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DISPARIDADES RACIAIS NA SAÚDE BUCAL EM ADOLESCENTES: UMA ABORDAGEM MULTINÍVEL

DISSERTAÇÃO DE MESTRADO

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Santa Maria, RS, Brasil
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DISPARIDADES RACIAIS NA SAÚDE BUCAL EM ADOLESCENTES: UMA ABORDAGEM MULTINÍVEL

Bruno Emmanuelli

Dissertação apresentada ao Curso de Mestrado 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 **Mestre em Ciências Odontológicas**

Orientador: Prof. Dr. Thiago Machado Ardenghi

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elaborada por
Bruno Emmanuelli

como requisito parcial para a obtenção do grau de
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“What counts in life is not the mere fact that we have lived. It is what difference we have made to the lives of others that will determine the significance of the life we lead.”

- Nelson Mandela.

RESUMO

Dissertação de Mestrado
Programa de Pós-Graduação em Ciências Odontológicas
Universidade Federal de Santa Maria

DISPARIDADES RACIAIS NA SAÚDE BUCAL EM ADOLESCENTES BRASILEIROS: UMA ABORDAGEM MULTINÍVEL

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Data e Local da Defesa: Santa Maria – RS, 14 de julho de 2015.

O objetivo desse estudo foi verificar a ocorrência e a magnitude de diferenças raciais em desfechos clínicos e subjetivos de saúde bucal em adolescentes brasileiros. Um levantamento epidemiológico foi realizado, em 2012, com uma amostra de escolares de 12 anos na cidade de Santa Maria-RS, Brasil. Dados foram coletados através de exames clínicos e entrevistas estruturadas. Os critérios clínicos avaliados foram cárie dentária, presença de placa e cálculo dental e sangramento gengival. Os participantes responderam a versão brasileira e reduzida do *Child Perceptions Questionnaire* (CPQ11-14). As condições socioeconômicas e o principal preditor deste estudo, raça, foram coletados através de questionários respondidos pelos pais. Variáveis relacionadas ao bairro da escola em que as crianças estudavam foram obtidas de publicações oficiais do município. Os dados foram analisados através do programa estatístico STATA 12.0, utilizando o modelo multinível de Regressão de Poisson para determinar as associações entre raça, variáveis clínicas, qualidade de vida relacionada à saúde bucal e uso de serviços odontológicos. Um total de 1134 adolescentes foi examinado. Indivíduos não-brancos apresentaram piores condições clínicas quando comparados aos brancos. Em relação à cárie, adolescentes não-brancos tiveram maior número de dentes perdidos e menor número de dentes restaurados (RR 1,92 IC 1,31-2,82 e RR 0,52 IC 0,37-0,71, respectivamente). Relacionado às condições periodontais, o mesmo grupo apresentou maior taxa de placa dental (RR 1,14 IC 1,09-1,18) e sangramento gengival (RR 1,07 IC 1,02-1,12). Não houve diferenças relacionadas ao uso de serviços odontológicos. No entanto, a procura por motivo de dor foi maior para adolescentes não-brancos (RR 1,36 IC 1,05-1,77). Adolescentes não-brancos apresentaram uma pior qualidade de vida relacionada à saúde bucal. Os domínios mais afetados do CPQ 11-14 foram “Bem estar Emocional” (RR 1,10 IC 1,00-1,20) e “Bem estar Social” (RR 1,16 IC 1,03-1,10). Existem desigualdades raciais em desfechos clínicos, subjetivos e no motivo do uso de serviços em adolescentes brasileiros. Os resultados apontam a necessidade de políticas públicas de saúde que considerem a existência dessas diferenças e reforcem a atenção a grupos étnicos minoritários no intuito de reduzir essas inequidades.
Palavras-chave: Adolescentes. Disparidades. OHRQOL. Raça. Saúde bucal.

ABSTRACT

Master Course Dissertation
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Federal University of Santa Maria

RACIAL DISPARITIES IN ORAL HEALTH OUTCOMES AMONG BRAZILIAN ADOLESCENTS: A MULTILEVEL APPROACH

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Date and Local of Defense: Santa Maria – RS, 2015, July 14.

The aim of this study was to assess the occurrence and magnitude of racial inequalities in clinical and subjective oral health outcomes in Brazilian adolescents. A survey was conducted in 2012 with a multistage sample of 12 years-old schoolers in the city of Santa Maria, RS, Brazil. Data were collected through oral clinical examinations and structured interviews. The clinical variables evaluated were: dental caries, dental plaque, calculus and gingival bleeding. Participants answered the Brazilian short version of Child Perception Questionnaire (CPQ11-14) for assessing their Oral Health-related Quality of life (OHRQoL). The socioeconomic status and race were colected throug questionnaires answered by parentes. Variables related to the school neighborhood of the adolescentes were obtained by oficial publications of the city. Data were analysed using STATA 12.0 software. Multilevel Poisson Regresson models were performed to assess the associations between race, clinical variables, oral health-related quality of life and use of dental care. A total of 1,134 adolescents were examined. Non-white individuals presented the worst clinical conditions compared to White ones. Non-white adolescentes had the higher number of missed and less filled surfaces (RR 1.92 CI 1.31-2.82 and RR 0.52 CI 0.37-0.71, respectively); they also presented at a higher rate of dental plaque (RR 1.14 CI 1.09-1.18) and gingival bleeding (RR 1.07 CI 1.02-1.12) when comparing to their white counterparts. There are no racialdiferences in the use of dental services. However, the use of dental services due to pain was higher for non-white adolescents (RR 1.36 CI 1.05-1.77). Non-white adolescents had poorer OHRQoL. The most affected domains were “Emotional well-being” (RR 1.10 CI 1.00-1.20) and “Social well-being” (RR 1.16 CI 1.03-1.10). There are racial inequalities in clinical and subjective oral health outcomes as well as the reason for use of dental care in the Brazilian adolescents. The results demonstrate the need for public health policies and programm targing minority ethnic / racial groups to reduce these inequities.

Keywords: Adolescents. Disparities. OHRQoL. Oral Health. Race.

SUMÁRIO

INTRODUÇÃO GERAL

O status socioeconômico (SES) é considerado um constructo multidimensional e refere-se a um conceito amplo, que agrega tanto medidas baseadas em recursos quanto medidas de prestígio (ABRAMSON et al., 1982; KRIEGER et al., 1997). É possível representá-lo por meio de fatores individuais como: nível educacional, ocupação e renda e/ou fatores contextuais como classe social, renda média do bairro, renda per capita, – os quais têm sido associados a desfechos em saúde (KRIEGER et al., 1997; SABBAH et al., 2007; SHAVERS, 2007). De forma geral, indivíduos com pior status socioeconômico, como aqueles que possuem renda e escolaridade baixas, apresentam piores condições de saúde e qualidade de vida quando comparados a indivíduos com renda e escolaridade mais elevadas (SHAVERS, 2007; PIOVESAN et al., 2010a). O SES, além de estar associado a diferentes desfechos em nível individual, também pode ser retratado como um determinante social de iniquidades em saúde quando considerado em nível comunitário (SHEIHAM et al., 2011).

No que se refere à saúde bucal, tem sido observado um gradiente socioeconômico na ocorrência de desfechos clínicos (ANTUNES et al., 2002) (ANTUNES et al., 2006; PIOVESAN et al., 2010b), subjetivos - referentes à auto percepção ou qualidade de vida relacionada à saúde bucal (ABANTO et al., 2011; PIOVESAN et al., 2011; SCARPELLI et al., 2013) e de uso de serviços (ANTUNES et al., 2003; AL-HABOUBI et al., 2013). O status socioeconômico é tido como um determinante distal de saúde bucal capaz de influenciar determinantes proximais como hábitos de higiene e comportamento dos indivíduos (HOLST et al., 2001). Paula et al.(2013), ao avaliarem a influência de fatores socioeconômicos, condições bucais e do ambiente familiar na percepção de saúde de adolescentes, demonstraram que renda familiar e nível de escolaridade da mãe estão associados à auto percepção de saúde bucal desses indivíduos (DE PAULA et al., 2013). Nesse sentido, já foi demonstrado que pessoas em desvantagem financeira estão, também, em desvantagem relacionada a questões como nível educacional, moradia, acesso a produtos, além de serviços de saúde e estilo de vida (BRAVEMAN et al., 2005).

Diversas teorias buscam explicar a forma pela qual as condições socioeconômicas, tanto em nível individual quanto comunitário, atuam sobre

questões de saúde. Argumenta-se que o estilo de vida e as condições nas quais as pessoas vivem possuem forte influência nos desfechos em saúde (WILKINSON , 2003). As principais teorias desenvolvidas para demonstrar de que maneira as doenças ocorrem, enfatizam a questão da posição social como um importante determinante de iniquidades em saúde (SOLAR; IRWIN, 2010). De maneira geral, quando se referem à saúde bucal, estudos apontam que pessoas em desvantagens social e econômica são as que apresentam piores condições de saúde e impacto na qualidade de vida (ABANTO et al., 2011; CELESTE et al., 2011) bem como tendem a usar menos os serviços odontológicos (MANSKI; BROWN, 2007)

Entre as principais teorias sobre os determinantes de saúde, destacam-se: a Teoria Materialista que inclui questões do ambiente físico, moradia e local de habitação e poder de consumo e sua influência sobre saúde e fatores de risco para os indivíduos; a Teoria Psicossocial a qual delega o papel de preditor de saúde aos estressores psicossociais, como eventos negativos aos quais os indivíduos estão expostos, falta de suporte social e incapacidade de lidar com situações de adversidade; e, por fim, a Teoria Comportamental que demonstra que os hábitos dos indivíduos, como os de dieta, consumo de álcool e tabaco, prática ou não de exercícios físicos podem causar danos ou melhorar o seu estado de saúde (SOLAR; IRWIN, 2010).

Apesar da forte influência do nível socioeconômico, desigualdades étnico/raciais também têm sido reconhecidas em estudos epidemiológicos como um importante preditor de desigualdades em saúde (ANTUNES et al., 2002; HUANG; PARK, 2015), e tem sido relacionada a diferentes desfechos tanto em saúde geral (MCMANUS et al., 2012; ROSSEN; SCHOENDORF, 2012) quanto em saúde bucal (ANTUNES et al., 2002; NANAYAKKARA et al., 2013; HUANG; PARK, 2015). Nesse sentido, vale salientar que raça e etnia são descritas como categorias sociais, e não biológicas, referindo-se a grupos sociais que, em geral, compartilham de características em comum, sejam elas uma herança cultural e de ancestralidade ou, simplesmente, a cor da pele (KRIEGER, 2001).

De maneira geral, a categorização dos indivíduos quanto à raça pode estar relacionada a características fenotípicas como cor da pele, tipo de cabelo e traços faciais, principalmente quando há uma heteroclassificação. Por outro lado, o fato de os indivíduos se autoclassificarem quanto à sua cor pode refletir o modo como se percebem frente a outras pessoas em determinados contextos (SCHWARTZMAN,

2007). O estudo de Perreira e Telles (2014)demonstrou que indivíduos latino-americanos com a cor da pele mais escura estiveram mais expostos a episódios de discriminação racial ou de classe, e tiveram também, uma maior exposição a baixos níveis socioeconômicos, levando a uma maior propensão de relato de pior condição de saúde quando comparados a indivíduos com cor de pele clara (PERREIRA; TELLES, 2014). O estudo de Christopherson et al.(2009), com crianças americanas de 8 a 11 anos, observou que, embora a necessidade de tratamento ortodôntico fosse maior em crianças brancas comparadas às negras, essas estavam menos satisfeitas com seus sorrisos e julgavam ter uma maior necessidade de uso de aparelho ortodôntico. Os autores demonstraram, ainda, que a autopercepção das crianças variou de acordo com o gênero, idade e etnia/raça, independentemente do seu status socioeconômico (CHRISTOPHERSON et al., 2009).

Outros autores demonstraram que associações entre níveis de status socioeconômico e perdas dentárias, em adultos, variaram conforme os grupos étnicos estudados, indicando que os benefícios esperados em indivíduos com elevado status socioeconômico não são distribuídos de maneira igualitária entre os grupos étnico/raciais (JIMENEZ et al., 2009).

No contexto brasileiro, Antunes et. al.(2002), em uma análise espacial realizada na cidade de São Paulo demonstraram disparidades raciais entre crianças brancas e não brancas para o índice de cuidados odontológicos e número de dentes com necessidade de tratamento preventivo e restaurador. Nessa análise, indivíduos não-brancos obtiveram piores resultados quando comparados aos da cor branca. Padrões semelhantes foram observados quando questões socioeconômicas foram consideradas: crianças de escolas públicas também apresentaram piores condições de saúde bucal quando comparadas a crianças de escolas privadas (ANTUNES et al., 2002). Nesse sentido, percebe-se, além da importância da questão socioeconômica, uma independência da questão étnico/racial na influência de desfechos em saúde.

Dentre esses desfechos, a qualidade de vida relacionada à saúde bucal (OHRQoL) tem ganhado grande destaque na literatura epidemiológica. É considerada – assim como o SES - um constructo multidimensional (LOCKER et al., 2004) e está associada ao impacto, nas atividades diárias, qualidade de vida e bem estar de um indivíduo, ocasionado pelas condições de saúde bucal (LOCKER; QUINONEZ, 2011). Este constructo não só envolve o impacto negativo das

condições bucais nas funções orais, mas também afeta o âmbito físico-social e conceitos referentes à aparência, função social e autopercepção do estado de saúde bucal (LOCKER et al., 2004). As variáveis referentes à OHRQoL são mensuradas através de questionários estruturados auto-aplicáveis (SLADE, 1998) que têm, também, o intuito de verificar a relação entre medidas normativas (clínicas) e subjetivas de saúde bucal, contribuindo, dessa maneira, para uma estimativa mais real das necessidades de tratamento de uma população (LEÃO; LOCKER, 2006).

Estudos já demonstraram a associação existente entre status socioeconômico e qualidade de vida em indivíduos com diferentes desfechos em saúde. Tais trabalhos evidenciaram que indivíduos em desvantagem socioeconômica apresentam um impacto negativo na qualidade de vida relacionada à sua saúde (BURKERT et al., 2012; DE PAULA et al., 2013; LIU et al., 2013). Além disso, iniquidades raciais também têm sido observadas na autopercepção de saúde. No Brasil, o estudo prospectivo de Gonçalves et. al.(2012), no município de Pelotas, RS, avaliou indivíduos desde seu nascimento até os 11 anos de idade e revelou que a cor da pele afetou quase todos os domínios relacionados à qualidade de vida, independente da posição socioeconômica. Os autores demonstraram que a qualidade de vida foi afetada em quase todos os aspectos estudados, dentre eles, questões familiares e sociais, de forma desfavorável para indivíduos não-brancos, mesmo após ajustes por variáveis socioeconômicas (GONCALVES et al., 2012). Em relação à qualidade de vida relacionada à saúde bucal (OHRQoL), o padrão de desigualdades se mantem. Pesquisas demonstraram que indivíduos negros e latino-americanos apresentam uma pior percepção de saúde bucal quando comparados a indivíduos da raça branca, ainda que parte dessa associação seja atribuída a diferenças no status socioenocômico (SABBAH et al., 2009). No entanto, um estudo transversal com uma amostra representativa de 2.745 adultos com 65 anos ou mais demonstrou que o fato de pertencer ao grupo economicamente desfavorecido e ao grupo de minoria racial estava associado a uma pior condição clínica de saúde bucal e também de OHRQoL (HUANG; PARK, 2015).

Iniquidades têm sido também observadas quanto ao uso de serviços odontológicos e isso tem ocorrido principalmente entre grupos menos favorecidos (MEDINA-SOLIS et al., 2008; NORO et al., 2008). Tais desigualdades têm sido relacionadas tanto a diferenças socioeconômicas (NORO et al., 2008) quanto psicossociais (PIOVESAN et al., 2011). De maneira geral estudos demonstram

associações entre uso de serviço odontológicos e fatores individuais e contextuais (US DEPARTMENT OF HEALTH AND HUMAN SERVICES, 2014). Em um levantamento de nível nacional, com norte-americanos, observou-se que indivíduos não-brancos e hispânicos tiveram uma menor probabilidade de ter realizado uma consulta odontológica comparados ao restante da população (MANSKI; BROWN, 2007). Dados referentes à pesquisa nacional de Saúde Bucal no Brasil (SB Brasil 2003) mostraram, para a população idosa, que indivíduos negros têm uma menor chance de visitar o dentista quando comparados aos brancos (SB BRASIL, 2003).

Sabe-se que as interações ou associações entre indicadores de saúde em nível individual e diferentes desfechos podem ser influenciadas por questões ambientais (DIEZ-ROUX, 2000). Alguns autores já demonstraram uma tendência a comportamentos semelhantes para indivíduos que estejam inseridos em um mesmo contexto (PATTUSSI et al., 2006; CHOI; LEE, 2011). Levando-se em consideração o fato de a autoclassificação de cor estar relacionada a como os indivíduos se percebem ou sentem frente aos demais dentro de um determinado contexto (SCHWARTZMAN, 2007), percebe-se a importância de utilizarmos uma abordagem multinível que avalie a influência de fatores de nível contextual.

Embora raça seja usada apenas como variável de ajuste de análises estatísticas em boa parte das pesquisas, o estudo das iniquidades raciais em desfechos objetivos e subjetivos de saúde bucal tem recebido atenção especial nas últimas décadas, principalmente no cenário internacional. No Brasil, ainda são raros os estudos que avaliam as disparidades raciais em desfechos clínicos e subjetivos relacionados à saúde bucal, considerando a influência do contexto, em adolescentes. Os resultados desse estudo podem ser úteis para melhor compreensão a respeito das iniquidades raciais em diferentes desfechos de saúde bucal, servindo como guia para a elaboração de políticas públicas de saúde que não considerem apenas a influência de fatores clínicos, mas também a influência de questões psicossociais.

Sendo assim, o objetivo deste trabalho foi avaliar a ocorrência de diferenças raciais em desfechos clínicos e subjetivos de saúde bucal e também quanto ao uso de serviços odontológicos em adolescentes estudantes da rede pública de ensino de Santa Maria, RS, Brasil.

Este estudo tem como base as normativas da Universidade Federal de Santa Maria (UFSM). Por se tratar de uma pesquisa envolvendo humanos, o projeto foi previamente submetido ao Comitê de Ética em Pesquisa da UFSM, tendo sido aprovado (ANEXOS A e B). Sendo assim, esta dissertação é composta de um capítulo contendo um artigo que será enviado para publicação na revista "*Community Dentistry and Oral Epidemiology*" (ANEXO C).

1 ARTIGO

Racial Disparities in Oral Health Outcomes Among Brazilian Adolescents: A Multilevel Approach

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Racial Disparities in Oral Health Outcomes among Brazilian Adolescents: a Multilevel Approach.

Abstract

Objectives: This study assessed the influence of race on Briazilian adolescents' clinical and subjective oral health outcomes and use of dental services. **Methods:** A multistage random sampling selected a representative sample of 1,134 twelve-year-old adolescents from public schools of Santa Maria, a southern city in Brazil. Participants were examined by a clinician and were administered the Brazilian short version of the Child Perceptions Questionnaire (CPQ11–14). The adolescents' parents or guardians answered questions regarding their demographics and socioeconomic status. Multilevel Poisson Regresson models were performed to assess the associations between race, clinical variables, oral health-related quality of life and use of dental care. **Results:** Adolescents from racial minority groups had poorer clinical outcomes and oral health-related quality of life. They have more missed and less filled surfaces. Non-white adolescents also have more dental plaque and gingival bleeding. The mean CPQ11–14 score was 1.07 higher for non-white adolescents than their white counterparts' score. "Social well-being" and "Emotional well-being" were the most affected domains for black adolescents. There are no racial diferences in the use of dental services. However, the use of dental services due to pain was higher for non-white adolescents. The associations remained significant even after adjusting for individual and contextual covariates. **Conclusions:** Oral health disparities are prevalent among adolescents from racial minority groups. The results demonstrate the need for public health policies and programm targing minority ethnic / racial groups to reduce these inequities.

Key words: Adolescents, Disparities, Minorities, Oral Health, OHRQoL, Race.

Introduction

Disparities in health are strongly related to inequalities in the social and economic contexts. These differences have been described as social gradient in health. People from minority's marginalized groups and living at poorest conditions have the worst health outcomes (1). The same pattern can be seen for both general (2) and oral health (3, 4). Data from international and national researches show that those living in social deprivation or having less years of education and low household income are exposed to worst oral health conditions when compared with their counterparts (5).

The racial issue has been considered a socioeconomic predictor for health outcomes (1). Race as a social category (6) has been related to health inequalities (7, 8), showing a direct influence on health (8). It has been shown that White and Black people, even in the same socioeconomic position, present different health outcomes such as life expectancy (8). Furthermore, race disparities are also associated with several clinical and subjective oral health outcomes (9). In a survey conducted in the UK, minority ethnic groups of children had significantly higher experience of caries compared to their counterparties, and this difference remained even after the adjustment for level of material deprivation (10).

A previous study with a national representative sample of 0-17 year-old American children also demonstrated racial disparities for general and oral health outcomes. Blacks and individuals from minorities groups had worst health status and dental condition according their parents' report (11).

Additionally, inequalities have also been observed in other outcomes such as dental health care use (7, 12) and Oral Health Related Quality of Life (OHRQoL) (13). These inequalities were associated to individuals from different socioeconomic status, sex, age and race (7). Data from a previous study in the USA showed that 30% of individuals from a low income family had at last one dental visit comparing to 58% of those from from more

advantage income family (14). Regarding to race/ethnic inequalities, studies have shown that minority groups have poorer clinical (15) and subjective oral health conditions (16). These differences can also be seen for dental care use (14).

It has been postulated that racial differences in health can be reduced or eliminated when SES are take into account (17). Nonetheless, other studies have already shown that SES is not able to completely explain racial differences in health (8). However, those studies are inconclusive since contextual variations were not considered. Recent studies have indicated that the environment where people live, study and work also has influence on their health and consequently their life (18). Thus, it is important to take into account the influence of contextual variables to assess the socioeconomic predictors for health and oral health outcomes.

Although the World Health Organization (WHO) considered oral health inequalities as one of the most important research issue (19), contradictory results exist regarding to racial differences and its impact on oral health clinical conditions, use of dental care services and OHRQoL of Brazilian adolescents. Studies evaluating ethnic/racial differences in oral health clinical and subjective outcomes among Brazilian adolescents are scarce and to our knowledge no study has assessed the link between race on more than one oral health outcome using a multilevel approach. Recognize ethnoracial differences in oral health is of great importance for improve this population's health and planning future health policy.

The aim of this study was to assess the influence of race on clinical conditions, OHRQoL and use of dental services in Brazilian adolescents taking into account the contextual variability in a multilevel approach.

Materials and Methods

Ethical Considerations

The Ethics in Research Committee of the Federal University of Santa Maria consented this study protocol. All participants were informed verbally and by a letter about the aims of the study. The participant's parents or legal guardians signed a free and informed consent form. Furthermore, all schools received information about the study and agreed to participate.

Study Design

This study follows a cross-sectional design with a representative sample of twelve-year-old adolescents from Santa Maria, located in a southern state of Brazil. According official data this region has almost 80% of European descents and the lowest proportion of black (4.1%) and brown (*mulato*) (16.5%) individuals compared to other country regions (20). The reference population at the time of data collection was 3,817 individuals. A two-stage sample design was adopted for subject's selection. Twenty schools were randomly selected from a total of 39 public schools in the city (21, 22). We used probabilities proportional to the size of schools by the number of students to guarantee that all adolescents had an equal likelihood of being selected. A sample size needed for assessing racial differences on different oral health outcomes was calculated using the following parameters: gingival bleeding prevalence in the exposed group (black adolescents) of 27.81% and gingival bleeding prevalence in the non-exposed group (white adolescents) of 18.99% (23) confidence level of 95%, proportion of exposed to non-exposed of 1:2 and 80% power resulting in 899 individuals. Adding 30% for possible losses and considering 1.2 of effect design, the total required amount was 1078 adolescents. Calculation used gingival bleeding as the outcome because it yields the higher number of individuals to be sampled.

Race

Information regarding to race was collected by means of structured questionnaire sent to parent/guardians. We adopted the classification of race according to the criteria established by the agency for demographic analysis – the Brazilian Institute of Geography and Statistics

(20), using the following question: "What race do you consider you child?" Four options of choice was offered as possible answers: "white", "black", "brown (*mulato*)" or "other (orient/indigenous)". For the analysis the race variable was dichotomized into "Non-white" (African descents) and "White" (European descents) categories. There were no indigenous and oriental individuals in our sample.

Clinical Oral Health Outcomes

Adolescents were clinically examinated at the school by four dentists. They were previously trained and calibrated for the evaluation of all parameters assessed (21).Clinical examinations were made with adolescents for oral conditions data collection. The following parameters were assessed: dental plaque (24) and calculus (present/absent), gingival bleeding, dental caries (DMFS index) according to WHO (21). Clinical examinations were performed with gauze, Community Periodontal Index (CPI) probe and dental mirror (21)

Oral Health-Related Quality of Life

Oral health-related quality of life was assessed using the Brazilian short version of Child Perception Questionnaire (CPQ11-14) (25) (26). The questionnaire comprises four domains: Oral Symptoms, Functional Limitation, Emotional Well-Being and Social Well-Being. For each domain, four questions are asked. The possible answers are marked on a 5-point Likert scale ('Never', 'Once/ twice a day', 'Sometimes', 'Often' and 'Every day/ almost everyday'). The possible scores range from 0-64. Higher values represent greater impact on quality of life.

Sociodemographic and Socioeconomic Individual and Contextual Variables

Sociodemographic and socioeconomic information were collected through structured questionnaires sent to adolescent's parents/guardians. Data on gender, parents' educational level, household income and use of dental service were then obtained. For the analysis these variables were categorized: parents' educational level (parents that have completed primary

school, eight years/ parents with less than eight years of education); household income (Tertiles of income: Richest, Intermediate and Poorest). Use of dental services was collected as follows: “Have your child searched dental care in the last six months?” (27) and “What is the reason for the dental visit?”. The possible answers for the first question were “yes” or “no” and for the second were: dental pain, oral pain, knocks and falls or routine exams. Feasibility of the socioeconomic/ sociodemographic questionnaire was previously assessed with 20 parents who were excluded for the sample.

Contextual data such as neighborhood income, rate of literacy and proportion of black people in the community where the adolescent school was located were obtained through official publications of the city (20) with the aim of assessing the environment effect on our outcomes.

Data Analysis

Stata 12.0 software (Stata Corporation; College Station, TX, USA) was used for the analysis. Descriptive analyses were performed taking into account the sample weight, through “svy” command for complex data samples. With these analyses demographic, clinical and socioeconomic were described. Unadjusted analyses were conducted as a preliminary assessment to observe the association between race and the outcomes (dental caries, periodontal conditions, use of dental services and OHRQoL). Multi-level Poisson Regression analysis were performed to investigate associations between race and dental caries (DMFS index), mean of decayed, missing and filled surfaces, gingival conditions (mean of dental plaque, calculus and gingival bleeding) use of dental services (yes/no) and the reason for this use (pain/other), and OHRQoL by mean CPQ11-14 scores adjusted for individual and contextual co-variables. The Rate Ratio (RR, 95% CI) was used to verify race categories as a possible predictor to oral health outcomes adopted in this study.

We have used the scheme of fixed effects/random intercept for the Multilvel Analysis. In this analysis adolescents comprised the first level and schools were considered the second level (28). In our first model ("individual model") only the first-level variables were included. Our final model ("full model"), included the individual and contextual level covariates for the association adjustment. The model was tested considering only variables presenting a P-value ≤0.20 in the unadjusted analyses, and those having a P-value ≤0.05 after adjustment were retained in the final models. Deviance (-2loglikelihood) was used to measure the quality of the fit in all models, and their significance was assessed by the likelihood ratio test.

Results

Our sample comprised 1,134 adolescents (93% of response rate) in wich 54.1% were girls. Most of their parents/legal guardians had at least the formal instruction (≥ 8 years); and 52.8% of the children have not used dental services in the last six months. Regarding to race, white adolescents represented the majority of the sample. Thirty-nine percent of the subjects were in the intermediate income level, while 33% were in the poorest. Prevalence of decayed surfaces was 42.3% whereas prevalence of filled surfaces was 17%. Descriptive results related to individual and contextual (neighborhood income and neighborhood porportion of blacks and whites and literacy rate) variables are shown in table 1.

In the unadjusted analysis, being a non-white adolescent was associated with a higher number of missing and decayed surfaces, higher rates of dental plaque and gingival bleeding and with a lower number of filled surfaces. They also had a lower use of dental services and had use often the dentist due to pain than their counterparts (Table 2). The association remained significant after the adjustment for individual characteristics, except for the use of dental service (Table 3- Model 1). However, non-white adolescents were 36% more likely to have used the dental service due to pain when comparing to their counterparts. When subjective oral health outcomes were analyzed we found that non-white adolescents had the

greatest impact on their oral health-related quality of life (CPQ total score RR 1.07 95% CI 1.02-1.12). The most affected domains were: “Emotional” and “Social well-being” (RR 1.10 95% CI 1.00-1.20 and RR 1.16 95% CI 1.03-1.10, respectively). Figure 1 illustrates the mean CPQ 11-14 score by domains and all data are shown in table 3.

Table 3 also shows the racial differences by the full adjusted model (Model 2). In this analysis the association between adolescents’ racial/ethnic status and missed and filled surfaces, dental plaque, gingival bleeding and visit to dental health service due to pain remained the same observed in the individual adjusted model. Subjective outcomes (OHRQoL) also remained associated with adolescents’ race even after adjustments by contextual co-variables. Figure 2 displays that even in the richest tertile of income, non-whites adolescents report poorer OHRQoL.

Discussion

This study assessed racial differences in clinical, subjetive outcomes and use of oral health services in Brazillian adolescents. Our results demonstrated that regardless of the measure used to assess oral health, the non-white group had poorer health outcomes compared to white counterparts. The differences remained even after controlling for possible confounders. Some authors have also found racial differences in general and oral health outcomes (9). However, to the best of our knowledge, no study has described racial differences for more than one oral health outcome combining clinically and subjective conditions in adolescents.

Some authors have demosntrated that individuals from minority ethnoracial groups experience poorer oral health conditions (15, 30). Theoretical explanation has been focused on psychosocial, socioeconomic and cultural heritage that leads to discrimination, difference in the acess to resources and the level of trust and self-perception of health (31).

Although racial differences have been widely documented in the international literature, in the Brazilian context few studies have addressed racial disparities on caries (12, 30). We have used in our analysis several clinically determined oral health variables to verify their associations with race categories. Our results have demonstrated that non-white adolescents had almost twice missing surfaces and received less dental restorations when compared to white ones. A previous study showed that non-white preschool children had an avarage 34% higher dmf-s than their counterparts (30). Similar findings have been shown in other study, indicating that Black children had a higher average of teeth with preventive and restorative needs compared to white counterparts (32).

Regarding periodontal conditions, non-white adolescents also presented more dental plaque and gingival bleeding compared to their counterparts even after adjustment for covariates. Similar results were found by other authors who have observed poorer gingival status for Black Brazilian children than for the white ones (33). Children from ethnic minorities in different countries were also associated with more unhealthy gingival conditions (15).

We did not observe difference in the use of dental services between white and non-white adolescents in our analysis. However, non-white adolescents were more likely to have used the oral health services due to pain and emergency episodies, which is in accordance with a previous study (14). Analogous association was demonstrated in the Brazilian national oral health survey (34). The relationship between social factors, such as race, and the use of services is considered complex and is not yet well explained (35). Although some authors have stated that racial/ethnic differences could be due to differences in socioeconomic conditions and access to services (33), the mechanism behind this unequal distribution of oral health and the reasons for using oral health services is still unclear. Some authors have

suggested that stress situations can lead to unhealthy conditions through behavioral, psychologycal and physiologycal means (36).

In addition to the gradient observed for clinically determined variables and use of oral health services, OHRQoL was also different among adolescents from minority racial groups. Non-white adolescents presented poorer OHRQoL compared to white ones. Our results are in accordance with previous studies that have also observed poorer OHRQoL (16) and poor oral health perception (37) among ethnnoracial minority groups. "Social well-being" and "Emotional well-being" were the most affected domains for non-white adolescents. These associations remained significant even after controlling for socioeconomic factors. It suggests an independency of race influence on OHRQoL. Furthermore, we believe that race may have an influence on self-perceived oral health through social class discrimination (38). Previous study has showed that some racial discrimination at any level increases the chance to report poorer health (39).

The influence of race in health is complex and has been postulated that race is able to influence psychosocial issues, access to economic resources and individual's health behavior (1). In the Brazilian context there are several differences among white and non-white individuals. It is known that the black population has the worst social and health indicators (40). In this sense, some authors have already shown that an amount of these health differences can be explained by SES features (17). However, other authors (41) have demonstrated that racial inequities in health outcomes are prevalent even after controlling for socioeconomic variables. Furthermore, authors have stated that minority groups experienced discrimination episodes and social exclusion and it could predispose them to have worse health conditions (18).

There is a growing body of evidence assessing the influence of discrimination on health (41). Although some authors have demonstrated positive association between

ethnoracial discrimination and poor health status (42, 43), others have not found it (44). Moreover, the literature about discrimination has several limitations regarding measurement and design issues (41). It is known that racial discrimination can be stressful and cause social exclusion. This situation can lead people to develop worse health conditions and be in a high risk for several diseases (18). Hudson et al. (2012) have suggested that the association between race and poorer health outcomes could be mediated by exposure to discrimination (45). Then, more attention should be given to methodological issues related to discrimination data collection to better understand their influence on health.

Our study has some limitations. We only assessed adolescents from public schools and did not consider those from private ones. However, our sample was heterogeneous regarding to socioeconomic characteristics comprising individuals from different instruction and economic levels. Furthermore, more than 80% of the adolescents study in public schools in our city according to the municipality official data. Another limitation is regarding the lack of data on the discrimination issue, which may have a temporal relation in the pathway of the association posed in this study. Despite these limitations, we believed that our results make a significant contribution to the undestanding of racial inequalities in oral health. Few studies have demonstrated racial/ethnic inequalities in oral health and to our knowledge none have estimated these differences in clinical and subjective oral health outcomes. Notwithstanding, we have adjusted our results for a possible effect of contextual covariates. It is well know that individual determinants of an outcome are influenced by the community context. For instance, there may be a variability among adolescents in the school but also among schools; by modelling contextual-level covariates with subject-level characteristics in the analysis, our multilevel models identified the extent to which the individual outcome is accounted for by group and subject-level variables. In conclusion, oral health disparities were prevalent among adolescents from racial minority groups. We suggest that race influenced oral health by

psycological means leading the minority group to engage in harmful behaviors. The results show the need for public health policies that consider the existence of these differences and strengthen attention to ethnic minority groups in order to reduce these inequities.

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Table 1. Sociodemographic and clinical characteristics of the study sample. Santa Maria, RS, Brazil.

Variables	N	% / mean(SD)
Individual Level (Adolescents)		
Gender		
Female	611	54.12
Male	523	45.88
Race		
White	851	77.93
Non-white	254	22.07
Household income (per month)		
Richest (3rd tertile)	288	27.80
Intermediate (2nd tertile)	402	38.80
Poorest (1st tertile)	346	33.40
Mother's schooling		
With formal instruction (≥8 years of education)	702	65.55
Without formal instruction (<8 years of education)	382	34.45
Father's schooling		
With formal instruction (≥8 years of education)	628	61.44
Without formal instruction (<8 years of education)	406	38.56
Use of Oral Health Care (in the last 6 months)		
Yes	514	47.24
No	574	52.76
Dental Plaque[£]	-	12.37(0.57)
Gingival Bleeding[£]	-	11.31(0.48)
Decayed Surfaces[£]	-	1.28 (0.91)
Missing Surfaces[£]	-	0.10 (0.25)
Filled Surfaces[£]	-	0.35 (0.32)
Contextual Level (Schools)		
Neighborhood's mean income (per month) [†]		
≥75thquartile	342	30.16
<75thquartile	792	69.84
Neighborhood's literacy rate[§]		
> 94% literate individuals	610	53.8
≤ 94% literate individuals	524	46.2
Proportion of White individuals in the Neighborhood[§]		
> 88% White individuals	583	51.41
≤ 88% White individuals	541	48.59

*Descriptive analysis were run considering the sample weight

[†] Average income: represent average income from the neighbourhood of the school.

[§] Categories dichotomized by median.

[£] Means based on affected surfaces.

Table 2. Unadjusted Poisson Regression analysis for different outcomes related to racial group.

	White N (%) /mean (SE)	Non-white N (%) /mean(SE)	RR (95% IC)	p-value
Dental Caries (DMFS components)				
Decayed surface	1.21 (0.10)	1.57 (0.16)	1.14 (1.00- 1.28)	0.03
Missing surface	0.21 (0.08)	0.07 (0.01)	2.37 (1.62- 3.44)	0.00
Filled surface	0.40 (0.04)	0.19 (0.04)	0.49 (0.35- 0.66)	0.00
Periodontal outcomes				
Dental Calculus	1.90 (0.14)	1.84 (0.24)	0.93 (0.83-1.03)	0.17
Dental Plaque	11.8 (0.60)	13.93 (1.03)	1.13 (1.08- 1.17)	0.00
Gingival Bleeding	10.78 (0.60)	12.87 (0.79)	1.17 (1.12-1.22)	0.00
Use of Oral Health Service				
Had not visited the dentist	414 (50)	149 (62)	1.22 (1.01-1.47)	0.04
Had visited for pain reason	212 (26.3)	100 (44)	1.57 (1.23-2.01)	0.00
Oral Health Related Quality of Life				
Total Score	9.92 (0.34)	11.46 (0.49)	1.14 (1.10-1.20)	0.00
Specific domains				
Emotional well-being	2.51 (0.17)	3.31(0.19)	1.27 (1.17-1.38)	0.00
Functional limitation	2.40 (0,07)	2.66 (0.14)	1.10 (1.00-1.20)	0.03
Oral symptoms	3.47 (0.09)	3.53 (0.18)	1.04 (0.97-1.12)	0.28
Social well-being	1.53 (0.09)	1.94 (1.16)	1.28 (1.15-1.42)	0.00

* analysis was run considering the sample weight.

Table 3. Incidence Rate Ratio (IRR) for the Adjusted Poisson Regression for Racial categories and oral health outcomes in Brazilian adolescents: Individual and Full Contextual Models.

Variables	Individual Model* Non-White x White IRR(95% CI)	p-value	Full Model** Non-White x White IRR (95% CI)	p-value
Dental Outcomes				
Decayed Surface	1.03 (0.90- 1.18)	0.63	1.03 (0.91-1.17)	0.63
Missing Surface	1.92 (1.31- 2.82)	0.00	**1.92 (1.31-2.82)**	0.00
Filled Surface	0.52 (0.37-0.71)	0.00	**0.52 (0.37-0.71)**	0.00
Periodontal Outcomes				
Dental Plaque	1.14 (1.09-1.19)	0.00	**1.14 (1.09-1.19)**	0.00
Dental Calculus	0.90 (0.80-1.01)	0.08	0.90 (0.80-1.01)	0.08
Gingival bleeding	1.07 (1.03-1.12)	0.00	**1.08 (1.03-1.13)**	0.00
Use of Oral Health Service				
Had not visited the dentist	1.12 (0.91-1.37)	0.27	1.10 (0.90-1.36)	0.34
Visited due to pain	1.36 (1.05-1.77)	0.02	**1.34 (1.03-1.73)**	0.03
OHRQOL				
CPQ total score	1.07 (1.02-1.12)	0.00	**1.07 (1.02-1.12)**	0.00
Functional Limitation	1.04 (0.94-1.11)	0.43	1.04 (0.94-1.14)	0.43
Oral Symptoms	1.02 (0.94-1.10)	0.66	1.02 (0.94-1.11)	0.64
Emotional Well-Being	1.10 (1.00-1.20)	0.04	**1.10 (1.00-1.20)**	0.04
Social Well-Being	1.16 (1.04-1.11)	0.10	**1.16 (1.03-1.30)**	0.01

***** Poisson Regression Analysis adjusted by: gender, mother's schooling and income
****** Multilevel Poisson Regression Analysis adjusted by: gender, mother's schooling, income, neighborhood income, Literacy rate and Proportion of Non-white individuals in the neighborhood.

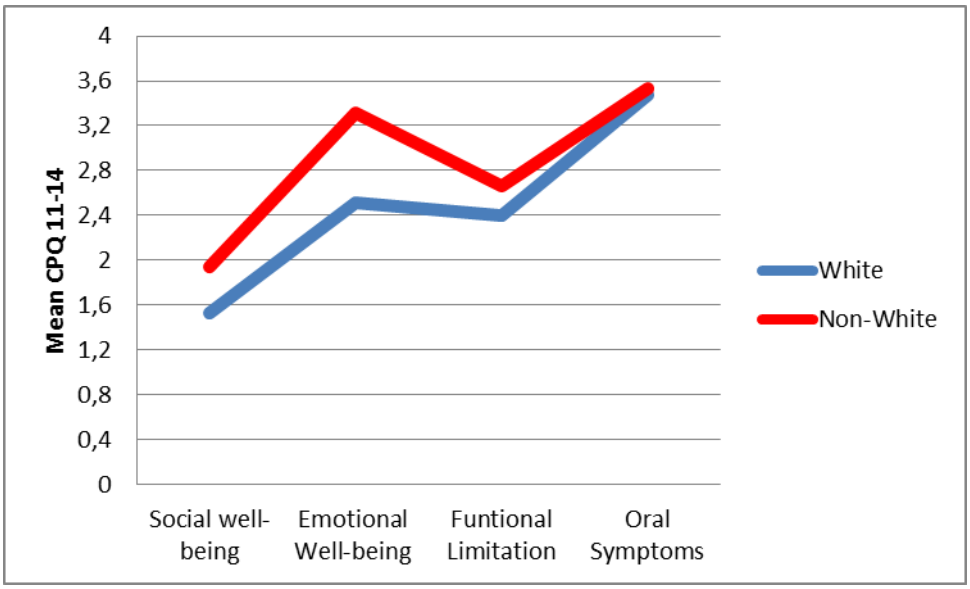

Figure 1. Mean of Child Perception Questionnaire (CPQ11-14) by domains for White and Non-white Brazilian adolescents.

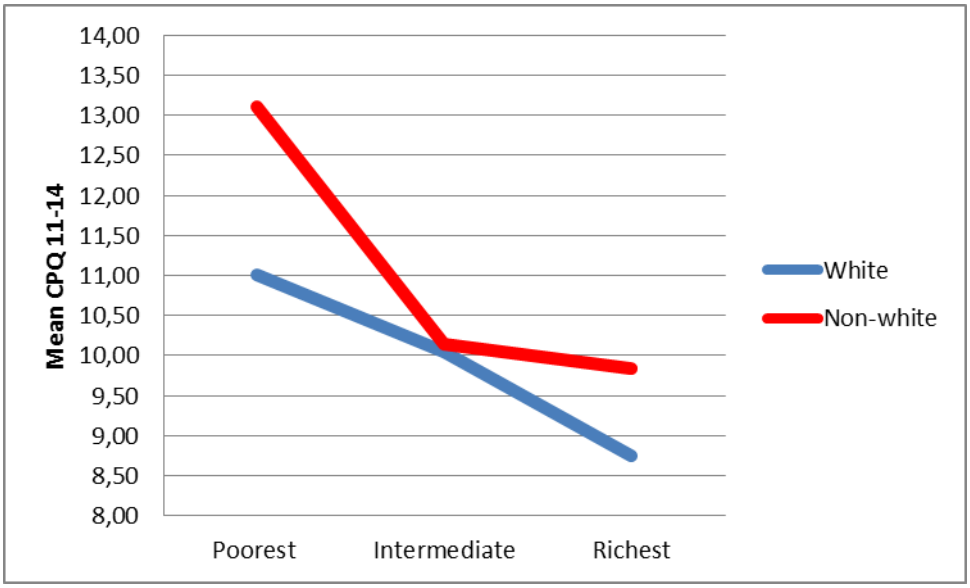

Figure 2. Racial differences in the Child Perception Questionnaire (CPQ11-14) mean by tertile of income in Brazilian adolescents.

2 CONSIDERAÇÕES FINAIS

Este estudo avaliou a influência da raça na saúde bucal de adolescentes de 12 anos de idade de Santa Maria, RS. Através de nossas análises foi possível verificar a existência de desigualdades raciais em desfechos clínicos e subjetivos de saúde bucal, bem como no uso de serviços odontológicos. Indivíduos não-brancos apresentaram os piores desfechos.

Diversos estudos têm observado a presença de iniquidades raciais em desfechos de saúde. Em geral grupos étnico-raciais minoritários são os que demonstram as piores condições de saúde bucal (ANTUNES et al., 2002; HUANG; PARK, 2015). No entanto, ao nosso conhecimento, esse é o primeiro estudo a avaliar aspectos clínicos e subjetivos da saúde bucal de adolescentes brasileiros, bem como o uso de serviços odontológicos por essa população, utilizando uma abordagem multinível.

Adolescentes não-brancos apresentaram piores condições de saúde bucal comparados aos brancos. Uma possível explicação para que isso tenha ocorrido é que raça pode ter influenciado a saúde bucal através de aspectos psicológicos, como discriminação, que levam os indivíduos à exclusão social e à adoção de hábitos de saúde nocivos (WILKINSON; MARMOT, 2003). Alguns autores já demonstraram a associação entre discriminação e piores estado de saúde (KARLSEN; NAZROO, 2002; HUDSON et al., 2012).

Apesar de termos algumas limitações em nosso estudo, principalmente referente ao fato de termos avaliado apenas adolescentes de escolas públicas da cidade, o mesmo pode trazer importantes contribuições para o reconhecimento de iniquidades raciais em saúde bucal. Além disso, poucos estudos avaliaram a influência da raça na saúde bucal de adolescentes utilizando diferentes desfechos clínicos e subjetivos considerando também a influência do contexto.

Dessa forma, concluimos que disparidades em saúde bucal são prevalentes entre adolescentes de grupos raciais minoritários. Nossos resultados apontam para a necessidade de as políticas públicas considerarem a existência dessas diferenças e reforçarem a atenção a grupos étnicos minoritários com o intuito de reduzir essas iniquidades.

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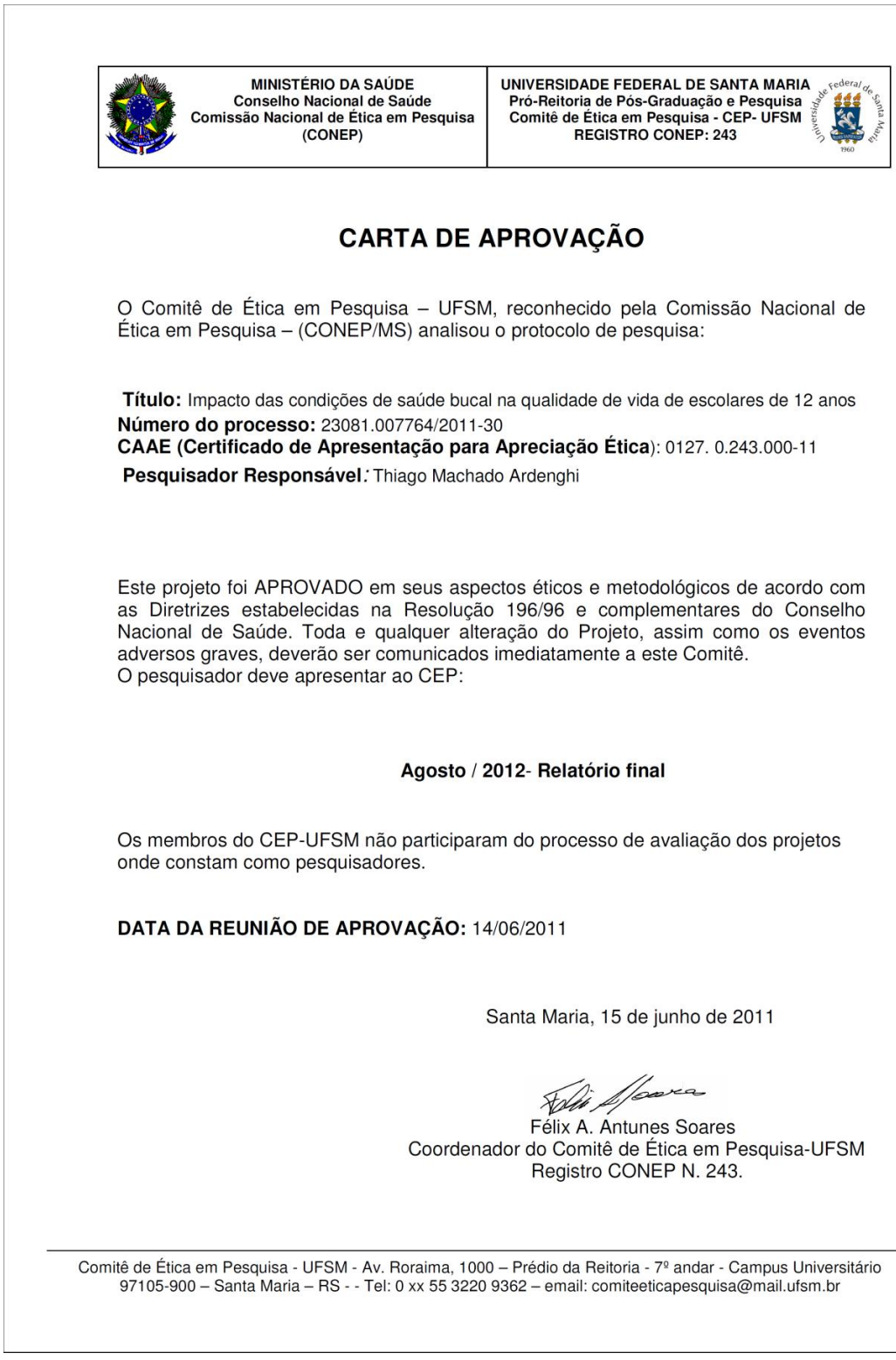
ANEXOS

Anexo A – Carta de Aprovação do Comitê de Ética em Pesquisa da UFSM



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 das condições de saúde bucal na qualidade de vida de escolares de 12 anos
Número do processo: 23081.007764/2011-30
CAAE (Certificado de Apresentação para Apreciação Ética): 0127. 0.243.000-11
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:

Agosto / 2012- Relatório final

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

DATA DA REUNIÃO DE APROVAÇÃO: 14/06/2011

Santa Maria, 15 de junho de 2011

Félix A. Antunes Soares
Coordenador do Comitê de Ética em Pesquisa-UFSM
Registro CONEP N. 243.

Comitê de Ética em Pesquisa - UFSM - Av. Roraima, 1000 – Prédio da Reitoria - 7º andar - Campus Universitário
97105-900 – Santa Maria – RS - - Tel: 0 xx 55 3220 9362 – email: comiteeticapesquisa@mail.ufsm.br

ANEXO B – Extensão do Cronograma do Projeto de Pesquisa aprovado pelo Comitê de Ética em Pesquisa da UFSM

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

PARECER PROTOCOLO DE PESQUISA

Protocolo CEP-UFSM: 23081.007764/2011-30 **CAAE:** 00127.0.243.000-11
Data entrada CEP: 27/05/2011 **Data do parecer CEP:** 13/12/2012
Data encaminhamento CONEP (caso necessário): / /

IDENTIFICAÇÃO

Título do Projeto: Impacto das condições de saúde bucal na qualidade de vida de escolares de 12 anos
Pesquisador Responsável: . Thiago Machado Ardenghi
Instituição: Universidade Federal de Santa Maria.
Unidade/Órgão: Departamento de Estomatologia
Área Temática: III - Projeto fora das áreas temáticas especiais

OBJETIVOS DO PROJETO (Descrever os objetivos e metas do projeto)

GERAL:
Avaliar o impacto das condições bucais e fatores socioeconômicos na qualidade de vida de escolares de 12 anos de idade do Município de Santa Maria, RS.

ESPECÍFICOS
- Avaliar prevalência e severidade da cárie dental, fluorose, má-oclusão, erosão dentária, traumatismo e doenças periodontais; bem como sua associação com fatores psicossociais e comportamentais em escolares de Santa Maria- RS;
- Avaliar o impacto dos sinais clínicos dessas condições e fatores socioeconômicos na qualidade de vida de crianças de 12 anos de idade da referida população;
- Fornecer subsídios para o planejamento e a organização de políticas públicas de promoção de saúde bucal

RESUMO (Descrever o objeto de pesquisa, justificativa, condições de realização, aspectos metodológicos, cronograma, orçamento e financiamento)

Conceitos contemporâneos de saúde sugerem que a saúde bucal seja definida em termos de bem-estar físico, psicológico e social em relação ao status bucal. Tal conceito remete à avaliação de saúde bucal através métodos que incluam ambos os aspectos clínicos objetivos e subjetivos em relação ao impacto das condições de saúde/doença nas atividades físicas e psicossociais de um indivíduo. Estudos prévios têm demonstrado que diversas condições de saúde bucal ainda são consideradas um problema de saúde pública na medida em que seus efeitos extrapolam uma visão meramente bucal e causam impacto significativo na qualidade de vida dos indivíduos afetados. Neste contexto, tem sido freqüente na literatura a utilização de medidas sócio-dentais para verificar a severidade com que as condições de saúde/doença interferem nas atividades diárias e na qualidade de vida de grupos. Entender a real interação entre fatores clínicos e sócio-dentais associados com as variáveis socioeconômicas proveria informações importantes para a adoção de políticas públicas de promoção de saúde bucal e para a tomada de decisões saudáveis de acordo com a necessidade percebida, trazendo um retorno direto para a população estudada.
Para realização deste estudo será verificado o impacto da cárie, fluorose dental, má-oclusão, erosão dental, traumatismo, doença periodontal e fatores socioeconômicos na qualidade de vida de 850 escolares de 12 anos de idade do Município de Santa Maria, RS. Os exames das condições bucais

Anexo C – Guideline da revista Community Dentistry and Oral Epidemiology

Author Guidelines

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

Relevant Documents: Colour Work Agreement Form

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 subjects. 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 accredited as appropriate upon submission of the manuscript. Contributors who do not qualify as authors should be mentioned under Acknowledgments.

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

2.2. Ethical Approvals

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

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: When 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.

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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.

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

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3. SUBMISSION OF MANUSCRIPTS

Manuscripts should be submitted electronically via the online submission sitehttp://mc.manuscriptcentral.com/cdoe. The use of an online submission and peer review site enables immediate distribution of manuscripts and consequentially speeds up the review process. It also allows authors to track the status of their own manuscripts. Complete instructions for submitting a manuscript are available online and below. Further assistance can be obtained from the Editorial Assistant, Natalie Brown, n.brown@otago.ac.nz

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3.1. Getting Started

• Launch your web browser (supported browsers include Internet Explorer 6 or higher, Netscape 7.0, 7.1, or 7.2, Safari 1.2.4, or Firefox 1.0.4 or higher) and go to the journal's online Submission Site: http://mc.manuscriptcentral.com/cdoe
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• Review your submission (in HTML and PDF format) before sending to the Journal. Click the 'Submit' button when you are finished reviewing.

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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.

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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.

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

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

3.6. E-mail Confirmation of Submission

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

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All manuscripts (except invited reviews and some commentaries and conference proceedings) are submitted to

an initial review by the Editor or Associate Editors. Manuscripts which are not considered relevant to oral epidemiology or the practice of community dentistry or are 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.

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

3.9. Submission of Revised Manuscripts

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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.

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4. MANUSCRIPT FORMAT AND STRUCTURE

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4.3. Structure

All manuscripts submitted to *Community Dentistry and Oral Epidemiology* should follow the structure guidelines below.
Title Page: should include a title of no more than 50 words, a running head of no more than 50 characters, and the names and institutional affiliations of all authors of the manuscript should be included.
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Main Text of Original Articles should include Introduction, Methods, Results and Discussion. Subheadings are not encouraged.
Introduction: 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.
Discussion: this may usually start with a brief summary of the major findings, but repetition of parts of the Abstract or of the Results sections should be avoided. The section should end with a brief conclusion and a comment on the potential clinical program or policy relevance of the findings. Statements and interpretation of the data should be appropriately supported by original references.

4.4. References

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.
The list of references begins on a fresh page in the manuscript, using the Vancouver format. References should be numbered consecutively in the order in which they are first mentioned in the text. Identified references in the text should be sequentially numbered by superscript Arabic numerals in the text; for example[12]. For correct style, authors are referred to: International Committee of Medical Journal Editors. Uniform requirements for manuscripts submitted to biomedical journals: writing and editing for biomedical publication. http://www.icmje.org October 2004. For abbreviations of journal names, consulthttp://www.ncbi.nlm.nih.gov/nlmcatalog/journals.
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We recommend the use of a tool such as Reference Manager or EndNote for reference management and formatting. Reference Manager reference styles can be searched for here:www.refman.com/support/rmstyles.asp

Examples of the Vancouver reference style are given below:

Journals

Standard journal article

(List all authors when six or fewer. When there are seven or more, list first six and add et al.)

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

Corporate author

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

Books and other monographs

Personal author(s)

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

Chapter in a book

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

4.5. Tables, Figures and Figure Legends

Tables are part of the text and should be included, one per page, after the References. All graphs, drawings, and photographs are considered figures and should be sequentially numbered with Arabic numerals. Each figure must be on a separate page and each must have a caption. All captions, with necessary references, should be typed together on a separate page and numbered clearly (Fig.1, Fig. 2, etc.).

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Special issues: Larger papers, monographs, and conference proceedings may be published as special issues of the journal. The full cost of these extra issues must be paid by the authors. Further information can be obtained from the editor or publisher.

5. AFTER ACCEPTANCE

Upon acceptance of a manuscript for publication, the manuscript will be forwarded to the Production Editor, who is responsible for the production of the journal.

5.1. Proof Corrections

The corresponding author will receive an email alert containing a link to a web site. A working email address must therefore be provided for the corresponding author. The proof can be downloaded as a PDF (portable document format) file from this site.
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