.

All surveys were carried out on National Children's Vaccination Day. Pre-schoolers were selected systematically through the health units that had a dental chair, being eight in 2008, and 15 in both 2013 and 2019. The health units were distributed in different neighbourhoods of the city and encompassed about 90% of the children vaccinated in the municipally. For the recruitment, every fifth child in line for vaccination was invited to participate in the study. If their caregivers did not authorize their participation, the next child in line was selected. Children who presented some disability with cognitive impairment were excluded from the sample.

The sample size calculation considered a sampling error of 5%, confidence level of 95%, estimated population of pre-schoolers in the municipally (28,000) and the expected maximum prevalence of caries of 50%. Considering a design effect of 1.2 and adding 10% for possible refusals, the minimum required sample size was 501 individuals.

Data collection and variables

All data collection periods were performed through clinical examinations, interviews and structured questionnaires, following standardized criteria for oral health surveys.[16] The research team consisted of 15 calibrated examiners plus 30 trained assistants for recruitment of the pre-school children and questionnaires application.

Dental caries was evaluated by decayed, missing and filled deciduous teeth index (dmft index).[16] Children were examined in a private room with a dental chair in the healthcare centres. The dental exams were performed using a plain dental mirror and CPI “ball point” periodontal probes. In all surveys, about fifteen examiners were previously trained and calibrated following the WHO recommendations, totalling 36 hours. The process first

involved a theoretical class ministered by a gold standard researcher, followed by an evaluation of photographs and a discussion of cases. Subsequently, clinical-epidemiological exercise using 10 exfoliated primary teeth was fulfilled. In 2008, inter-and intraexaminer kappa coefficients for the dmft ranged from 0.77 to 0.95 and from 0.80 to 0.94, respectively. In 2013, inter-and intraexaminer kappa coefficients ranged from 0.70 to 0.95 and from 0.73 to 0.88, and in 2019, both from 0.70 to 1.00. For data analysis, caries experience was considered as absent (dmft = 0) or present (dmft $\geq$ 1).

Questions about dental visits and parents' perception of the child's oral health were also collected. Use of dental services was evaluated using the following question: “In the last year (12 months), how many times have you been to the dentist?”, proposed by WHO.[16] Pre-schoolers were dichotomized according to visiting the dentist at least once in the last year (regular users) or not (non-regular users).[16] Parents’ perception of child oral health was assessed with the question: “Would you say that the health of your child's teeth, lips, jaws, and mouth is…,” and response options (0) “excellent,” (1) “very good,” (2) “good,” (3) “fair,” and (4) “poor”. For data analysis, the variable was dichotomized into excellent or good (0,1 and 2) and fair or poor (3 or 4).[17]

Some demographic and socioeconomic variables were also evaluated to explain the distribution of dental caries. Demographic variables included sex (boys or girls), age (in years) and skin colour, evaluated using the criteria established by the IBGE[15] and after dichotomized into whites and non-whites. The socioeconomic level was assessed through monthly household income and maternal education. Household income was collected in reais (Brazilian currency [R$] - US$1.00 is equivalent to R$5.40 approximately) and subsequently categorized by the median (R$ 1,390). Maternal education was collected in years and posteriorly dichotomized into $\geq$ 8 years or < 8 years of formal education (incomplete elementary education).

Ethical issues

All surveys considered in this study were previously approved by the Ethics in Research Committee of the Federal University of Santa Maria (protocol number 2008: 0090.0.243.000-08; protocol number 2013: 18512213.5.0000.5306; and protocol number 2019: 18426219.5.0000.5346). All children agreed to participate in the study and their caregivers signed an informed consent form.

Data analysis

Data were analysed using STATA 14.0 statistical software (StataCorp. 2014. Stata Statistical Software: Release 14.0. College Station, TX: StataCorp L). A descriptive analysis of the sample characteristics was performed. The data analysis accounted age-period-cohort effect. Age (chronological age) was considered in four groups: 1, 2, 4, and 5 years; the evaluation period in three groups (year of examination): 2008, 2013, and 2019; and the cohort in twelve groups (year of child's birth), from 2003 to 2018. A chi-square test for trends was used to compare the experience of dental caries according to the APC effects.

Multilevel Poisson regression analysis considering the hierarchical age-period-cohort (HAPC) model for evaluating the association between sample characteristics and dental caries experience was also performed. HAPC treats periods and cohorts at the contextual level and age as individual characteristics.[18] This model was executed considered random effects. Variables with $p \leq 0.20$ in the unadjusted analysis were eligible for inclusion in the adjusted analysis. The variables were included for the adjusted model according to the forward method. Maternal education was removed from the final model due to high collinearity with household income. Results are presented in Prevalence Ratio (PR) and a 95% confidence interval (95% CI).

Results

Of the 1,644 individuals included in all epidemiological surveys, 580, 545 and 546 were evaluated in 2008, 2013 and 2019, respectively. The sample was balanced between boys and girls in all surveys. The mean age was 3.1 (standard deviation [1.6]) in 2008, 3.3 (SD 1.6) in 2013 and 3.3 (SD 1.6) in 2019. Most individuals presented white skin colour and mothers whose formal education was greater than or equal to 8 years. Regarding the use of dental services in the last year, most pre-schoolers had not attended. The dmft means (standard deviation [SD]) were of 0.8 (SD 2.0), 0.5 (SD 1.6) and 0.6 (SD1.7) in 2008, 2013 and 2019, respectively. More details about the sample characteristics are shown in Table 1.

Figure 1 displays the trends in the prevalence of caries experience according to the APC effect. There was a significant difference in caries experience through the years considering all APC effects. The prevalence of pre-school children who experienced dental caries was 25.0% in 2008, 16.3% in 2013, and 19.4% in 2019 ($p<0.01$). An age effect showed that older children were more likely to experience dental caries ($p<0.01$). The cohort effect varied nonlinearly over the years, however, a significant reduction in caries prevalence from 40.2% to 4.6% was observed among those born in 2003 and 2018 ($p<0.01$), respectively.

Multilevel Poisson regression analyses in dental caries prevalence and associated factors considering the APC effects are presented in Table 2. In the unadjusted analysis, age, skin colour, household income, maternal education, use of dental services and parents' perception of their child's oral health were associated with dental caries experience in the surveys. In the adjusted analysis, 2-, 4-, and 5-year-olds had a 3.2, 4.4, and 6.1-fold higher prevalence of dental caries than 1-year-olds. Pre-schoolers whose household income was lower than R$1,390 presented a 27% higher prevalence of dental caries than their counterparts (RP 1.27 95%CI 1.01-1.61). Individuals who did not use dental services in the last year were protected from experiencing dental caries (PR 0.63; 95%CI 0.50-0.80). In addition, the parent's perception of their child's oral health as fair or poor was related to a 2.35-fold higher prevalence of dental caries (RP 2.35 95%CI; 1.86-2.98).

Discussion

This study aimed to evaluate trends in the prevalence of dental caries in preschool children and associated factors considering the age-period-cohort effects. Our findings showed a significant change in the prevalence of dental caries considering the effect of age, period, and cohort. Household income, use of dental services, and parents' perception of child oral health were associated with dental caries experience. Although previous studies have evaluated the prevalence of dental caries considering APC effects[12-14], the assessment of these factors in pre-schoolers in the last two decades had not been explored yet.

The age effect impact the occurrence of caries, indicating that older children have a greater experience of dental caries. The literature reinforces that dental caries is related to the age of individuals, with a notable gradient in its occurrence according to the increases of age.[9] Our study brought similar results, indicating that 5-year-olds are about six times more likely to have caries when compared to 1-year-olds. A possible explanation for this finding is due to the increase in the number of teeth exposed to risk factors according to eruption chronology and age since that dental caries is a cumulative disease and the dmft index measures past and present caries experience.[12] Thus, the longer exposure of teeth to risk factors over the years and the cumulative effect of oral problems, as well as harmful eating habits, such as a greater intake of cariogenic foods[19-20] may impact higher levels of dental caries according to age.

Over the years analysed, the prevalence of caries decreased between 2008 and 2013 and had a slight increased in the last period (2019). A recent systematic review has shown that in the last two decades there have been no significant improvements in the prevalence of untreated dental caries in the primary dentition, maintaining some stability.[1] In addition, in

Latin American and Caribbean countries, although the prevalence of caries has been reduced, it is still considered high, being around 55% for the primary dentition.[21] Another possible explanation for the increase in caries prevalence is the worsening of economic indices that occurred before the last period. Between the years 2015 and 2016, Brazil faced one of the five biggest economic crises in its history.[22] Since the occurrence of dental caries in pre-schoolers in 2019 is the result of worse conditions in the first years of life, lower income, worse housing conditions, and parental unemployment may result in higher levels of disease over time.[6,23]

Our findings also demonstrated the cohort effects, which refer to variation among groups born in different years, showing that younger cohorts presented lower levels of dental caries. This result is in agreement with the most recent evidence, showing that, globally, dental caries rates in this age group have declined over the last few decades.[1,21] This decline over the years may be due to the use of preventive methods, such as the widespread use of fluorides in water supplies and toothpastes, as well as changes in the social and economic characteristics of the population.[21] Despite that, dental caries reduction has not occurred equally in the population, and non-white individuals, whose mothers present less education and income, remain with a higher burden of the disease, which reflects a global polarization of dental caries, especially in middle- and low-income countries.[4,24]

In this context, our findings also displayed that the pre-schoolers from families with lower income were more likely to present dental caries than their counterparts. Family income has been associated with several oral health outcomes and also with dental caries in the primary dentition.[25,26] We considered household income as a proxy to individual socioeconomic status.[27] Individuals from poorer socioeconomic backgrounds are more exposed to several risk factors that can affect oral health.[27] Thus, these individuals usually live in worse housing conditions and present poorer health behaviours, such as less access to dental services and poor oral hygiene habits,[17,28] which leads to worse oral health conditions, such as a higher prevalence of dental caries.

Individuals who did not use dental services in the last year were protected from experiencing dental caries. A previous study showed that children who higher levels of dental caries visited the dentist more frequently than counterparts.[29] Thus, it is hypothesized that individuals who presented more dental caries may experience more pain episodes and difficulties in daily life,[2,30] leading to a greater search for dental services, especially for curative treatment. Furthermore, our findings displayed that the parent's perception of their child's oral health as fair or poor was related to a higher prevalence of dental caries, in agreement with previous studies.[6,31] It has been shown that parents who negatively perceive

their child's oral health status may be less likely to care with children's oral health hygiene, which may be related to a higher experience of dental caries.[31]

This study has some limitations that need to be considered. First, the data analysis includes only three points in time. However, our trend study evaluated deciduous teeth and considered a temporal period of 10-years, which permits tracing a pattern in the occurrence of the disease in this population. Furthermore, the cross-sectional design does not allow us to trace cause-effect relationships and, for that, longitudinal studies are encouraged. Furthermore, the analysis was based on a series of cross-sectional studies rather than longitudinal data. However, the same strategy has been used in other studies considering.[12,32]

Some strengths of the study also need to be highlighted. First, our data are from a representative sample of pre-schoolers in the city, considering neighbourhoods from different socioeconomic backgrounds, reinforcing the external validity of our findings. In addition, the sample points used for data collection covered about 90% of the children vaccinated municipally in each survey period. Finally, it should be noted that our study considered the APC effects during early childhood. Understanding the pattern of dental caries occurrence and the predisposing factors in this period is essential to prevent poor oral conditions throughout the life course.

Conclusion

Our findings demonstrated the impact of age-period-cohort effects on the pattern of dental caries occurrence. In general, was shown a significant reduction in dental caries prevalence over the periods-cohorts and an increased according to age. Household income, use of dental services, and parents' perception of child oral health were associated with dental caries experience. Although recent decline in dental caries prevalence among preschool children, their levels increased with age and the social inequalities persisted through the years, indicating a need for improving the public policies to reduce the burden of this oral disease.

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Figure legends

Fig 1. Trends in prevalence of dental caries experience by age, period, and cohort (n=1,644)

Table 1. Descriptive characteristics of the sample according to the survey year, Santa Maria, Brazil (n= 1,644)

Year	**2008**	**2013**	**2019**	**Total**
Variables	**n (%)**	**n (%)**	**n (%)**	**n (%)**
Sex				
Boys	309 (53.3)	283 (51.8)	282 (51.7)	874 (52.3)
Girls	271 (46.7)	263 (48.2)	263 (48.3)	797 (47.7)
Age				
1	132 (22.9)	118 (21.7)	107 (20.6)	357 (21.7)
2	127 (21.9)	106 (19.4)	112 (21.5)	345 (21.0)
4	146 (25.2)	146 (26.8)	121 (23.3)	413 (25.1)
5	174 (30.0)	175 (32.1)	180 (34.6)	529 (32.2)
Skin colour				
White	448 (77.2)	441 (81.2)	396 (73.3)	1,285 (77.3)
No-white	132 (22.8)	102 (18.8)	144 (26.7)	378 (22.7)
Household income in Reais (R$)				
< R$ 1,390	296 (52.2)	264 (49.1)	244 (49.1)	804 (50.4)
≥ R$ 1,390	271 (47.8)	266 (50.2)	253 (50.9)	790 (49.6)
Maternal education				
≥ 8 years	394 (69.5)	423 (78.8)	453 (86.0)	1,270 (77.9)
< 8 years	173 (30.5)	114 (21.2)	74 (14.0)	361 (22.1)
Dental attendance in the last year				
Yes	138 (23.8)	135 (25.1)	163 (30.8)	436 (26.5)
No	441 (76.2)	404 (74.9)	367 (69.2)	1,212 (73.5)
Parents' perception of their child's oral health				
Excellent or good	470 (81.1)	446 (82.0)	332 (75.3)	1,248 (79.8)
Fair or poor	109 (18.9)	98 (18.0)	109 (24.7)	316 (20.2)
dmft ≥ 1				
Not	435 (75.0)	457 (83.7)	439 (80.6)	1,331 (79.7)
Yes	145 (25.0)	89 (16.3)	108 (19.4)	340 (20.3)
dmft [mean (SD)]	0.8 (2.0)	0.5 (1.6)	0.6 (1.7)	0.7 (1.8)

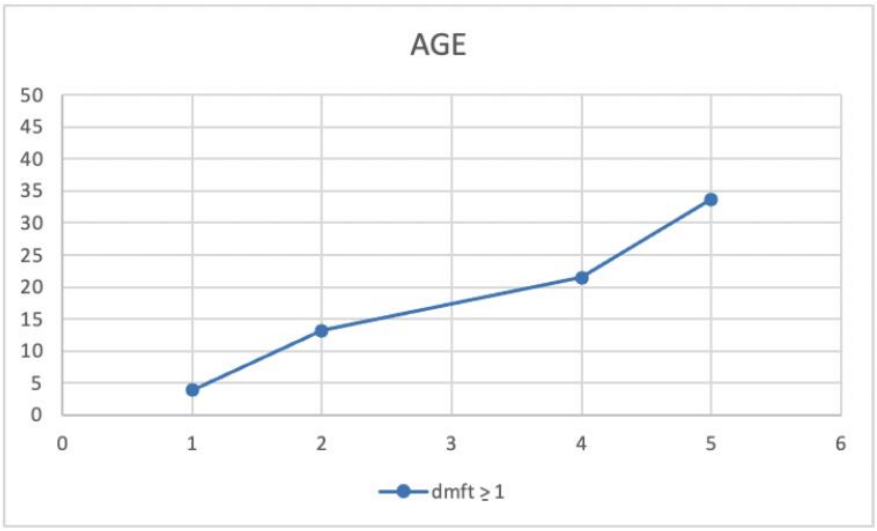
R$, Real (US$1.00 is equivalent to R$5.4 approximately); dmft, decayed, missing and filled deciduous teeth; SD, standar deviation

Table 2. Unadjusted and adjusted multilevel Poisson regression analysis in dental caries prevalence and associated factors considering the age-period-cohort (n=1,644)

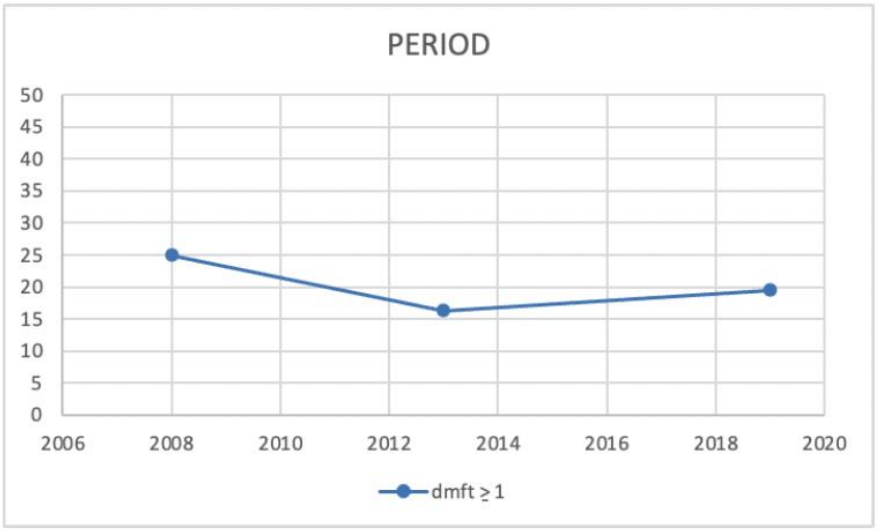
Variables	**dmft ≥ 1**			
	Unadjusted		**Adjusted**	
	PR (95% CI)	**p-value**	**PR (95% CI)**	**p-value**
Sex				
Boys	1.00		1.00	
Girls	0.96 (0.77-1.19)	0.732	0.98 (0.78-1.23)	0.893
Age				
1	1.00		1.00	
2	3.51 (1.94-6.38)	<0.01	3.21 (1.69-6.10)	<0.01
4	5.50 (2.84-2.97)	<0.01	4.45 (2.40-8.24)	<0.01
5	7.73 (4.40-13.56)	<0.01	6.10 (3.32-11.21)	<0.01
Skin colour				
White	1.00		1.00	
No-white	1.34 (1.05-1.71)	<0.05	1.18 (0.91-.154)	0.188
Household income in Reais (R$)				
< R$ 1,390	1.00		1.00	
≥ R$ 1,390	1.42 (1.13-1.78)	<0.01	1.27 (1.01-1.61)	<0.05
Maternal education				
≥ 8 years	1.00		-	
< 8 years	1.62 (1.27-2.06)	<0.01		
Dental attendance in the last year				
Yes	1.00		1.00	
No	0.66 (0.53-0.83)	<0.01	0.63 (0.50-0.80)	<0.01
Parents' perception of their child's oral health				
Excellent or good	1.00		1.00	
Fair or poor	2.55 (2.04- 3.19)	<0.01	2.35 (1.86-2.98)	<0.01

R$, Real (US$1.00 is equivalent to R$5.4 approximately); PR, prevalence ratio; CI, confidence interval.

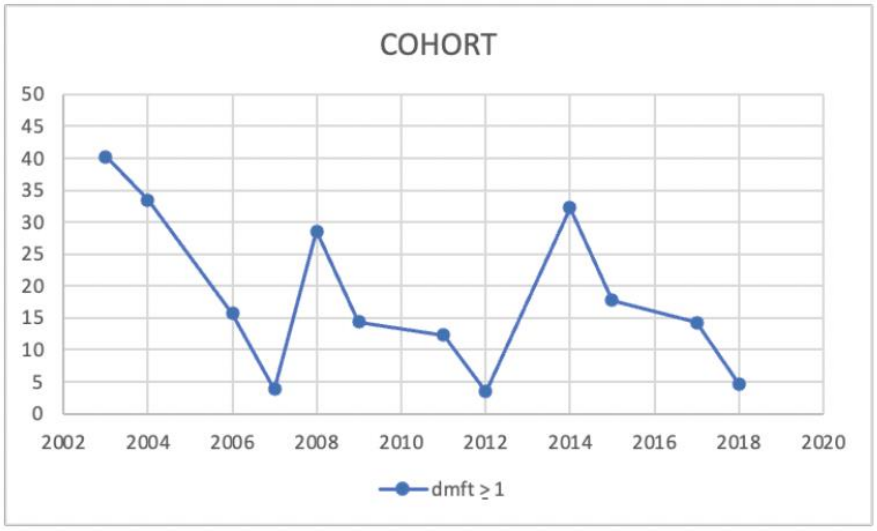
Fig 1.



p < 0.01



p < 0.01



p < 0.01

DISCUSSÃO

Este estudo avaliou a associação da cárie dentária em crianças pré-escolares com fatores socioeconômicos, demográficos, comportamentais e psicossociais. Além disso, verificou a tendência na prevalência de cárie entre 2008 e 2019, considerando os efeitos de idade-período-coorte.

Nosso estudo observou uma prevalência de cárie dentária no ano de 2019 de 19,4%(ceod≥1). Outros estudos com amostra semelhante encontram valores superiores a este. Porém, embora menor que a encontrada em outras populações de pré-escolares (NDEKERO, 2021; KRAMER, 2019; AGOSTINI, 2019), este resultado deve ser avaliado com cuidado, uma vez que crianças que já apresentam lesões cariosas apresentam maior risco de desenvolver cárie dentária na dentição permanente (HALL-SCULLIN ET AL., 2017). Além disso, experiências adversas na primeira infância tem impacto de longo prazo no desenvolvimento físico e cognição das crianças (NOBLE ET AL., 2015).

Além disso, ao avaliar os três períodos de tempo, observamos que entre 2013 e 2019 houve uma aumento na prevalência de cárie. Um estudo recente, observou que as maiores quedas nos índices de doença aconteceram em países desenvolvidos e as inequidades na distribuição da doença ficaram cada vez mais evidentes em países em desenvolvimento, como o Brasil (GBD, 2017). Somando-se a isso, cerca de 69, 3% da amostra avaliada no último ano nunca foi ao dentista. A atenção odontológica nos primeiros anos de vida pode contribuir para a prevenção de agravos bucais como a cárie, diagnóstico precoce e assim, reduzindo as sequelas bucais, com tratamentos menos invasivos e onerosos (ANTUNES, 2006).

Considerando os efeitos de idade-período e coorte, podemos observar a influência dos três na experiência de cárie em crianças pré-escolares. Um gradiente pode ser observado na distribuição da doença entre as faixa etárias e identificamos que a conforme a idade aumenta, os índices de cárie também se elevam. A literatura reforça estes achados (BROADBENT, 2008). Um número maior de dentes e superfícies expostos, bem como a adoção de um maior número de alimento cariogênicos pode ser responsável por estes achados (BARNABÉ, 2014; FELDENS, 2010, CHAFFE, 2013). Já em relação as coorte, as mais novas apresentaram menor prevalência de cárie. Ainda assim, indivíduos e desvantagem permanecem sendo os mais afetados pela doença evidenciando ainda a desigualdade na distribuição da doença.

Crianças vindas de famílias com menor renda familiar, que moravam somente com o pai ou outro familiar e que os pais não percebiam necessidade de tratamento odontológico nos

filhos apresentaram maior probabilidade de ter cárie dentária. Diversos estudos tem mostrado associações semelhantes entre fatores sociodemográficos, comportamentais e psicossociais com a cárie dentária em crianças pré-escolares. A identificação deste fatores é de fundamental importância para o direcionamento de medidas públicas preventivas, com o intuito de erradicar essas diferenças injustas que podem ser evitadas.

Dessa forma, podemos concluir que a distribuição da doença cárie em crianças pré-escolares ainda permanece desigual e sua redução ocorre de maneira menos significativa entre aqueles em maior vulnerabilidade social. Ainda, observamos a influência dos efeitos temporais de idade-período e coorte na experiência de cárie. Estes efeitos devem ser considerados no planejamento de políticas públicas e no desenvolvimento de outros estudos.

CONCLUSÃO

Podemos observar a associação entre fatores socioeconômicos, demográficos, comportamentais e psicossociais e a cárie dentária em pré-escolares, assim como uma tendência no padrão de ocorrência da doença cárie em crianças pré-escolares. A identificação dos indivíduos mais vulneráveis ao desenvolvimento da doença é de fundamental importância no âmbito da saúde pública, à medida que pode auxiliar no direcionamento de medidas de prevenção e promoção de saúde bucal à população de risco.

Devemos salientar também que a análise dos efeitos de idade-período-coorte em conjunto melhora o entendimento e também auxilia na identificação dos fatores sociais e ambientais que possam ser modificados. Identificamos neste estudo a ação dos ambos os três efeitos (idade, período e coorte), indicando a influência causada pelo próprio crescimento dos indivíduos e suas alterações biológicas e comportamentais, a influência de eventos sociais temporais no período em análise e das mudanças sociais experenciadas por indivíduos de uma mesma coorte de nascimento, capazes de alterar as condições bucais em questão.

Os resultados desta tese indicam a necessidade de ampliação ou melhor estruturação de medidas de saúde pública que levem melhores condições de se obter saúde bucal para a população mais afetada pela doença. Tais ações deveriam contemplar não somente as questões biológicas já conhecidas para o desenvolvimento da doença, mas também questões sociais e temporais. Reduzir as iniquidades em saúde bucal deve ser ponto primordial de qualquer medida de saúde pública uma vez que são evitáveis e injustas.

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ANEXO A- CARTA DE APROVAÇÃO DO COMITÊ DE ÉTICA EM PESQUISA PARA O LEVANTAMENTO EPIDEMIOLÓGICO DO ANO DE 2008

MINISTÉRIO DA SAÚDE Conselho Nacional de Saúde Comissão Nacional de Ética em Pesquisa (CONEP)	UNIVERSIDADE FEDERAL DE SANTA MARIA Pró-Reitoria de Pós-Graduação e Pesquisa Comitê de Ética em Pesquisa - CEP- UFSM REGISTRO CONEP: 243

CARTA DE APROVAÇÃO

O Comitê de Ética em Pesquisa – UFSM, reconhecido pela Comissão Nacional de Ética em Pesquisa – (CONEP/MS) analisou o protocolo de pesquisa:

Título: Impacto dos fatores psicossociais, sócio-econômicos e étnicos na utilização e acesso aos serviços odontológicos.
Número do processo: 23081.007516/2008-93
CAAE (Certificado de Apresentação para Apreciação Ética): 0090.0.243.000-08
Pesquisador Responsável: Thiago Machado Ardenghi

Este projeto foi APROVADO em seus aspectos éticos e metodológicos de acordo com as Diretrizes estabelecidas na Resolução 196/96 e complementares do Conselho Nacional de Saúde. Toda e qualquer alteração do Projeto, assim como os eventos adversos graves, deverão ser comunicados imediatamente a este Comitê. O pesquisador deve apresentar ao CEP:

Novembro/2008 Relatório final

Os membros do CEP-UFSM não participaram do processo de avaliação dos projetos onde constam como pesquisadores.

DATA DA REUNIÃO DE APROVAÇÃO: 24/06/2008

Santa Maria, 24 de Junho de 2008.

Lissandra Dal Lago
Coordenadora do Comitê de Ética em Pesquisa – UFSM
Registro CONEP N. 243.

ANEXO B- PARECER CONSUBSTANCIADO DO COMITÊ DE ÉTICA EM PESQUISA PARA O LEVANTAMENTO EPIDEMIOLÓGICO DO ANO DE 2013

CENTRO UNIVERSITÁRIO FRANCISCANO DE SANTA MARIA

PARECER CONSUBSTANCIADO DO CEP

DADOS DO PROJETO DE PESQUISA

Título da Pesquisa: ASSOCIAÇÃO DOS FATORES SOCIOECONOMICOS COM AS CONDIÇÕES DE SAÚDE BUCAL DE PRÉ-ESCOLARES DE SANTA MARIA-RS

Pesquisador: Chaiana Piovesan

Área Temática:

Versão: 2

CAAE: 18512213.5.0000.5306

Instituição Proponente: Centro Universitário Franciscano - UNIFRA

Patrocinador Principal: Financiamento Próprio

DADOS DO PARECER

Número do Parecer: 330.277

Data da Relatoria: 09/07/2013

Apresentação do Projeto:

Desigualdades socioeconômicas têm sido descritas como importantes determinantes de várias doenças, da cárie dentária em particular, cuja incidência é influenciada tanto por determinantes de ordem individual como por fatores relacionados ao contexto em que vivem os indivíduos(Antunes, Narvai et al., 2004; Piovesan, Mendes et al., 2010). Este estudo fará parte de uma série de estudos transversais que vêm sendo realizados com amostras representativas de pré-escolares de Santa Maria-RS desde 2008. Dados prévios já foram coletados em 2008 e 2010, através de estudos devidamente aprovados pelo Comitê de ética na Universidade Federal de Santa Maria (CAAE 2008-0090.0.243.000-08; CAAE 2009-0270.0.243.000-09). O presente estudo, observacional do tipo transversal, ocorrerá durante a Campanha Nacional de Vacinação que acontecerá no mês de agosto de 2013, no município de Santa Maria. Serão avaliadas 648 crianças de 0 a 5 anos de idade que participarem da Campanha e cujos responsáveis consentirem a sua participação na pesquisa. O número de sujeitos envolvidos foi obtido a partir de cálculo amostral detalhado no Formulário da Plataforma Brasil e no projeto anexado na íntegra. Os participantes serão selecionados aleatoriamente e os exames serão realizados em 15 unidades básicas de saúde, equipadas com consultórios odontológicos. Cada Unidade Básica de saúde terá uma equipe de avaliação, composta por um examinador, um

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Telefone: (55)3220-1200 **Fax:** (55)3222-6484 **E-mail:** cep@unifra.br

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ANEXO B- PARECER CONSUBSTANCIADO DO COMITÊ DE ÉTICA EM PESQUISA PARA O LEVANTAMENTO EPIDEMIOLÓGICO DO ANO DE 2013

CENTRO UNIVERSITÁRIO FRANCISCANO DE SANTA MARIA

Continuação do Parecer: 330.277

distribuição das doenças na população estudada. Essas informações poderão favorecer a organização de políticas públicas de promoção de saúde de acordo com a necessidade percebida, trazendo um retorno direto para essa mesma população.

Considerações sobre os Termos de apresentação obrigatória:
O projeto apresenta todos os Termos e documentos preconizados pela Resolução CNS n.466/12, que revisa e revoga a Resolução n.196/96 CNS/MS.

Recomendações:
Não há recomendações.

Conclusões ou Pendências e Lista de Inadequações:
Diante o exposto, esse Comitê de Ética em Pesquisa aprova o presente protocolo.

Situação do Parecer:
Aprovado

Necessita Apreciação da CONEP:
Não

Considerações Finais a critério do CEP:
Toda e qualquer alteração do Projeto, assim como os eventos adversos graves, deverão ser comunicados imediatamente a este Comitê. O pesquisador deve apresentar relatório final da pesquisa, ao CEP/UNIFRA, via Plataforma Brasil, no mês de Novembro /2014, conforme determinação do CONEP.

SANTA MARIA, 09 de Julho de 2013

Assinador por:
Maria do Carmo dos Santos Araujo
(Coordenador)

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ANEXO C- PARECER CONSUBSTANCIADO DO COMITÊ DE ÉTICA EM PESQUISA DO LEVANTAMENTO EPIDEMIOLÓGICO DE 2019

UNIVERSIDADE FEDERAL DE SANTA MARIA/ PRÓ-REITORIA DE PÓS-GRADUAÇÃO E PESQUISA

PARECER CONSUBSTANCIADO DO CEP

DADOS DO PROJETO DE PESQUISA

Título da Pesquisa: Associação entre fatores socioeconômicos, qualidade de vida relacionada à saúde bucal, uso de serviços odontológicos e condição de saúde bucal em pré-escolares

Pesquisador: Thiago Machado Ardenghi
Área Temática:
Versão: 1
CAAE: 18426219.5.0000.5346
Instituição Proponente: Departamento de Estomatologia
Patrocinador Principal: Financiamento Próprio

DADOS DO PARECER

Número do Parecer: 3.505.416

Apresentação do Projeto:
O objetivo deste estudo é avaliar a associação entre a condição de saúde bucal, fatores socioeconômicos e a qualidade de vida relacionada à saúde bucal (QVRSB), bem como identificar os determinantes das iniquidades existentes no uso de serviços em crianças entre 1 e 5 anos de idade do Município de Santa Maria- RS no ano de 2019. Trata-se de um estudo transversal a ser realizado com uma amostra representativa de crianças pré-escolares da cidade. Os dados serão coletados durante a Campanha Nacional de Multivacinação Infantil que acontecerá no mês de outubro de 2019. Os examinadores treinados e calibrados serão alocados em 15 centros de saúde distribuídos entre as oito regiões administrativas da cidade. Os participantes serão selecionados randomicamente e os dados serão coletados através de exames clínicos e entrevistas estruturadas. Os pais responderão o questionário demográfico e socioeconômico e o Early Childhood Oral Health Impact Scale (ECOHIS), utilizado para avaliar a QVRSB. As variáveis clínicas incluirão cárie dentária, trauma dental e indicadores de maloclusão. Serão realizadas as análises de Regressão de Poisson em multinível para verificar a associação entre as variáveis socioeconômicas, fatores associados e os diferentes desfechos de saúde bucal.

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ANEXO C- PARECER CONSUBSTANCIADO DO COMITÊ DE ÉTICA EM PESQUISA DO LEVANTAMENTO EPIDEMIOLÓGICO DE 2019

UNIVERSIDADE FEDERAL DE SANTA MARIA/ PRÓ-REITORIA DE PÓS-GRADUAÇÃO E PESQUISA

Continuação do Parecer: 3.505.416

Objetivo da Pesquisa:

Avaliar a associação entre as condições de saúde bucal, fatores socioeconômicos e qualidade de vida relacionada à saúde bucal em crianças de 1 a 5 anos de idade do Município de Santa Maria-RS no ano de 2019.

Avaliação dos Riscos e Benefícios:

De acordo com os pesquisadores, conforme descrito no TCLE:

Como para esta pesquisa será feito apenas um exame odontológico, o risco previsto para a participação de seu/sua filho é que ele pode ficar cansado, ansioso ou envergonhado quando estiver sendo examinado. Se isto ocorrer seu filho pode descansar, tentaremos acalma-lo e seguiremos com o exame se ele autorizar. Como benefício, o Sr(a) será informado sobre a condição bucal do seu filho e orientado a procurar uma assistência odontológica caso seja observado algum problema durante o exame. No caso da sua participação, respondendo aos questionários, também pode acontecer do Sr/Sra se sentir cansado e da mesma forma, o Sr(a) poderá descansar. Em ambas as situações podemos interromper as atividades sem dano algum para vocês. Você não terá nenhum gasto financeiro para participar da pesquisa e também não receberá nenhum valor por sua participação no estudo.

Comentários e Considerações sobre a Pesquisa:

.

Considerações sobre os Termos de apresentação obrigatória:

Apresentados de forma satisfatória. Porém, necessita ajustes no Termo de Assentimento.

Recomendações:

Veja no site do CEP - http://w3.ufsm.br/nucleodecomites/index.php/cep - na aba "orientações gerais", modelos e orientações para apresentação dos documentos. ACOMPANHE AS ORIENTAÇÕES DISPONÍVEIS, EVITE PENDÊNCIAS E AGILIZE A TRAMITAÇÃO DO SEU PROJETO.

Conclusões ou Pendências e Lista de Inadequações:

Revisar o Termo de Assentimento, usando linguagem mais simples, evitando termos técnicos (ou

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ANEXO C- PARECER CONSUBSTANCIADO DO COMITÊ DE ÉTICA EM PESQUISA DO LEVANTAMENTO EPIDEMIOLÓGICO DE 2019

UNIVERSIDADE FEDERAL DE SANTA MARIA/ PRÓ-REITORIA DE PÓS-GRADUAÇÃO E PESQUISA

Continuação do Parecer: 3.505.416

explicando os mesmos). Observar as orientações disponíveis em:
http://nucleodecomites.ufsm.br/index.php/cep/orientacoes-gerais

Considerações Finais a critério do CEP:

Este parecer foi elaborado baseado nos documentos abaixo relacionados:

Tipo Documento	Arquivo	Postagem	Autor	Situação
Informações Básicas do Projeto	PB_INFORMAÇÕES_BÁSICAS_DO_PROJETO_1406986.pdf	05/08/2019 15:46:45		Aceito
Folha de Rosto	folhaderostoPB.pdf	05/08/2019 15:44:08	Thiago Machado Ardenghi	Aceito
Outros	ComprovanteGAP.pdf	01/08/2019 21:57:24	Thiago Machado Ardenghi	Aceito
Declaração de Instituição e Infraestrutura	AutorizacaoSec.pdf	01/08/2019 21:56:32	Thiago Machado Ardenghi	Aceito
Declaração de Instituição e Infraestrutura	AutorizacaoUFSM.pdf	01/08/2019 21:56:11	Thiago Machado Ardenghi	Aceito
Declaração de Pesquisadores	Termodeconfidencialidade.pdf	01/08/2019 21:54:41	Thiago Machado Ardenghi	Aceito
TCLE / Termos de Assentimento / Justificativa de Ausência	Termodeconsentimentolivreeesclarecido.pdf	01/08/2019 21:53:54	Thiago Machado Ardenghi	Aceito
TCLE / Termos de Assentimento / Justificativa de Ausência	TermodeAssentimentocamp2019.pdf	01/08/2019 21:53:08	Thiago Machado Ardenghi	Aceito
Projeto Detalhado / Brochura Investigador	ProjetoCampanhaVacinacao2019.pdf	01/08/2019 21:52:19	Thiago Machado Ardenghi	Aceito
Orçamento	Orcamento.pdf	01/08/2019 21:49:29	Thiago Machado Ardenghi	Aceito
Cronograma	cronograma.pdf	01/08/2019 21:48:13	Thiago Machado Ardenghi	Aceito

Situação do Parecer:
Aprovado

Necessita Apreciação da CONEP:
Não

Endereço: Av. Roraima, 1000 - prédio da Reitoria - 2º andar
Bairro: Camobi **CEP:** 97.105-970
UF: RS **Município:** SANTA MARIA
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ANEXO D- NORMAS PARA SUBMISSÃO DE ARTIGOS DO PERIÓDICO BRAZILIAN DENTAL JOURNAL

Instruções aos autores

BRAZILIAN DENTAL JOURNAL

Escopo e política

O Brazilian Dental Journal é um periódico científico revisado por pares (sistema duplo-cego) que publica Documentos Originais Completos, Comunicações Curtas, Relatórios de Casos e Críticas Convidadas, tratando os diversos campos da Odontologia ou áreas relacionadas, com acesso aberto. Serão considerados para publicação apenas artigos originais. Na submissão de um manuscrito, os autores devem informar em carta de encaminhamento que o material não foi publicado anteriormente e não está sendo considerado para publicação em outro periódico, quer seja no formato impresso ou eletrônico.

ENDEREÇO ELETRÔNICO PARA SUBMISSÃO: http://mc04.manuscriptcentral.com/bdj-scielo

SERÃO CONSIDERADOS APENAS TRABALHOS REDIGIDOS EM INGLÊS. Autores cuja língua nativa não seja o Inglês, devem ter seus manuscritos revisados por profissionais proficientes na Língua Inglesa. **Os trabalhos aceitos para publicação serão submetidos à Revisão Técnica, que compreende revisão lingüística, revisão das normas técnicas e adequação ao padrão de publicação do periódico. O custo da Revisão Técnica será repassado aos autores. A submissão de um manuscrito ao BDJ implica na aceitação prévia desta condição.** A decisão de aceitação para publicação é de responsabilidade dos Editores e baseia-se nas recomendações do corpo editorial e/ou revisores "*ad hoc*". Os manuscritos que não forem considerados aptos para publicação receberão um e-mail justificando a decisão. Os conceitos emitidos nos trabalhos publicados no BDJ são de responsabilidade exclusiva dos autores, não refletindo obrigatoriamente a opinião do corpo editorial.

Todos os manuscritos serão submetidos a revisão por pares. Autores e revisores serão mantidos anônimos durante o processo de revisão. Os artigos aceitos para a publicação se tornam propriedade da revista.

Brazilian Dental Journal é um jornal de acesso aberto, o que significa que todos os artigos publicados estão disponíveis gratuitamente na Internet imediatamente após a publicação.

O Brazilian Dental Journal manterá os direitos autorais e editoriais de todos os artigos publicados, incluindo traduções. Os usuários podem usar, reutilizar e construir sobre o material publicado na revista, mas apenas para fins não comerciais e desde que a fonte seja claramente e adequadamente

mencionada.

A Revista adota sistema para identificação de plagiarismo (AntiPlagiarist - ACNP Software).

O Brazilian Dental Journal está indexado na base de dados DOAJ para acesso público.

Forma e preparação de manuscritos

AS NORMAS DESCRITAS A SEGUIR DEVERÃO SER CRITERIOSAMENTE SEGUIDAS.

Geral

- Submeter o manuscrito em Word e em PDF, composto pela página de rosto, texto, tabelas, legendas das figuras e figuras (fotografias, micrografias, desenhos esquemáticos, gráficos e imagens geradas em computador, etc).
- O manuscrito deve ser digitado usando fonte Times New Roman 12, espaço entrelinhas de 1,5 e margens de 2,5 cm em todos os lados. **NÃO UTILIZAR** negrito, marcas d'água ou outros recursos para tornar o texto visualmente atrativo.
- As páginas devem ser numeradas seqüencialmente, começando no *Summary*.
- Trabalhos completos devem estar divididos sequencialmente conforme os itens abaixo:

1. Página de Rosto
2. Summary e Key Words
3. Introdução, Material e Métodos, Resultados e Discussão
4. Resumo em Português (obrigatório apenas para os autores nacionais)
5. Agradecimentos (se houver)
6. Referências
7. Tabelas
8. Legendas das figuras
9. Figuras

- Todos os títulos dos capítulos (Introdução, Material e Métodos, etc) em letras maiúsculas e sem negrito.
- Resultados e Discussão **NÃO** podem ser apresentados conjuntamente.
- Comunicações rápidas e relatos de casos devem ser divididos em itens apropriados.
- Produtos, equipamentos e materiais: na primeira citação mencionar o nome do fabricante e o local de fabricação completo (cidade, estado e país). Nas demais citações, incluir apenas o nome do fabricante.
- Todas as abreviações devem ter sua descrição por extenso, entre parênteses, na primeira vez em que são mencionadas.

Página de rosto

- A primeira página deve conter: título do trabalho, título resumido (*short*

title) com no máximo 40 caracteres, nome dos autores (máximo 6), Departamento, Faculdade e/ou Universidade/Instituição a que pertencem (incluindo cidade, estado e país). **NÃO INCLUIR** titulação (DDS, MSc, PhD etc) e/ou cargos dos autores (Professor, Aluno de Pós-Graduação, etc).

- Incluir o nome e endereço **completo** do autor para correspondência **(informar e-mail, telefone e fax)**.
- A página de rosto deve ser incluída em arquivo separado do manuscrito.

Manuscrito

- A primeira página do manuscrito deve conter: título do trabalho, título resumido (*short title*) com no máximo 40 caracteres, sem o nome dos autores.

Summary

- A segunda página deve conter o *Summary* (resumo em Inglês; máximo 250 palavras), em redação contínua, descrevendo o objetivo, material e métodos, resultados e conclusões. Não dividir em tópicos e não citar referências.
- Abaixo do *Summary* deve ser incluída uma lista de Key Words (5 no máximo), em letras minúsculas, separadas por vírgulas.

Introdução

- Breve descrição dos objetivos do estudo, apresentando somente as referências pertinentes. Não deve ser feita uma extensa revisão da literatura existente. As hipóteses do trabalho devem ser claramente apresentadas.

Material e métodos

- A metodologia, bem como os materiais, técnicas e equipamentos utilizados devem ser apresentados de forma detalhada. **Indicar os testes estatísticos utilizados neste capítulo**.

Resultados

- Apresentar os resultados em uma seqüência lógica no texto, tabelas e figuras, enfatizando as informações importantes.
- Os dados das tabelas e figuras não devem ser repetidos no texto.
- Tabelas e figuras devem trazer informações distintas ou complementares entre si.
- Os dados estatísticos devem ser descritos neste capítulo.

Discussão

- Resumir os fatos encontrados sem repetir em detalhes os dados fornecidos nos Resultados.
- Comparar as observações do trabalho com as de outros estudos relevantes, indicando as implicações dos achados e suas limitações. Citar outros estudos pertinentes.
- Apresentar as conclusões no final deste capítulo. Preferencialmente, as conclusões devem ser dispostas de forma corrida, isto é, evitar citá-las em tópicos.

Resumo (em Português) - Somente para autores nacionais

O resumo em Português deve ser **IDÊNTICO** ao resumo em Inglês (Summary). OBS: **NÃO COLOCAR** título e palavras-chave em Português.

Agradecimentos

- O Apoio financeiro de agências governamentais deve ser mencionado. Agradecimentos a auxílio técnico e assistência de colaboradores podem ser feitos neste capítulo.

Referências

- As referências devem ser apresentadas de acordo com o estilo do **Brazilian Dental Journal (BDJ)**. É recomendado aos autores consultar números recentes do BDJ para se familiarizar com a forma de citação das referências.
- As referências devem ser numeradas por ordem de aparecimento no texto e citadas entre parênteses, sem espaço entre os números: (1), (3,5,8), (10-15). **NÃO USAR SOBRESCRITO**.
- Para artigos com dois autores deve-se citar os dois nomes sempre que o artigo for referido. Ex: "According to Santos **and** Silva (1)...". Para artigos com três ou mais autores, citar apenas o primeiro autor, seguido de "et al.". Ex: "Pécora et al. (2) reported that..."
- Na lista de referências, os nomes de TODOS OS AUTORES de cada artigo devem ser relacionados. Para trabalhos com 7 ou mais autores, os 6 primeiros autores devem ser listados seguido de "et al."
- A lista de referências deve ser digitada no final do manuscrito, em seqüência numérica. Citar **NO MÁXIMO** 25 referências.
- A citação de abstracts e livros, bem como de artigos publicados em revistas não indexadas deve ser evitada, a menos que seja absolutamente necessário. **Não citar referências em Português**.
- Os títulos dos periódicos devem estar abreviados de acordo com o Dental Index. O estilo e pontuação das referências devem seguir o formato indicado abaixo:

Periódico
1. Lea SC, Landini G, Walmsley AD. A novel method for the evaluation of powered toothbrush oscillation characteristics. Am J Dent 2004;17:307-309.
Livro
2. Shafer WG, Hine MK, Levy BM. A textbook of oral pathology. 4th ed. Philadelphia: WB Saunders; 1983.
Capítulo de Livro
3. Walton RE, Rotstein I. Bleaching discolored teeth: internal and external. In: Principles and Practice of Endodontics. Walton RE (Editor). 2nd ed. Philadelphia: WB Saunders; 1996. p 385-400.

Tabelas

- As tabelas com seus respectivos títulos devem ser inseridas após o texto, numeradas com algarismos arábicos; **NÃO UTILIZAR** linhas verticais, negrito e letras maiúsculas (exceto as iniciais).
- O título de cada tabela deve ser colocado na parte superior.
- Cada tabela deve conter toda a informação necessária, de modo a ser compreendida independentemente do texto.

Figuras

- **NÃO SERÃO ACEITAS FIGURAS INSERIDAS EM ARQUIVOS ORIGINADOS EM EDITORES DE TEXTO COMO O WORD E NEM FIGURAS EM POWER POINT**;
- Os arquivos digitais das imagens devem ser gerados em Photoshop, Corel ou outro software similar, com extensão TIFF e resolução mínima de 300 dpi. Apenas figuras em PRETO E BRANCO são publicadas. Salvar as figuras no CD-ROM.
- Letras e marcas de identificação devem ser claras e definidas. Áreas críticas de radiografias e fotomicrografias devem estar isoladas e/ou demarcadas.
- Partes separadas de uma mesma figura devem ser legendadas com letras maiúsculas (A, B, C, etc). Figuras simples e pranchas de figuras devem ter largura mínima de 8 cm e 16 cm, respectivamente.
- As legendas das figuras devem ser numeradas com algarismos arábicos e apresentadas em uma página separada, após a lista de referências (ou após as tabelas, quando houver).

ANEXO E- NORMAS PARA SUBMISSÃO DE ARTIGOS DO PERIÓDICO COMMUNITY DENTISTRY AND ORAL EPIDEMIOLOGY

Author Guidelines

Community Dentistry & Oral Epidemiology now offers Free Format submission for a simplified and streamlined submission process; More details here

Content of Author Guidelines: 1. General, 2. Ethical Guidelines, 3. Submission of Manuscripts, 4. Manuscript Format and Structure, 5. After Acceptance

Useful Websites: **Submission Site**, **Articles published in *Community Dentistry and Oral Epidemiology***, **Author Services**, **Wiley Blackwell's Ethical Guidelines**, **Guidelines for Figures**

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, behavioural sciences related to dentistry, and health services research, through to methodological reports in program planning, implementation and evaluation. Reports dealing with people of any age group 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, and neither are behavioural science reports with only marginal application to dentistry.

Knowledge in any field advances only when research findings and policies are held up to critical scrutiny. To be consistent with that view, the journal encourages scientific debate on a wide range of topics. Responses to research findings 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, and the journal's requirements and standards, as well as information on 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. GUIDELINES FOR RESEARCH REPORTING

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

2.1. Authorship and Acknowledgements

Authorship: Authors submitting a manuscript do so on the understanding that the manuscript has 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 credited as appropriate upon submission of the manuscript. Contributors who do not qualify as authors should instead be mentioned under Acknowledgments.

Acknowledgements: Under *acknowledgements*, please specify contributors to the article other than the authors accredited, along with 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 for the study protocol. Informed consent must be obtained from human participants in research studies. Some reports, such as those dealing with institutionalized children or mentally disabled persons, may need additional details of ethical clearance.

Research participants: research involving human participants will be published only 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 research was undertaken with the understanding and written consent of each participant and according to the above mentioned principles.

All studies should include an explicit statement in the 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. Take care to use the term “participant” instead of “subject” when reporting on your study.

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

Animal Studies: If experimental animals are used, the methods section must clearly indicate that adequate measures were taken to minimize pain or discomfort. Experiments should be carried out in accordance with the Guidelines laid down by the National Institute of Health (NIH) in the USA in respect of the care and use of animals for experimental procedures or with the European Communities Council Directive of 24 November 1986 (86/609/EEC) and in accordance with local laws and regulations.

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

Reports on observational studies such as cohort, case-control and cross-sectional studies should be consistent with guidelines such as STROBE. Meta-analysis for systematic reviews should be reported consistent with guidelines such as QUOROM or MOOSE. These guidelines can be accessed at **www.equator-network.org**. Authors of analytical studies are strongly encouraged to submit a Directed Acyclic Graph as a supplementary file for the reviewers and editors. This serves to outline the rationale for their modelling approach and to ensure that authors consider carefully the analyses that they conduct.

Studies with a health economics focus should be consistent with the Consolidated Health Economic Evaluation Reporting Standards (CHEERS) statement and the CHEERS checklist; see the article at the following link: **https://www.bmj.com/content/346/bmj.f1049**.

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 primary author's responsibility to obtain these in writing and provide copies to the Publishers.

Photographs of People

Community Dentistry and Oral Epidemiology follows current HIPAA guidelines for the protection of patient/participant privacy. If an individual pictured in a digital image or photograph can be identified, his or her permission is required to publish the image. The corresponding author may submit a letter signed by the patient authorizing the *Community Dentistry and Oral Epidemiology* to publish the image/photo. Alternatively, a form provided by *Community Dentistry and Oral Epidemiology* (available by clicking the "Instructions and Forms" link in Manuscript central) may be downloaded for your use. You can also download

the form **here**. This approval must be received by the Editorial Office prior to final acceptance of the manuscript for publication. Otherwise, the image/photo must be altered such that the individual cannot be identified (black bars over eyes, etc.).

2.7. Copyright Assignment

If your paper is accepted, the author identified as the formal corresponding author for the paper will receive an email prompting them to log into Author Services, where, via the Wiley Author Licensing Service (WALS), they will be able to complete the licence agreement on behalf of all authors on the paper.

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3. SUBMISSION OF MANUSCRIPTS

New submissions should be made via the Research Exchange submission portal: **https://wiley.atyponrex.com/journal/CDOE**. Should your manuscript proceed to the revision stage, you will be directed to make your revisions via the same submission portal. You may check the status of your submission at anytime by logging on to submission.wiley.com and clicking the "My Submissions" button. For technical help with the submission system, please review our **FAQs** or contact **submissionhelp@wiley.com**.

Community Dentistry and Oral Epidemiology requires the submitting/corresponding author (only) to provide an ORCID iD when submitting their manuscript. If the author does not have an ORCID iD, an easy-to-use application to obtain one is available through the journal's ScholarOne system. Complete instructions for submitting a manuscript are available online and below. Further assistance can be obtained from the Managing Editor, Michelle Martire: **cdoejournal@wiley.com**

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Data Sharing and Data Availability

Community Dentistry and Oral Epidemiology expects that data supporting the results in the paper will be archived in an appropriate public repository. Authors are required to provide a **data availability statement** to describe the availability or the absence of shared data. When data have been shared, authors are required to include in their data availability statement a link to the repository they have used, and to cite the data they have shared. Whenever possible the scripts and other artefacts used to generate the analyses presented in the paper should also be publicly archived. If sharing data compromises ethical standards or legal requirements, then authors are not expected to share it.

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3.1. Getting Started

By submitting a manuscript to or reviewing for this publication, your name, email address, and affiliation, and other contact details the publication might require, will be used for the regular operations of the publication, including, when necessary, sharing with the publisher (Wiley) and partners for production and publication. The publication and the publisher recognize the importance of protecting the personal information collected from users in the operation of these services, and have practices in place to ensure that steps are taken to maintain the security, integrity, and privacy of the personal data collected and processed. You can learn more at **https://authorservices.wiley.com/statements/data-protection-policy.html**

3.2. Manuscript Files Accepted

Manuscripts should be uploaded as Word (.doc or .docx) or Rich Text Format (.rtf) files (not write-protected), along with separate Figure files. For the latter, GIF, JPEG, PICT or Bitmap files are acceptable for submission, but only high-resolution TIF or EPS files are suitable for printing. Tables should be done in Word rather than in Excel. The files will be automatically converted to HTML and a PDF document on upload, and those will be used for the review process. The text file must contain the entire manuscript, including the 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.

3.3. 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. Whether these are used is up to the Editor, but it is helpful to have the suggestions.

3.4. 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.

3.5. 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 get through to you if your IT department adds our email server (uranus.scholarone.com) to their whitelist.

3.6. Review Procedures
All manuscripts (except some commentaries and conference proceedings) are submitted to an initial review by the Editor or Associate Editors. Manuscripts which are not considered relevant to oral epidemiology or the practice of community dentistry or are not 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 will be returned to the corresponding author.

3.7. 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.

3.8. Submission of Revised Manuscripts
Revised manuscripts must be uploaded within two or three months of authors being notified of a Minor or Major revision decision respectively. Locate your manuscript under 'Manuscripts with Decisions' and click on 'Submit a Revision' to submit your revised manuscript. Please remember to delete any previously-uploaded files when you upload your revised manuscript. Revised manuscripts must show changes to the text in either a coloured font or highlighted text. Do NOT use track changes for this. Prepare and submit a separate “Response to reviewers” document, in which you address EACH of the points raised by the reviewers.

3.9. 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.

3.10. 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 conflicts of interest.

4. MANUSCRIPT FORMAT AND STRUCTURE

Community Dentistry & Oral Epidemiology now offers Free Format submission for a simplified and streamlined submission process.

Before you submit, you will need:

- Your manuscript: this should be an editable file including text, figures, and tables, or separate files – whichever you prefer. All required sections should be contained in your manuscript, including abstract, introduction, methods, results, and conclusions. Figures and tables should have legends. Figures should be uploaded in the highest resolution possible. References may be submitted in any style or format, as long as it is consistent throughout the manuscript. Supporting information should be submitted in separate files. If the manuscript, figures or tables are difficult for you to read, they will also be difficult for the editors and reviewers, and the editorial office will send it back to you for revision. Your manuscript may also be sent back to you for revision if the quality of English language is poor.
- An ORCID ID, freely available at https://orcid.org. *(Why is this important? Your article, if accepted and published, will be attached to your ORCID profile. Institutions and funders are increasingly requiring authors to have ORCID IDs.)*
- The title page of the manuscript, including:
    - Your co-author details, including affiliation and email address. *(Why is this important? We need to keep all co-authors informed of the outcome of the peer review process.)*
    - Statements relating to our ethics and integrity policies, which may include any of the following *(Why are these important? We need to uphold rigorous ethical standards for the research we consider for publication):*
        - data availability statement
        - funding statement
        - conflict of interest disclosure
        - ethics approval statement
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        - permission to reproduce material from other sources
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If you are invited to revise your manuscript after peer review, the journal will also request the revised manuscript to be formatted according to journal requirements as described below.

Main Text File
Manuscripts can be uploaded either as a single document (containing the main text, tables and figures), or with figures and tables provided as separate files. Should your manuscript reach revision stage, figures and tables must be provided as separate files. The main manuscript file can be submitted in Microsoft Word (.doc or .docx) format.

Your main document file should include:

- A short informative title containing the major key words. The title should not contain abbreviations
- The full names of the authors with institutional affiliations where the work was conducted, with a footnote for the author's present address if different from where the work was conducted
- Acknowledgments
- Abstract
- Up to seven keywords
- Main body
- References
- Tables (each table complete with title and footnotes)
- Figures: Figure legends must be added beneath each individual image during upload AND as a complete list in the text

4.1. Word Limit and Page Charges
Articles should be limited to 3,700 words (including references) and 6 Tables or Figures; alternatively, 4,000 words and 5 Tables or Figures may be used. This equates to seven published pages, **and authors are strongly encouraged to stay within those limits.** The Methods and Results sections are usually where the word count can "blow out", and authors are encouraged to consider submitting heavily detailed material for inclusion in a separate online Appendix to their article (at no cost). **Articles exceeding seven published pages are subject to a charge of USD 300 per additional page. One published page amounts approximately to 5,500 characters (including spaces) of text but does not include Figures and Tables.**

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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 the manuscript is professionally edited. A list of independent suppliers of editing services can be found at **http://wileyeditingservices.com/en/**. All services must be 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 1.5 spaced using a standard 12-point font size, and preferably in the Times Roman font.

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 structure guidelines below.

Title Page: 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, Methods, Results and Discussion. Subheadings are not encouraged.

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

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 other academic researchers for their own use.

Results should not focus overly on P values – we concur with recent calls for less emphasis on statistical significance (see Amrhein et al, Nature 2019; 567: 305-307). In the Results section, have one paragraph of text per Table, and do not repeat Table data in that Results text; instead, draw the reader's attention to the highlights/important parts of the Table. Avoid "compared to" - use 'than' instead.

Discussion: See Docherty and Smith, BMJ 1999; 318: 1224-5 for how to structure a Discussion section. That structure is encouraged. 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. In the Discussion and conclusion, use the term 'findings' rather than 'results'.

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Authors are required to cite all necessary references for the research background, methods and issues discussed. Primary sources should be cited. Relevant references published in CDOE are expected to be among the cited literature.

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1. King VM, Armstrong DM, Apps R, Trott JR. Numerical aspects of pontine, lateral reticular, and inferior olivary projections to two paravermal cortical zones of the cat cerebellum. *J Comp Neurol* 1998;390:537-551.

Book:

2. Voet D, Voet JG. *Biochemistry*. New York: John Wiley & Sons; 1990. 1223 p.

Please note that journal title abbreviations should conform to the practices of Chemical Abstracts.

For more information about AMA reference style - **AMA Manual of Style**

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Tables are part of the text and should be included, one per page, after the References. Please see our **Guide to Tables and Figures** for guidance on how to lay these out. 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 captions, with necessary references, should be typed together on a separate page and numbered clearly (Fig.1, Fig. 2, etc.).

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