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**DETERMINANTES SOCIAIS, SAÚDE BUCAL,
RENDIMENTO ESCOLAR E QUALIDADE DE VIDA
EM CRIANÇAS E ADOLESCENTES**

**SOCIAL DETERMINANTS, ORAL HEALTH,
SCHOOL PERFORMANCE AND QUALITY OF LIFE
IN CHILDREN AND ADOLESCENTS**

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Universidade Estadual de Campinas
Faculdade de Odontologia de Piracicaba

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CRIANÇAS E ADOLESCENTES**

**SOCIAL DETERMINANTS, ORAL HEALTH, SCHOOL
PERFORMANCE AND QUALITY OF LIFE IN CHILDREN
AND ADOLESCENTS**

Tese apresentada à Faculdade de Odontologia de Piracicaba, Universidade Estadual de Campinas, como parte dos requisitos exigidos para obtenção do título de Doutora em Odontologia, na área de Saúde Coletiva.

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Orientador: Prof. Dr. Fabio Luiz Mialhe

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ABSTRACT

The overall objective of this thesis was to evaluate the social determinants of health (SDH) associated with oral health, school performance and the quality of life in children and adolescents, as well as test the longitudinal psychometric properties of Oral Health related Quality of Life (OHRQoL) questionnaires and compare a generic questionnaire of quality of life with other of OHRQoL. For this, two samples were used: one consisting of children 8-10 years participating in the Program Always Smiling (PSS), in Piracicaba, São Paulo, and another composed of schoolchildren of 12 years from public and private schools in the city Juiz de Fora, Minas Gerais. Data were collected regarding on clinical conditions and questionnaires to assess quality of life (Child Perception Questionnaire - CPQ₈₋₁₀ and CPQ₁₁₋₁₄ and AUQUEI - Autoquestionnaire Qualité de Vie Enfant Image) and socioeconomic status, home environment and school performance of schoolchildren. The results showed that the SDH were associated with dental caries and, in particular, the socioeconomic aspects contained higher association with caries experience compared to variables related to the home environment. It was observed also that both socioeconomic aspects of the home environment and the presence of caries lesions, even if treated, were risk factors for poor school performance, and caries experience was an important predictor of changes in QVRSB adolescents over time. On the responsiveness of OHRQoL instruments, it has been found that the questionnaire is presented CPQ₁₁₋₁₄ responsive to longitudinal changes, as evaluated by Longitudinal Construct Validity, but with little change as determined by the effect size analysis. The results also showed that CPQ₁₁₋₁₄ correlated with the generic instrument of quality of life AUQUEI and both were associated with clinical, social and environmental variables. Finally, it was found that treatment of dental caries has impacted positively on improving of OHRQoL, and had good psychometric properties of CPQ₈₋₁₀ for measuring changes over time. In conclusion, from the results of the aforementioned studies, there were associations between SDH and tooth decay, and both were associated with poorer school performance. Likewise, it

was found that the OHRQoL was correlated to quality of life in population. When the students were assessed longitudinally, it was found that caries experience was an important predictor of changes OHRQoL over time in this population, as measured by the Child Perception Questionnaire questionnaires, which showed good psychometric properties of responsiveness to quality of life changes related to oral health. Within this context, access to dental treatment was an important factor in improving the quality of life related to oral health of children living under social vulnerability.

Keywords: quality of life, oral health, social determinants of health, child, adolescent.

RESUMO

O objetivo geral dessa Tese foi avaliar os determinantes sociais da saúde (DSS) associados à saúde bucal, ao rendimento escolar e a qualidade de vida em crianças e adolescentes, além de testar as propriedades psicométricas longitudinais de questionários de Qualidade de Vida Relacionada à Saúde Bucal (QVRSB) e comparar um questionário genérico de qualidade de vida com outro de QVRSB. Para isso, foram usadas duas amostras: uma composta por crianças de 8 a 10 anos, participantes do Programa Sempre Sorrindo (PSS), no município de Piracicaba, São Paulo, e outra composta por escolares de 12 anos provenientes de escolas públicas e privadas do município de Juiz de Fora, Minas Gerais. Foram coletados dados referentes às condições clínicas e aplicados questionários para avaliação da qualidade de vida (*Child Perception Questionnaire* – CPQ₈₋₁₀ e CPQ₁₁₋₁₄ e AUQUEI – *Autoquestionnaire Qualité de Vie Enfant Image*), bem como do nível socioeconômico, do ambiente familiar e do rendimento escolar das crianças. Os resultados demonstraram que os DSS apresentaram associações com cárie dentária e que, em particular, os aspectos socioeconômicos possuíram maior associação com a experiência de cárie, quando comparados com variáveis relacionadas ao ambiente familiar. Observou-se, ainda, que tanto aspectos socioeconômicos, do ambiente familiar e a presença de lesões de cárie, mesmo que tratadas, foram indicadores de risco para o pobre rendimento escolar, e a experiência de cárie foi um importante preditor para mudanças na QVRSB de adolescentes ao longo do tempo. Sobre a responsividade dos instrumentos de QVRSB, verificou-se que o questionário CPQ₁₁₋₁₄ apresentou-se responsivo às mudanças longitudinais, avaliadas pelo critério de *Longitudinal Construct Validity*, mas com pequena alteração quando avaliada pela análise de *effect size*. Os resultados também demonstraram que o CPQ₁₁₋₁₄ apresentou correlação com o instrumento genérico de qualidade de vida AUQUEI e que ambos apresentaram associações com variáveis clínicas e socioambientais. Por fim, verificou-se que o tratamento da cárie dentária impactou positivamente na melhora da QVRSB de

escolares, e o CPQ₈₋₁₀ apresentou boas propriedades psicométricas para avaliar estas mudanças ao longo do tempo. Conclui-se, a partir dos resultados dos estudos supracitados, que houve associações entre DSS e a cárie dentária, e que ambos estiveram associados a um pior rendimento escolar. Da mesma forma, verificou-se que a QVRSB esteve correlacionada à qualidade de vida nesta população. Quando os escolares foram avaliados longitudinalmente, constatou-se que a experiência de cárie foi um preditor importante para mudanças da QVRSB ao longo do tempo nesta população, mensurada pelos questionários Child Perception Questionnaire, que apresentaram boas propriedades psicométricas de responsividade às mudanças de qualidade de vida relacionada à saúde bucal. Dentro deste contexto, o acesso ao tratamento odontológico foi um importante fator para a melhoria da qualidade de vida relacionada à saúde bucal de escolares que vivem sob vulnerabilidade social.

Palavras-chave: qualidade de vida, saúde bucal, determinantes sociais de saúde, crianças, adolescentes.

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EPÍGRAFE

*Conheça todas as teorias,
domine todas as técnicas,
mas ao tocar uma alma humana,
seja apenas outra alma humana.*

Carl Jung

INTRODUÇÃO

As ações de Promoção de Saúde visam à qualidade de vida e de saúde dos indivíduos e, para tanto, devem ter como base os diversos fatores que estão direta ou indiretamente associados a esta condição. Desta forma, é essencial entender que saúde é modulada por fatores sociais, ambientais e culturais, chamados Determinantes Sociais de Saúde (DSS).

De acordo com a Comissão Nacional sobre os Determinantes Sociais da Saúde (CNDSS), “os DSS são os fatores sociais, econômicos, culturais, étnicos/raciais, psicológicos e comportamentais que influenciam a ocorrência de problemas de saúde e seus fatores de risco na população”. Enquanto a Organização Mundial de Saúde adota um conceito resumido: “são as condições sociais em que as pessoas vivem e trabalham” (Buss e Pelegrini, 2007).

Assim sendo, aspectos como nível socioeconômico, a estrutura familiar, as percepções subjetivas dos indivíduos e famílias, o rendimento na escola e a qualidade de vida estão envolvidos neste amplo e complexo modelo de DSS. É preciso reconhecer os problemas, o processo saúde-doença da população, bem como os determinantes sociais de saúde que podem influenciar diretamente no bem-estar e na qualidade de vida da sociedade e dos indivíduos, como indicam alguns estudos transversais (Rootman et al., 2001; Locker et al., 2007; Piovesan et al., 2010; Paula et al., 2012; Paula et al., 2013; Vazquez et al., 2014). Neste sentido, cabe destacar que as medidas de saúde estão interligadas e o uso de um único critério avaliativo o torna muito limitado.

Nos estudos em odontologia é possível encontrar inúmeras afirmações que saúde bucal é considerada um elemento integral da saúde geral e, por sua vez, pode influenciar no rendimento escolar e na qualidade de vida de acordo com os impactos funcionais e psicossociais nos indivíduos (Tesch et al., 2007; Blumenshine et al., 2008; Solans, 2008; Paula e Mialhe, 2013). Especificamente no caso da promoção de saúde bucal, assim como no conceito geral, parte-se do

princípio da necessidade de atuações de prevenção voltadas para os DSS, paralelas ao enfoque curativo, já que as ações exclusivas em educação em saúde são limitadas (Kay e Locker, 1996; Watt, 2004). Esta prática de promoção de saúde aborda suas causas subjacentes na sociedade (Watt, 2004; Pertersen e Kwan, 2010) e, por isso, os comportamentos relacionados à saúde bucal não são apenas ações simples, mas estão envolvidos com as complexas condições socioambientais (Sheiham, 2000; Newton e Bower, 2005; Brennan et al, 2006; Fisher-Owens et al., 2007).

O envolvimento da saúde bucal com determinantes sociais de saúde, rendimento escolar e qualidade de vida vêm sendo apontados nas pesquisas com crianças e adolescentes (Paula e Mialhe, 2013; Kumar et al., 2014). A relação entre qualidade de vida e saúde bucal tem sido motivo de atenção dos profissionais de saúde, principalmente pelos impactos biopsicossociais dos problemas bucais, tais como cárie, doença periodontal e problemas ortodônticos. Tais alterações podem causar dor, desconforto, limitações e outras condições decorrentes de fatores estéticos que afetam a vida social, a alimentação, o exercício de atividades diárias e o bem-estar do indivíduo (Wilson e Cleary, 1995; Leão e Sheiham, 1996), gerando consequências na qualidade de vida (Locker, 1996; Locker, 1998; Paula et al., 2012; Vazquez et al., 2014).

Deste modo, muitos estudos comprovam que a prevalência de doenças bucais, como lesões de cárie, possui relação com aspectos socioeconômicos (Antunes et al., 2002; Locker et al., 2004; Antunes et al., 2004; Newton e Bower, 2005; Pereira et al., 2007; Christopherson et al., 2009; Polk et al., 2010; Benazzi et al., 2012). Contudo, a associação entre saúde bucal e estrutura familiar não se encontra tão bem definida. Sabe-se que a família tem importante impacto nos comportamentos e hábitos em saúde bucal (Antunes et al, 2002; Levin and Currie, 2010; Polk et al., 2010; Castilho et al., 2013), mas a inclusão de aspectos familiares junto com outros determinantes de saúde para definir o impacto na saúde bucal ainda é escassa. Similarmente ocorre com as percepções subjetivas

dos pais em relação à saúde bucal de crianças e adolescentes (Talekar et al., 2005).

Por outro ponto de vista, há evidências de que as condições bucais podem impactar no rendimento escolar de crianças e adolescentes (Muirhead e Marcenes, 2004; Blumenshine et al., 2008; Seirawan et al., 2012; Paula e Mialhe, 2013; de Paula et al., 2014). Estudo indicou que alunos livres de cárie apresentaram-se, em geral, mais atentos às explicações dos professores em sala de aula e com menor dificuldade na realização das tarefas escolares, bem como não apresentaram faltas à escola por motivos relacionados aos dentes, o que não ocorre com alunos que possuem manifestações cáries severas (Colares e Feitosa, 2003). Observa-se, todavia, que estudos avaliando o rendimento escolar de crianças que passaram por tratamento odontológico são insuficientes na literatura científica.

Quanto às pesquisas envolvendo qualidade de vida, estas se baseiam no conceito definido pela Organização Mundial da Saúde como “a percepção do indivíduo sobre a sua posição na vida, no contexto da cultura e dos sistemas de valores nos quais ele vive, e em relação a seus objetivos, expectativas, padrões e preocupações” (WHOQOL Group, 1995). Qualidade de vida compreende, então, um campo multidimensional, uma vez que ela é decorrente de aspectos sociais, econômicos, políticos e culturais de cada sociedade.

Considerando que as doenças já não podem ser mais compreendidas apenas pelos fatores biológicos que as caracterizam, estudos vêm analisando a relação entre qualidade de vida e saúde bucal e concluíram que as doenças bucais exercem impacto sobre os aspectos funcionais e psicossociais dos indivíduos (Jokovic et al, 2002; Jokovic et al, 2004; Gherunpong et al., 2004; Brennan et al., 2006; Marques et al 2006; Do e Spencer, 2007; Biazevic et al., 2008; Agou et al., 2008; Barbosa et al., 2009; Bendo et al., 2010; Paula e Mialhe, 2010). Diante da evidência do impacto da saúde bucal na qualidade de vida, mudanças nos paradigmas estruturantes dos sistemas de saúde têm ocorrido (Gherunpong et al., 2006).

Sob este ponto de vista, observa-se uma tendência de estudos voltados para avaliação das possíveis mudanças nas percepções subjetivas de crianças e adolescentes após o tratamento odontológico. Alguns pesquisadores têm demonstrado uma relação específica entre o tratamento ortodôntico e periodontal e a qualidade de vida relacionada à saúde bucal - QVRSB (Zhang et al, 2007; Zhang et al, 2008; Agou et al, 2008;. Azuma et al, 2008; Mandall et al, 2008; Taylor et al., 2009; Feu et al, 2010; Ohrn et al, 2011). Em relação ao impacto do tratamento para cárie dentária na QVRSB, observa-se que o número de estudos é menor, como os que avaliam a percepção dos pais sobre a qualidade de vida de seus filhos antes e após o tratamento da cárie rampante na primeira infância (Cunnion et al, 2010; Filstrup et al, 2003). Há também pesquisas direcionadas para a avaliação do impacto do tratamento restaurador atraumático na QVRSB (Mashoto et al., 2010; Paula et al., 2012).

Entre os instrumentos desenvolvidos para avaliação da qualidade de vida relacionada à saúde bucal destaca-se um grupo de questionários denominado *Child Oral Health Quality of Life Questionnaires* (COHQoL) desenvolvido por pesquisadores canadenses, constituídos de questionários para grupos etários específicos, como *Child Perceptions Questionnaire* (CPQ₈₋₁₁ e CPQ₁₁₋₁₄) (Jokovic et al., 2002; Jokovic et al., 2004), que avaliam o impacto das desordens bucais sobre a qualidade de vida de crianças entre 8 e 11 anos e 11 e 14 anos respectivamente. Questionários esses que já foram previamente traduzidos e validados para a língua portuguesa (Barbosa et al., 2009).

Os autores Foster Page et al. (2010), Foster Page e Thomson (2012), Turton et al. (2014) e Gururatana et al. (2014) apresentam alguns dos poucos e recentes estudos longitudinais sobre cárie dentária utilizando o CPQ. Deve-se, porém, ressaltar que esta utilização de questionários de QVRSB em estudos longitudinais vem sendo, há alguns anos, discutida na literatura (Slade, 1997; Locker, 1998; Locker e Allen, 2007; Locker e Quinonez, 2011). Por meio deste tipo de pesquisa, avalia-se os chamados *responsiveness* e então é possível testar e estimar a aplicabilidade e fidedignidade destes instrumentos, aspectos ainda não

avaliados até o momento na versão brasileira dos questionários CPQ (Locker et al., 2004; Foster Page et al., 2010; Abanto et al., 2013).

Desta forma, considerando que todos estes fatores (saúde bucal, rendimento escolar e qualidade de vida) parecem ser mediados por fatores socioambientais, os estudos buscam evidências para esta hipótese. Os estudos transversais de Locker et al. (2007), Piovesan et al. (2010), Paula et al. (2012) e Paula et al. (2013), utilizando o CPQ₁₁₋₁₄, apresentam resultados e discussões que abordam aspectos relacionados ao nível socioeconômico, ambiente familiar e qualidade de vida relacionada à saúde bucal. Kumar et al. (2014), em importante revisão de literatura sobre o tema, afirma que ainda há dificuldades em alcançar um consenso na literatura sobre o impacto do nível socioeconômico dos pais e das características do ambiente familiar sobre a QVRSB de crianças. Os mesmos autores indicam a necessidade de investigações longitudinais para definir os fatores preditores de mudanças na percepção de qualidade de vida ao longo do tempo.

A literatura mundial apresenta estudos transversais que avaliaram a associação entre as variáveis supracitadas, porém, estudos longitudinais que apresentam potencial para demonstrar os fatores de risco não foram encontrados até o momento. O conhecimento dos preditores que impactam na QVRSB e no rendimento escolar em crianças e adolescentes poderá permitir aos gestores e profissionais desenvolverem estratégias mais eficazes na atenção em saúde. É preciso abordar os indivíduos não apenas pelas suas características clínicas mas, também, pelo contexto biopsicossocial em que se encontram. Adicionalmente, a avaliação do impacto das condições bucais e QVRSB no rendimento escolar poderão servir como um importante dado para o estímulo ao planejamento de ações intersetoriais entre as áreas da saúde e da educação. Assim como a avaliação da aplicabilidade do questionário em nível longitudinal é essencial para o desenvolvimento de novos estudos e direcionamento de amplas medidas para a promoção de saúde bucal.

Por outro lado, a utilização de um questionário de QVRSB pode restringir a avaliação de alguns aspectos ligados aos DSS. Para se realizar pesquisas sobre qualidade de vida, existem dois tipos principais de instrumentos de avaliação: os genéricos, com abordagem geral das condições de vida; e os específicos, direcionados para determinada condição e capazes de detectar situações especiais, como o impacto das doenças bucais na qualidade de vida. Ambas as medidas subjetivas tem como objetivo avaliar a qualidade de vida relacionada à saúde (QVRS) e envolvem todas as dimensões/domínios do conceito de qualidade de vida: aspectos funcionais (funcionamento físico, emocional e social) e de bem estar (percepções subjetivas).

Fleck et al. (2008) destacam as razões que determinam a importância da avaliação da QVRS, tais como o interesse pelo o autorelato do paciente. Estes desfechos em muitos casos possuem importante peculiaridade, já que nem sempre a avaliação clínica da doença feita por profissional coincide com a percepção do paciente. Os aspectos objetivos de estados de saúde, mediante avaliações clínicas, devem ser associados aos aspectos subjetivos de experiência da saúde para completa descrição da qualidade de vida do paciente e possível direcionamento de ações em Promoção de Saúde.

Entre os instrumentos para avaliação da QVRS em crianças e adolescentes, destaca-se o Autoquestionnaire Qualité de Vie Infant Image (AUQUEI), desenvolvido por pesquisadores da França (Manificat e Dazord, 1997) e validado por Assumpção et al. (2000). Destaca-se, entretanto, o questionamento a respeito da correlação que pode existir entre um questionário genérico e um específico, além do reconhecimento de como os DSS impactam na percepção subjetiva de qualidade de vida geral. Em relação ao AUQUEI e o CPQ¹¹⁻¹⁴, tal questionamento ainda encontra-se obscuro na literatura científica e, até o momento, não foram encontrados estudos abordando este aspecto.

A presente Tese, em formato alternativo e baseada nas normas da Deliberação CCPG-Nº 228/2013, é composta de seis capítulos no formato de

artigo científico e previamente submetidos à publicação. O objetivo geral deste estudo foi avaliar variáveis associadas à saúde bucal, ao rendimento escolar e à qualidade de vida relacionada à saúde bucal (QVRSB) em crianças e adolescentes, além de testar o uso de questionário de QVRSB em estudos longitudinais e a correlação entre um questionário genérico de qualidade de vida com outro de QVRSB.

CAPÍTULO 1¹

THE IMPACT OF SOCIAL DETERMINANTS ON SCHOOLCHILDREN'S ORAL HEALTH IN BRAZIL

Janice Simpson de Paula, Glaucia Maria Bovi Ambrosano, Fabio Luiz Mialhe

Abstract

The aim of this study was to evaluate the impact of socioeconomic status, home environment and self-perception about health conditions on schoolchildren's dental caries experience. In the city of Juiz de Fora, MG, Brazil, a multistage sample of 515 schoolchildren aged 12 years-old were randomly selected. The schoolchildren were examined for the presence of caries lesions using the DMFT index (the number of permanent decayed, missing or filled teeth) and categorized as caries-free (DMFT=0) or with caries experience (DMFT>0). The participants and their parents were asked to answer questions about socioeconomic status, home environment and self-perception of their health conditions. The hierarchical multiple regression model was used to assess the associations, since a binary response variable was assumed. In the results observed, the bivariate analysis revealed that variables at four levels were significantly associated with children presenting worse dental caries conditions, among them school type, monthly family income, parents' education, home ownership, number of people living in the household, household overcrowding, parents' perception of their children's oral health, schoolchildren's self-perception of their oral health ($p<0.05$). Results of the regression model showed that the variables school type and monthly family income had a strong negative effect on schoolchildren's dental caries experience ($p<0.05$) in the final statistical model with all levels included. In conclusion, the socioeconomic variables

¹ Artigo redigido de acordo com as normas do periódico Brazilian Oral Research, submetido e em processo de revisão. (ANEXO 13)

assessed were associated with the schoolchildren's dental experience; therefore, dental health interventions are needed to improve the oral health of this population.

Descriptors: social conditions, oral health, health inequalities, dental caries.

Introduction

Oral health is considered an integral element of overall health and may impact the functional and psychosocial aspects of individuals.¹ Dental caries continues to be one of the most prevalent chronic disease worldwide and studies have confirmed the impact of socioeconomic status on the prevalence of this chronic disease.²⁻⁶

Therefore, studies evaluating the impact of the social determinants of health have fundamental importance in helping public health programmers to reduce health inequalities of oral health of population.^{7,8}

According to the Ottawa Charter '*health is created and lived by people within the settings of their everyday life; where they learn, work, play and love*', highlighting the importance of healthy settings as an infrastructure for health production and maintenance, including schools, worksites, cities, local communities, hospitals.⁹

In 2004 Christensen¹⁰ proposed a theoretical model of the "health-promotion family" for the encouragement of "capacity building for health" of children. It is known that family has a fundamental role in various aspects of children's development (biological, cultural, social) and is considered an important agent of their socialization. Parents are the most significant health role models, impacting the oral health values and behavioral routines of their children. Therefore, family setting is a valuable context for creation and support of children's oral health.^{5, 11}

Socioeconomic aspects of children such as family income, parent's education and home ownership have a large influence on family function, and Locker *et al.*¹² suggest the use of socioeconomic status as a control variable to reveal the associations between oral health and other factors. However, few

studies have evaluated the integration among socioeconomic status, home environment and self-perception of their health conditions in a more complex model in order to test how each one impacts on dental caries in children. Therefore, the use of a conceptual model, as proposed by the study of Fisher-Owens *et al.*⁶, may help researchers to consider a more holistic view of children oral health. This model comprises the influences of “Child-Level”, “Family-Level” and “Community-Level” in children’s oral health. The child-level comprises health behaviors and practices, physical and demographic attributes, biologic endowment, etc. The Family-Level comprises socioeconomic status, family composition, health behaviors, and family culture, among other aspects. The Community-Level comprises physical environment, dental care system characteristics, social environment, social capital, culture, physical safety, etc.

In addition, the use of conceptual models linked to hierarchical analysis in research, in order to define which social and environmental variables (proximal and/or distal) are associated with dental diseases is a new and innovative approach in the literature.¹³ Therefore, a more complex investigation, involving in a hierarchical model, which includes socioeconomic, family and subjective factors provides a more accurate evaluation about the joint action of these aspects in the dental caries experience of schoolchildren.

Much has been discussed about conceptual models of health promotion and social determinants, but it is important to combine this knowledge with epidemiological research in order to produce the best evidence for health managers to develop appropriate oral health promotion interventions for children based on social determinants of health.⁸

Such oral health promotion actions must be planned, based on the complexity of factors that may directly or indirectly influence oral health. Therefore, recognition of the impact of proximal and distal determinants allows point of action of health policies to be defined, which would lead to greater efficacy in the prevention and control of oral disease. This refers especially to dental caries, which continues to be a public health problem in our country/Brazil. Furthermore, it is

pointed out that the decisions in public health must be based on the results of investigations; that is, on practical evidence.^{1,14}

Therefore, it is necessary to consolidate the existent theoretical and conceptual models, based on epidemiologic studies and statistical analyses that include the different aspects, ranging in scope from clinical conditions through to the social determinants of health.⁶

The aim of this study was to evaluate the impact of social determinants of health on the dental caries experience of Brazilian schoolchildren.

Methodology

The research project was submitted to and approved by the Research Ethics Committee (Protocol 055/2009) of Piracicaba Dental School, State University of Campinas. The children's and parents' or guardians' consent was obtained.

This cross-sectional study was realized using a multistage sample of 515 schoolchildren aged 12 years-old from public and private schools, which were randomly selected. The study was realized in city of Juiz de Fora, MG, Brazil, which has 570.000 inhabitants, of whom 98.91% have access to fluoridated water. The details of the sample and methods of collecting data were published in a previous article.¹⁵

The independent variables used in this study were based on Fisher Owens *et al.*⁶ conceptual model of dental caries in schoolchildren, and the hierarchical theoretical framework that guided the statistical analyses was based on the study of Lacerda *et al.*¹⁶, which is shown in Figure 1. Clinical data was based on the number decayed, missing, and filled teeth in the permanent dentition (DMFT index) in accordance with WHO recommendations. Good intra-examiner reproducibility was founded (kappa > 0.91).

The schoolchildren answered a questionnaire concerning their general and oral health perceptions and their home environment. Furthermore, children's

parents answered a questionnaire which contained questions about their children's general and oral health and the socioeconomic status of the family.¹⁵

For statistical analyses the dependent variable selected was the presence or absence of caries disease (DMFT=0 or DMFT>0). The categorization of the DMFT index was based on the studies of Cinar *et al.*¹⁷, Delgado-Angulo *et al.*¹⁸ and Pereira *et al.*². Initially descriptive and bivariate statistics were performed by chi-square test, estimating the odds ratio and the respective confidence interval.

As follows, hierarchical multiple regression analysis was performed by means of mixed generalized linear models, using the "PROC GLIMMIX" procedure, in order to evaluate the associations of the demographic, socioeconomic, family and perception variables with the DMFT. In Model 1, the variable *gender* (demographic) was tested; in Model 2, the socioeconomic variables were included; in Model 3, those pertaining to the *family environment*, and in Model 4, those relevant to the perception of oral and general health. In order to select the variables within each block, which would be tested in the following model, $p < 0.20$ was considered, and analysis of the association among the independent variables to evaluate the multicollinearity. The model fit was assessed by -2 Res Log Likelihood (the lower, the better the model fit) and p-value (≤ 0.05).

The PROC GLIMMIX procedure was used because the modeling of oral health data is rather complex, since these data generally do not present normal distribution. With the development of generalized linear models (an extension of linear models for data not normally distributed) this type of problem has been considerably reduced. However, on many practical occasions, binomial data present overdispersion. The application of mixed generalized linear models has been satisfactorily used in these cases. Therefore, this statistical procedure (GLIMMIX) may adjust models to data that do not present normal distribution, and this has been satisfactorily used in analyses with hierarchic effects. All the analysis was performed using the SAS statistical software program version 9.3.

Results

The Table 1 presents the descriptive data and bivariate analysis. The mean number of decayed, missing and filled teeth in the permanent dentition (DMFT index) was of 1.09 (standard deviation of 1.70). Furthermore, 315 participants presented DMFT=0, i.e. 61.2% were caries free and 200 presented DMFT>0, corresponding to 38.8%.

Considering the bivariate analysis according to the levels evaluated, the first level (demographic) presented no association with worse dental caries experience ($p>0.05$). At the second level (socioeconomic), all the variables evaluated were significantly associated with children presenting worse dental caries experience ($p<0.05$), namely: school type, monthly family income, parent's education and home ownership. At the third level (home environmental), the number of people living in the household and household overcrowding variables were associated with dental caries experience ($p<0.05$). At the fourth level (subjective perceptions), parents' perception of their children's oral health and schoolchildren's self-perception of their oral health were significantly associated with children presenting worse dental caries experience ($p<0.05$)

The results of the hierarchical multiple regression analysis using generalized linear mixed models with the PROC GLIMMIX procedures are shown in Table 2. In Model 1, the variable gender was associated with dental caries experience. In Model 2, with inclusion of the socioeconomic level, the school type and monthly family income had a strong negative effect on the schoolchildren's dental caries experience, and variable gender not contributes in Model 2. In Model 3, the home environmental level was included and the negative effect of the school type and monthly family income on the schoolchildren's dental caries experience was found to remain. In Model 4, involving all levels, the school type and monthly family income were the only variables that had a strong negative effect on the schoolchildren's dental caries experience ($p<0.05$).

Discussion

The relevance of this study for oral health promotion interventions was the analysis of the impact of factors that influenced dental caries experience in schoolchildren in a broader framework including three dimensions (socioeconomic status, home environment and self-perception). Studies assessing factors related to the social determinants of dental caries are in the main stream of the public oral health agenda. The analytical model proposed to include distal and proximal determinants in regression analysis represents an important methodological option for building the model.^{6,13,14,16}

In Brazil, dental caries is still considered a public health problem, particularly in some polarized groups living in worse socioeconomic conditions.^{2,3,4,19,20} In the last national epidemiological survey conducted in Brazil in 2010, a DFMT of 2.1 was observed at the age of 12 years.²⁰ Therefore, the participants of this study, representative of the 12 year-old schoolchildren in Juiz de Fora, presented a better dental caries status (DMFT of 1.09) compared with that from the national survey. However, even in this sample with low prevalence and severity of the disease, differences were observed in caries prevalence between children living in families with higher and lower incomes.

In the hierarchical multiple regression model, we observed that children with family income lower than one minimum wage were 1.89 times more likely to have dental caries experience. This association is corroborated by various studies, highlighting the importance of socioeconomic factors as important determinants for oral health inequalities in 12-year-old schoolchildren.^{2,18,21} However, the present study advances due to the fact of having verified these associations by means of a hierarchical statistical model, including different levels of social determinants of health, and defining the contribution of each of the distal and proximal factors on caries experience.^{6,16}

School environment could influence, facilitate and support healthy choices by providing a physical and mental health setting.²² We verified that children from

public schools had 3.8 more chance of have carious lesions than those from private schools. This association was also found in other study²³ and Piovesan *et al.*²¹ stated that the type of school could be used as an alternative indicator for children's socioeconomic status. In the study of Moreira *et al.*,²⁴ conducted in João Pessoa with 12 to 15-year-olds from public and private schools in the city, whose mean DMFT index was 1.91 (SD=2.51), higher caries prevalence was observed in the children from public schools (51.6%). Similarly, in the studies of Antunes *et al.*²⁵ and Lopes *et al.*²⁶, the type of school and its location were associated with higher prevalence of the disease in 12-year-old schoolchildren. Therefore, it is noted that the results of the present study corroborate the findings in the literature, in addition to providing the innovative information that the fact of the variable *type of school* continues to be associated with caries experience, even after having been included in the hierarchical model together with other levels of evaluation.

Furthermore, mothers of children from private schools had more years of education and consequently reported more oral health care and regular dental visits of their children in comparison with mothers with lower number years of formal education.¹⁷ Benazzi *et al.*²³ evaluated a sample of 724 schoolchildren aged 12 years, from public and private schools schoolchildren in the city of Piracicaba, Sao Paulo, Brazil and verified significant associations between the presence of caries, monthly family income and visiting the dentist.

In this sense, this study reiterates the importance of the home environment as an important social determinant of children's dental caries. According to Shaw²⁷ housing affects the health of its residents and represents one of the key social determinants of health, highlighting the need of intersectorial interventions to promote environmental changes to reduce inequalities in oral health. Antunes *et al.*³ shown that overcrowding was associated with an increased risk for dental caries because it has an inverse relationship with healthy habits of nutrition and hygiene.

As dental caries is a significant public health problem that needs to be addressed, appropriate health promotion policies and actions should be directed to

the social, economic and environmental causes of dental disease at the primary, secondary and tertiary health care levels using strategies at macro, meso and micro levels.^{1,28}

In view of the recurrent theoretical discussions about health promotion and social determinants of health, the results of this study provide important data about the contribution of the social determinants (at their different conceptual levels) on dental caries experience, and for the planning of oral health promotion actions in public health.^{29,30}

Therefore, policies to promote oral health should comprise both upstream and downstream levels of intervention, such as policies of income distribution and other tools for breaking poverty; placing oral health within the primary health care approach; removal of taxes on oral health products, developing infrastructure for oral health services and population-based interventions; outreach oral health care towards vulnerable and poor population groups; intersectorial actions including social participation and empowerment of families and their children; the use of a common risk factors approach, development of personal skills throughout health education, and others.²⁸

Considering the importance of empowerment and knowledge about oral health promotion in population and health professionals, it is essential that research be discussed and disseminated among all to reduce the causes of health inequalities. In particular, health professionals must be prepared to provide subsidies in “health-promoting family”, an essential strategy for oral health of schoolchildren as demonstrated in the course of this research. Moreover, the results in this study corroborate the need of multi-disciplinary approaches for oral health promotion, previously discussed in theoretical studies.^{7,8,23,26}

Limitations of study

Within the limitations of the present study, the sample selected was representative of the population assessed. It is a cross-sectional study and, therefore, no causality between dental caries experience and socio-environmental aspects could be considered. Despite the important associations found between

home environment and dental caries in this research, it would be interesting to include other individual and community factors, such as health behaviors and dental care system characteristics in future studies in this field of research, following the conceptual model proposed by Fischer-Owens *et al.*⁶

Conclusion

In conclusion, the socioeconomic variables assessed were associated with the schoolchildren's dental experience; therefore, dental health interventions are needed to improve the oral health of this population.

Acknowledgements

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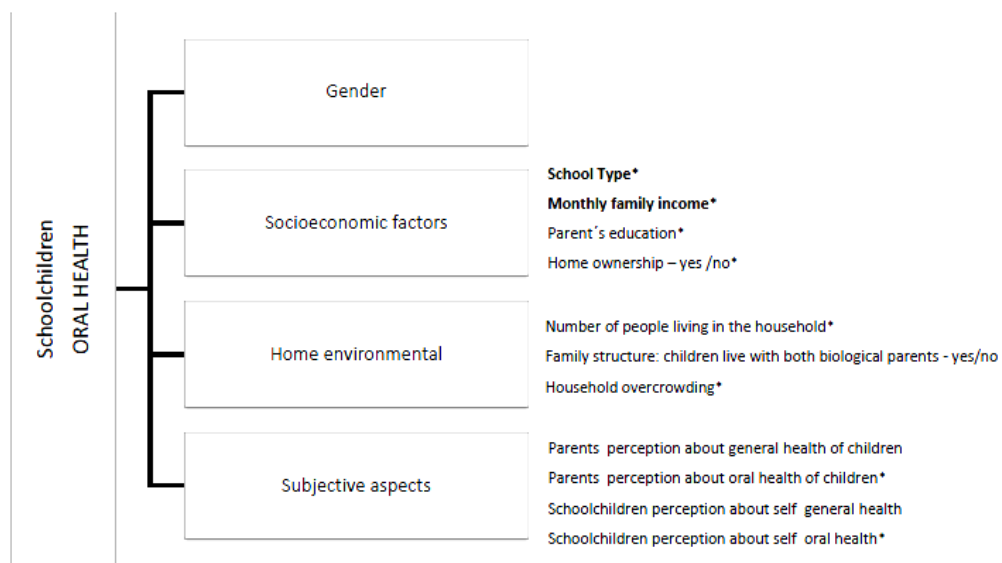
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Figure 1 – Theoretical model adopted in the study



Legend:
 * $p < 0.05$ in bivariate analyses
Bold highlighted the significant results in hierarchical multiple regression ($p < 0.05$)

Table 1 - Bivariate analysis of association of social determinants with caries disease

Variable	DMFT>0		DMFT=0		Bivariate analysis			
	N	%	N	%	OR	CI95%	p-value	
Level 1								
Gender	Male	98	43.5	127	56.5	1.4223	0.9951-2.0327	0.0650
	Female	102	35.2	188	64.8	Ref		
Level 2								
School type	Public	171	47.1	192	52.9	3.7775	2.3989-5.9484	<0.0001
	Private	29	19.0	123	81.0	Ref		
Monthly family income*	≤ 1 minimum wages	63	53.4	55	46.6	2.8636	1.7494-4.6876	<0.0001
	> 1 minimum wages	48	28.5	120	71.5	Ref		
Father's education	≤ 8 years	60	48.4	64	51.6	2.6786	1.5360-4.6712	0.0007
	> 8 years	28	25.9	80	74.1	Ref		
Mother's education	≤ 8 years	64	45.4	77	54.6	0.5402	0.3322-0.8784	0.0177
	> 8 years	98	69.0	44	31.0	Ref		
Home ownership	No	59	45.4	71	54.6	1.6620	1.0288-2.6848	0.0499
	Yes	52	33.3	104	66.7	Ref		
Level 3								
Number of people living in the household	> 4 people	57	46.4	66	53.6	1.7433	1.0769-2.8219	0.0318
	≤ 4 people	54	33.2	109	66.8	Ref		
Children live with both biological parents	No	83	43.0	110	57.0	1.3221	0.9183-1.9033	0.1583
	Yes	117	36.4	205	63.6	Ref		
Household overcrowding	More 1 person per room	41	54.0	35	46.0	2.0629	1.2622-3.2715	0.0051
	≤ 1 person per room	159	36.2	280	63.8	Ref		
Level 4								
Parents' perception of children's general health	fair/poor	12	60.0	8	40.0	2.5303	0.9998-6.4036	0.0753
	excellent/very good/ good	99	37.2	167	62.8	Ref		
Parents' perception of children's oral health	fair/poor	52	51.0	50	49.0	2.2034	1.3411-3.6202	0.0025
	excellent/very good/ good	59	32.0	125	68.0	Ref		
Children's perception of their general health	fair/poor	24	42.8	32	57.2	1.2060	0.6877-2.1149	0.6108
	excellent/very good/ good	176	38.4	283	61.6	Ref		
Children's perception of their oral health	fair/poor	77	46.4	89	53.6	1.5897	1.0916-2.3150	0.0199
	excellent/very good/ good	123	35.2	226	64.8	Ref		

* Minimum wage at the time of data collection, approximately US\$290,00; DMFT = decayed, missing, and filled teeth in the permanent dentition; OR= Odds Ratio; CI = Confidence Intervals

Table 2 – Hierarchical multiple regression models of social determinants associated with caries disease.

Variables	Model 1			Model 2		
	Estimate (EP)	OR	p-value	Estimate (EP)	OR	p-value
Level 1						
Gender						
Male	0.3485 (0.1883)	1.42	0.0559			
Female	Ref					
Level 2						
School type						
Public.				0.9217 (0.3528)	2.51	0.0090
Private	Ref					
Monthly family income						
≤ 1 minimum wages				0.6383 (0.2896)	1.89	0.0275
> 1 minimum wages	Ref					
<i>-2 Res Log Likelihood</i>	688.31			362.97		

* No variable in levels 3 and 4 remained in the model. Level 1 is not entered in model 2.

CAPÍTULO 2²

SCHOOL PERFORMANCE AND ORAL HEALTH CONDITIONS: ANALYSIS OF THE IMPACT MEDIATED BY SOCIOECONOMIC FACTORS

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SUMMARY

Background: Oral problems can cause strong impact on functional, emotional and social aspects of children and adolescents, as well as changes in school performance. **Aim:** to evaluate the associations of subjective perceptions of parents, socioeconomic factors and oral clinical conditions of children with their school performance. **Design:** a case-control design was used with a sample of 1411 schoolchildren aged 8-10 years from city of Piracicaba, São Paulo, Brazil. Clinical conditions were evaluated using the DMFT and dmft indexes. Socioeconomic data were obtained using a questionnaire sent to schoolchildren's parents. School performance was evaluated by the final scores of each schoolchild at the end of the 2011 school year. **Results:** According to the final logistic regression model, the schoolchildren who had carious lesions and underwent curative dental treatment at the beginning of the academic year presented 1.51 more chance of having low performance compared with schoolchildren who had no caries lesions. In addition, socioeconomic and demographic variables were associated with a greater chance of poor school performance. **Conclusion:** socioeconomic factors and presence of caries lesions, even if treated, were risk indicators for poor school performance.

INTRODUCTION

Oral problems can cause strong impact on the functional, emotional and social aspects of children and adolescents. However, maintenance of the oral health of this population still represents a great challenge to professionals and health systems around the world.¹ Whereas a large proportion of this population is engaged in activities in the school context, one has to consider the possibility that the school performance of these schoolchildren may be affected by several factors, such as psychological, socioeconomic, family environment, and also clinical conditions.²⁻⁵

Therefore, concern about school performance and its relationship with chronic systemic diseases has been investigated in recent years.^{3,6} As regards oral

health, one of the first studies evaluating its association with school performance was conducted by Gift et al.⁷ in 1989, who found that 117,000 hours of school were lost per 100,000 school-age American children, and 17,000 days of activity, apart from work and school time, were restricted per 100,000 individuals. Since then, other studies have been developed with different methodologies and have also found associations between oral health diseases and school performance and/or lost school days.^{3,4,8-13}

Blumenshine et al.¹⁴, for example, found that American children who have both poor oral and general health were 2.3 times more likely to report poor school performance, while Seirawan et al.¹⁵ verified that 11% of American students without access to needed dental care missed school, compared with 4% of those with access. Therefore, it is important for oral health programs to be developed for schoolchildren, to provide them with a better quality of life, in addition to physical and psychological conditions to improve their school performance.¹⁵

On the other hand, due to the complexity of the factors involved in poor school performance, in the analysis of association between oral health and school performance is necessary to consider the confounding variables, such as subjective perceptions, socio-environmental conditions, family aspects, and others, which may differ from one region or country to another.^{12,13,16-20} The existing studies to date are observational and cross-sectional⁷⁻²⁰, and all of them have verified associations between the presence of dental caries or self-reporting of poor oral conditions with poor school performance or more lost days in school due dental problems.^{3,12,13,16-20}

Therefore, inclusion of the aspects related to social determinants of health in the models of analysis with the aim of investigating the associations between health and school performance will allow us a better understanding of the interrelationships between these variables. This kind of analysis could allow us to define if the association between oral health and school performance is maintained in the model even after the inclusion other socioeconomic factors, as observed in

other studies.^{4,7,14,15,19} In some of these published studies, oral health was measured through clinical examination, included caries and periodontal indexes.^{9,10-12,15,17} In others, subjective reports of parents¹⁴ or schoolchildren^{8,11} were assessed through questionnaires. In relation of children's school performance, studies have evaluated it through statements from schoolchildren or their parents^{8,11,12,14} or governance source for evaluating children's school performance through national standard achievement.^{9,10,15,17}

The aim of the present study, with case-control design, was to evaluate associations among variables related to the subjective parent's perception about their children general health, oral health, oral hygiene and school performance, the socioeconomic conditions and oral health status of children with their school performance.

MATERIAL AND METHODS

The project was approved by the Research Ethics Committee (No. 111/2010) of the Piracicaba Dental School, University of Campinas, Brazil. The inclusion of children and parents to participate in this study depended on obtaining written permission from the children's parents for this purpose.

Study design

In this investigation, a case-control design was used with a sample of 1411 schoolchildren aged 8-10 years from the 9 schools participating in the Program Always Smiling (PAS), in the city of Piracicaba, São Paulo, Brazil. Piracicaba presents 55 primary schools with a total of 10,155 schoolchildren in the age group 8-10 years enrolled in 2011. The nine public schools participants of PAS have in common their location on the periphery of the city, providing preventive and curative dental care for children. All schoolchildren in the age group 8-10 years participants of the PAS were invited to participate in this study. Characterization of the population and description of sample calculation was detailed in a previous study, considering a power of 90%, with an odds ratio of 1.5 and percentage

response from unexposed group of 35%.²¹ The case-control design was chosen with the aim of evaluating the risk indicators related to cases (poor school performance).

The gender of schoolchildren and clinical data as regards the presence or absence of caries and gingivitis were obtained at the beginning of the year 2011. Clinical examination was performed in accordance with the World Health Organization criteria²² and was conducted by previously calibrated dental practitioners of PAS. The intra and inter-examiner reliability was considered good (higher than 0.85).²¹ The data referring to caries experience were evaluated using the DMFT and dmft indexes (decay, missing and filled permanent and deciduous teeth). The presence of gingivitis (bleeding) was established in accordance with the WHO recommendations for evaluation in children.

Data about parents' perception about their children health and the socioeconomic conditions were obtained by means of questionnaires sent to the schoolchildren's parents. This instrument, which has been used in previous studies^{14,20}, presented questions on the parent's perceptions of general health, oral health, oral hygiene and school performance of their children (with response options: "excellent", "very good", "good", "fair", "bad"). Furthermore, for socioeconomic characterization of the sample, parents were asked about monthly family income, measured by the number of minimum wages of the family (more or less of one wage); parent's education level, categorized by number of years in school (more or less than eight years); occupation of parents (Unemployed or employed); home ownership (yes or no); government assistance (yes or no), number of residents in the house (more or less than four persons), children living with both biological parents (yes/no) and schoolchildren's caregivers outside of school hours (father and/or mother or others-e.g. grandparents/ neighbors).²¹

School performance was evaluated by the final grades of each schoolchild at the end of the 2011 school year. The final scores of each discipline (Portuguese, Mathematics, Science, History and Geography) were added together to obtain the mean result of the sample, according to the same methodology used in other

studies.^{15,19,23} The final scores used to determine the school performance corresponded to the evaluations carried out by the schools, according to the criteria established by the municipal secretary of education. The schoolchildren with final scores equal to or lower than mean were considered "cases" and the schoolchildren with final scores above the mean were considered "controls", according to the methodology of design and analysis proposed by Ozmert et al.²

Data Analysis

To identify the independent variables (subjective parent's perception of their children general health, oral health, oral hygiene, the socioeconomic and oral clinical conditions of children) associated with the poor school performance of children, evaluated by final scores in the school and dichotomized in cases and controls, according the mean values found, those variables that showed p -value ≤ 0.20 in the assessment of association with each outcome (Bivariate analyses) were included in the final model. The logistic regression model was adjusted estimating the Odds Ratios (OR), their 95% confidence intervals (CI), and significance levels. All statistical tests were performed using the SAS software program (SAS institute Inc 2001, version 9.2, Cary, North-Carolina/USA).

RESULTS

Of the 1411 school initially contacted, 81.5% participated in the study ($n = 1149$). The loss of 262 students (18.5%) was due to many of them having changed schools and even moving to another city. The case group (final score equal to or lower than mean) was composed of 563 schoolchildren and the control group (final score above mean), of 586 schoolchildren.

Of the 1149 school children in the final sample, 589 were female and 560 were male. It was also observed that 490 of the schoolchildren had carious lesions at the beginning of the school year (D and/or d components of DMFT and/or dmft indexes > 0) while 659 had no caries lesions (D and/or d components of DMFT

and/or dmft indexes = 0). All children with caries lesions underwent curative treatment during the year 2011.

The mean final score (dependent variable) among schoolchildren was 34 (standard deviation 9.81), and according to this, the schoolchildren were divided into cases (equal or below mean) and control (above mean). According to the Table 1, the schoolchildren with presence of caries at the beginning of 2011 whose parents' perceptions of their oral health, dental hygiene and school performance were fair or bad, had higher chances of a final score be below mean ($p < 0.05$ in bivariate analysis of logistic regression).

Table 2 presents the socioeconomic variables associated with poor school performance, according to the bivariate analysis of logistic regression: income less than 1 minimum wage, father's and mother's education equivalent to fewer than eight years of schooling, receiving government assistance, more than 4 people living in the house, and children not living with both biological parents.

Finally, according Table 3, the variables that continued in the final logistic regression model and were associated with below average school performance were: gender, caries lesions without treatment at the beginning of 2011, income, mother's education, number of residents in the house and children living with both biological parents. From the Odds Ratio and Confidence Interval values, it could be inferred that female gender was a protective factor for final scores above the mean. The children who had caries (D component of DMFT and / or d component of dmft index > 0) and who consequently, underwent curative dental treatment in the Always Smiling Program presented 1.51 more chances of having a final score below the mean, in comparison with schoolchildren had no caries in early 2011. Moreover, socioeconomic factors variables related to income up to 1 minimum wage, mother's education equivalent to up to eight years of schooling, four or more residents living in the house and the fact of children not living with both biological parents were associated with an increased chance of children present an academic performance below the mean scores of the sample in the final model.

DISCUSSION

The results of this study provided important information on the association between social determinants, oral health and school performance in a statistical analysis model that simultaneously included socioeconomic factors and oral clinical variables. It should be highlighted that although socioeconomic factors remained in the final regression model, the presence of caries remained strongly associated with children in the case group (with a mean of final scores below the sample mean). This finding reinforces the evidence of the impact of oral diseases, particularly dental caries, on poor school performance in the children, in conjunction with factors related to the social determinants of health.

There seems to be a complex mechanism by which oral health affects school performance. These associations may be mediated by the impact that oral alterations have on the functional and psychosocial aspects of children and adolescents, and that affects their systemic health, self-esteem and cognitive aspects. Thus, oral health interferes with psychosocial aspects of the schoolchildren, which, in turn, impacts on their daily activities, including their school performance.^{24,25} This fact was corroborated by the study of Piovesan et al.¹⁹, which verified that oral health-related quality of life was an important variable associated with a number of higher school days missed and lower school performance. Thus, oral problems can cause deterioration in all quality of life domains which, in turn, can worsen the academic performance of adolescents.

Furthermore, the main highlight of this study was that in spite of carious lesions being treated during the school year, schoolchildren who presented the disease at the beginning of the academic year (2011) showed a lower median school performance compared with children without caries lesions. This demonstrated that even after treatment, the experience of active disease continued to be an important risk indicator for poor school performance. Complementary to the findings of this research, another research found that school performance was an important risk indicator for the existence of need for dental treatment, even when controlling for other factors of deprivation such as family income and parental

education.^{4,9-11,27} Therefore, it can be used as an important variable for the non-clinical prioritization of schoolchildren who should receive treatment in dental care programs.

In regard to the socioeconomic factors involved in school performance, Seirawam et al.¹⁵, in a study with students of Los Angeles Country Public Schools, found associations between socioeconomic characteristics of schoolchildren, toothache in the last six months and poor school performance. In the present study, we found associations of the variables gender and family income with poor school performance. Piovesan et al.¹⁹ also found that these same socioeconomic characteristics were associated with the performance of schoolchildren aged 12 years, measured by the test score in Portuguese. Blumenshine et al.¹⁴ conducted telephone interviews with the parents of schoolchildren and also concluded that socioeconomic parameters were related to poor school performance. However, this investigation advances by including other socioeconomic factors in the analysis model, which were not assessed together in the aforementioned studies. Here, we also found that the mother's education, number of residents in the house and with whom the child lives (father and mother or others) were also associated with school performance, which advances our knowledge about the variables involved in this scenario.

Certainly, the family is considered an important variable for the school performance of children and adolescents.²⁸ Özmert et al.² in their study, found associations between mother's education and school performance of their schoolchildren, explaining the impact of mother's education on the child's cognitive development.

Considering the results of the present study, it is evident that actions involving the sectors of education and health are essential to improve school performance and absenteeism, since the socioeconomic factors and oral health conditions were identified as risk indicators for poor performance in schoolchildren. Therefore, one realizes the importance of interdisciplinary public policy, including health, education and social programs^{13,29} that focus on the social determinants of

health with the aim of impacting on general⁶ and oral health, thus improving the quality of life as well the school performance of children and adolescents.^{10,19,20}

Furthermore, this study emphasizes the importance of schoolchildren having access to dental care programs at school, so that the damage caused by oral diseases does not impact their quality of life and school performance, and lead to psychological problems and possible consequences in their adult life, as pointed out by Kumar et al.³⁰ Therefore, where possible, these programs should direct their actions to preventing the onset and development of oral diseases, because children without diseases had more chance of obtaining the best mean scores at school.

This study has some limitations. The fact that it was a case-control and not a cohort study did not allow us to investigate the risk factors and causal relationships for better or worse school performance over time and after dental treatment. Additionally, the sample consisting of children coming only from peripheral public schools participating of PAS, which does not allow us to make inferences of our findings for children of all socioeconomic levels. The absence of a single and standardized test to evaluate school performance in every school can also be considered a limitation, although the type of evaluation in public schools be like.

In conclusion, socioeconomic factors and the presence of caries lesions, even if treated, were risk indicators for poor school performance.

BULLET POINTS

- The results of this study guide the actions of oral health promotion in the school setting for prevention,
- Access to curative treatment for children who had caries lesions have low academic performance compared to educational free of caries.
- The intersectoral working between health professionals and education should focus on healthy eating habits and hygiene inside and outside of school.

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Table 1 - Means of final scores of disciplines of Portuguese, Mathematics, Science, History and Geography scores of schoolchildren participants in “Program Always Smiling” according to following variables: demographic, clinical conditions, and subjective perceptions of parents. (n=1149)

VARIABLES	CATEGORIES	Bivariate analysis						
		BELOW MEAN (≤34)		ABOVE MEAN (>34)		OR	CI95%	p
		n	%	n	%			
Gender	Female	260	44.1%	329	55.9%	0.67	0.53-0.84	0.0009
	Male	303	54.1%	257	45.9%	Ref		
Caries lesions without treatment at the beginning of 2011	Yes	276	56.3%	214	43.7%	1.17	1.32-2.11	<0.0001
	No	287	43.6%	372	56.4%	Ref		
Gingivitis	Yes	37	46.3%	43	53.8%	0.89	0.56-1.40	0.6936
	No	526	49.2%	543	50.8%	Ref		
Parents’ perception of children’s general health	Fair/Poor	57	58.2%	41	41.8%	1.55	1.01-2.36	0.0503
	Excellent/very good/good	473	47.3%	528	52.7%	Ref		
Parents’ perception of children’s oral health	Fair/Poor	296	55.7%	235	44.3%	1.75	1.38-2.22	<0.0001
	Excellent/very good/good	239	41.8%	333	58.2%	Ref		
Parents’ perception of children’s oral hygiene	Fair/Poor	270	53.0%	239	47.0%	1.41	1.11-1.78	0.0054
	Excellent/very good/good	266	44.5%	332	55.5%	Ref		
Parents’ perception of children’s school performance	Fair/Poor	144	80.9%	34	19.1%	5.73	3.86-8.51	<0.0001
	Excellent/very good/good	398	42.5%	539	57.5%	Ref		

OR=Odds Ratio; CI= Confidence Intervals

Table 2 - Means of final scores of disciplines of Portuguese, Mathematics, Science, History and Geography scores of schoolchildren participants in “Program Always Smiling” according socioeconomic factors. (n=1149)

VARIABLES	CATEGORIES	Bivariate analysis						
		BELOW MEAN (≤ 34)		ABOVE MEAN (> 34)		OR	CI95%	p
		n	%	n	%			
Monthly Family Income	≤ 1 minimum wage*	177	58.2%	127	41.8%	1.74	1.33-2.27	<0.0001
	> 1 minimum wage	346	44.5%	432	55.5%	Ref		
Father’s education	≤ 8 years	266	51.1%	255	48.9%	1.66	1.25-2.21	0.0006
	> 8 years	121	38.5%	193	61.5%	Ref		
Mother’s education	≤ 8 years	375	55.4%	302	44.6%	1.92	1.49-2.45	<0.0001
	> 8 years	169	39.3%	261	60.7%	Ref		
Home ownership	No	227	51.2%	216	48.8%	1.17	0.92-1.49	0.2099
	Yes	325	47.2%	363	52.8%	Ref		
Government assistance	Yes	182	57.4%	135	42.6%	1.61	1.23-2.08	0.0005
	No	373	45.6%	445	54.4%	Ref		
Number of residents in the house	> 4 persons	466	50.3%	460	49.7%	1.45	1.06-1.98	0.0233
	≤ 4 persons	81	41.1%	116	58.9%	Ref		
Children living with both biological parents	No	225	54.7%	186	45.3%	1.68	1.32-2.14	<0.0001
	Yes	316	44.9%	388	55.1%	Ref		
Father’s occupation	Unemployed	54	50.5%	53	49.5%	1.23	0.82-1.84	0.3630
	Employed	338	45.2%	409	54.8%	Ref		
Mother’s occupation	Unemployed	230	48.8%	241	51.2%	1.05	0.82-1.34	0.7032
	Employed	281	47.5%	311	52.5%	Ref		
Schoolchildren’s caregivers outside of school hours	Others	246	49.7%	249	50.3%	1.09	0.86-1.38	0.5001
	Father and/or Mother	292	47.5%	323	52.5%	Ref		

OR=Odds Ratio; CI= Confidence Intervals

* Minimum wage at the time of data collection, approximately US\$ 290,00

Table 3 – Final Logistic Regression model in means of final scores of disciplines of Portuguese, Mathematics, Science, History and Geography scores of schoolchildren participants in “Program Always Smiling” according following variables: subjective perceptions of parents, socioeconomic factors and oral clinical conditions of children. (n=1149)

VARIABLES	CATEGORIES	Logistic analysis						
		BELOW MEAN (≤ 34)		ABOVE MEAN (> 34)		OR-adjusted	CI95%	p
		n	%	n	%			
Gender	Female	260	44.1%	329	55.9%	0.66	0.51-0.85	0.0013
	Male	303	54.1%	257	45.9%	Ref		
Caries lesions without treatment at the beginning of 2011	Yes	276	56.3%	214	43.7%	1.51	1.17-1.96	0.0016
	No	287	43.6%	372	56.4%	Ref		
Monthly Family Income	≤ 1 minimum wage*	177	58.2%	127	41.8%	1.43	1.06-1.93	0.0184
	> 1 minimum wage	346	44.5%	432	55.5%	Ref		
Mother’s education	≤ 8 years	375	55.4%	302	44.6%	1.65	1.26-2.16	0.0003
	> 8 years	169	39.3%	261	60.7%	Ref		
Number of residents in the house	> 4 persons	466	50.3%	460	49.7%	1.54	1.08-2.18	0.0157
	≤ 4 persons	81	41.1%	116	58.9%	Ref		
Children living with both biological parents	No	225	54.7%	186	45.3%	1.47	1.12-1.94	0.0057
	Yes	316	44.9%	388	55.1%	Ref		

OR=Odds Ratio; CI= Confidence Intervals; * Minimum wage at the time of data collection, approximately US\$ 290,00

CAPÍTULO 3³

IMPACT OF ORAL DISEASES, SOCIOECONOMIC AND FAMILY ENVIRONMENT VARIABLES IN ORAL HEALTH RELATED QUALITY OF LIFE IN ADOLESCENTS: A LONGITUDINAL ANALYSIS

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ABSTRACT

Background: The objective of this study was to investigate the impact of oral diseases, socioeconomic status and family environment factors on changes in perceptions oral health related quality of life in adolescents (OHRQoL). **Methods:** A prospective cohort study was conducted in Juiz de Fora, Minas Gerais, Brazil. The baseline sample was composed by schoolchildren aged 12 years from 22 public and private schools, selected according a random multistage sampling design. They were clinically examined for dental caries experience (DMFT and dmft index), presence of bleeding and orthodontic treatments needs (DAI index). The adolescents were asked to complete the Brazilian versions of Child Perceptions Questionnaire (CPQ₁₁₋₁₄). In addition, a questionnaire was sent to their parents inquiring about their socioeconomic status and family environmental. After a period of three years, the adolescents were again contacted to participate in the research. To determine which independent variables act on OHRQL, logistic regression models were used, considering explanatory variables individually and jointly in the model. **Results:** The final result of the logistic regression demonstrate that only variable the DMFT variable explaining part of the response variability of overall scores of CPQ₁₁₋₁₄. **Conclusion:** It is concluded that the caries experience was a predictor for OHRQoL in adolescents over 3 years.

Key-words: caries experience, quality of life, oral health, adolescents, cohort study, risk factors.

Background

Currently research in Dentistry have shown the role of oral health status on quality of life, conceptualized as a multidimensional field that includes functional limitations and wellbeing [1,2].

For children and adolescents, associations between oral diseases and oral health-related quality of life (OHRQoL) have been observed in several cross-sectional studies [3-13]. However, prospective cohort studies in this area are still

scarce, although considered very helpful in investigation the potential causes of a health condition [14].

Moreover, the social determinants of health such as socioeconomic conditions and family environment characteristics have also been linked to oral health in children and adolescents [15-19]. However, to date, few studies, such as Locker [20]; Piovesan et al. [21] and Paula et al. [12,13], evaluated the association between these variables jointly and OHRQoL and found that factors such as economic aspects of family and education level of parents can influence the subjective perceptions health of schoolchildren.

Specifically in relation to family environment, studies evaluating associations between clinical status and oral health behaviors found that the family exerts strong influence on the knowledge and attitudes about oral hygiene of children and adolescents [22,23]. Moreover, there is already evidence that aspects of the family environment are related to OHRQoL [12,13,21].

Talekar et al. [24] observed in children 2-5 years of age that the oral diseases and perceived need of treatment was significantly associated with parents' perceptions of their children's oral health and low family income. In the same tendency, but with children of 12 years, Paula & Mialhe [25] observed associations between perceptions of parents about their children's oral health and OHRQoL of these. In a recent systematic review study on the theme, Kumar et al. [26] found that there are difficulties in reaching a consensus in the literature regarding the results of the studies about the impact of parental socio-economic status and home environment characteristics on children's OHRQoL due to the differences in the study population, parental characteristics considered, methods used and statistical tests performed. Furthermore, the authors verified that most of the studies were of cross-sectional design, and there was a scarcity of evidence from longitudinal studies investigating the impact of oral health, socioeconomic and family factors in the worsening or improvement in quality of life over time in children and adolescents [26-28].

To our knowledge, so far only the study of Foster Page & Thomson [29] realized in New Zealand, investigate association between caries increment and OHRQoL in adolescents in a follow up of 3 years. In spite the authors verified an increased on caries experience, the OHRQoL of adolescents was not strongly affected as expected.

Therefore, the objective of this study was to investigate, through of prospective cohort study, the impact that factors related to oral diseases, socioeconomic status and family environment presents on changes in OHRQoL of Brazilian adolescents.

Methods

This study was approved by Ethics Committee on Research of the Faculty of Dentistry, University of Campinas, with Protocol number 147/2012 and the consent of parents was obtained.

The initial sample consisted of 286 students, representative of the population of 12 years of public and private schools in the city of Juiz de Fora, MG, Brazil, calculated by the technique of conglomerate, which were examined in 2009. Previous studies by the authors present in more detail the sample size calculation and the inclusion and exclusion criteria used at baseline [13]. After a period of three years, the adolescents were again contacted to participate in the study.

Measures

The OHRQoL was the dependent variable of the study and was measured through the Child Perceptions Questionnaire - CPQ₁₁₋₁₄ [30]. Locker [31] presents different methods for assessing changes self-perceive in oral health, such as the OHRQoL, and affirm that the change between baseline and follow-up scores can be used as the dependent variable in analyzes which aim to identify predictors of change, such as socioenvironmental aspects and personal characteristics of participants in baseline.

The CPQ₁₁₋₁₄ questionnaire has been translated and validated for the Brazilian population by Barbosa et al. [32], showing good psychometric properties. It consists of 37 questions divided into four domains: oral symptoms, functional limitations, emotional well-being and social well-being. Their responses are presented in Likert scale ("Never" = 0; "Once or twice" = 1; "Sometimes" = 2; "Often" = 3; and "Very often" = 4) in which higher values represent worse OHRQoL.

For purposes of data analysis at the moment of follow up (2012), the OHRQoL was categorized as "no improvement" and "improvement", according to the methodology proposed by Locker et al. [33]. For this, the value of the total score CPQ₁₁₋₁₄ was calculated by subtracting the baseline value by follow-up, and it was obtained negative or zero results (no improvement = no deterioration or maintenance) and positive results (improvement).

The independent variables were obtained at baseline through application of a questionnaire and clinical evaluation conducted in 2009. According to previously described methodology [13], a questionnaire was sent to parents with questions about education (below or above 4 years of study) and home ownership (yes or no). To the adolescent were administered a questionnaire containing questions about gender (male or female), number of siblings (none or more than one) and their perception of their oral health (excellent/very good/good or poor/very poor).

For purposes of clinical assessment of adolescents, clinical examinations were performed by two calibrated investigators (intra-examiner kappa greater than 0.91), based on recommended criteria by the World Health Organization [34]. The presence of bleeding and the number of decayed, missing and filled teeth (DMFT index) were evaluated under natural light in the school environment by an evaluator. Another evaluator carried out the assessment of malocclusion made based on the DAI index (Dental Aesthetic Index), in which the total score obtained was dichotomized with and without orthodontic treatment, respectively, <31 and ≥ 31, according to criteria described by Estioko et al. [35].

Data Analysis

The descriptive presentation of the data was made and after compared the proportions of the sample characteristics at the time of the baseline and follow-up through of chi-square test (significance level 5%). Analysis for independent variables individually was undertaken to estimate crude effects of dental care on change of OHRQoL and to find potential confounders.

The logistic regression is a statistical technique that aims to produce, from a set of observations, a model that allows the prediction of values taken by a categorical variable, often binary, from a number of independent variables (explanatory) discrete and / or continuous. More details on the logistic regression model can be obtained in Hosmer and Stanley [36].

To determine which independent variables act on the dependent variable (response) logistic regression models were used, considering explanatory variables individually and jointly in the model. Analyses were performed with SAS software using the procedure logistic and for conjoint analysis, we used the stepwise method of variable selection.

Results

The sample at follow-up was composed of 170 students and it was observed that over the three years there has been a loss of 40.5% of the sample, mainly due to the fact many adolescent have changed school, city and abandoned the search. Of total of schoolchildren followed until 2012, 92 (54.1%) were female and 78 gender (45.9%), male.

Regarding clinical conditions, DMFT index increased from 1.01 (SD 1.69) in 2009 to 1.66 (SD 2.19) in 2012, an increase of 64.3% on mean decayed missing and filled teeth. According to the DAI index, we observed that 131 schoolchildren did not need treatment orthodontic in 2012 (77.1%) and in 2009 this number was 161 (94.7%).

Table 1 shows the descriptive results regarding the sample accompanied at the time baseline and follow-up, as the result of the chi-square test comparing the

proportions are presented. It is observed that only the proportion of responses about caries experience (DMFT>0), presence of bleeding and orthodontic treatment need were statistically different when comparing baseline and follow-up. It is observed that there was no statistically significant difference between baseline and follow-up in the proportions of socio-environmental characteristics. This finding allows us to affirm that the sample studied maintained their characteristics over the three years between baseline and follow-up.

The results of the analyzes, considering the individual independent variables are presented in Table 2, in which it is observed that only the variable caries experience (DMFT>0) showed statistically significant associations with OHRQoL.

Table 3 presents the final results of the logistic regression. We found that only DMFT variable explaining part of the variability in response of OHRQoL (by overall scores CPQ₁₁₋₁₄). The results of analysis considering only the selected variable by stepwise method, and thus, the probability of adolescent shown improvement in OHRQoL was expressed by the formula:

$$\hat{p} = \frac{\exp(-0.2151 + 0.7920 * DMFT)}{1 + \exp(-0.2151 + 0.7920 * DMFT)}$$

So, the mean response adjusted for DMFT > 0 (individuals with caries experience in 2009) is given by 0.4464, i.e., this is the probability that an individual of this group have improved their OHRQoL. Considering DMFT = 0, ie, an individual that was free from caries in 2009, the probability of improvement of OHRQoL increases to 0.6403.

The odds ratio was obtained by OR = exp(0.7920) = 2.21, which means that the chance of an individual caries-free in 2009 have improved their OHRQOL increases by 22.1% compared to individuals with caries experience (DMFT >) in 2009.

Discussion

To our knowledge, this is the first study in Brazil that used a longitudinal observational design of three years to evaluate changes in OHRQoL for adolescents using the CPQ₁₁₋₁₄ questionnaire. Furthermore, it is inedited to include at the same time in an evaluation model of changes in oral health related-quality of life over time the social, family and clinical variables of adolescents

Longitudinal studies already published about OHRQoL generally has focused on changes in their scores after orthodontic dental treatments, periodontal [37-43], early childhood caries, according to the perceptions of parents [44-45] or after atraumatic restorative treatment [46,47]. However, assessments of the natural accompaniment of the changing perceptions adolescents related to their OHRQoL over time process is rare in the literature. Similar study methodology was found only in the research of Foster Page and Thomson [29].

According to the results, we found that the caries experience at baseline was a predictor of changes in OHRQoL of adolescents who remained in the final model. However, the same trend was not found for Foster Page and Thomson [29] who found no associations between caries experience at baseline and changes in OHRQoL. However, a direct comparison of a study conducted in Brazil and another in New Zealand must be made with reservation, since these are very different social, environmental and cultural conditions among populations and divergent clinical profiles that can greatly influence the OHRQoL along time [26].

In this way, the numerous psychosocial changes over three years that may interfere with the clinical condition, the cognitive development and the perception of quality of life of adolescent may be mediated by broader contextual factors [28,48]. Therefore, it is important to the health professionals to know how these chains of risk will tend to impact in a cumulative way on the clinical and psychosocial development of adolescents, in order to plan continuum interventions across the life-course to address the broader determinants of health [49].

Moreover, research shows that other psychosocial aspects, such as self-esteem, social capital and sense of coherence are associated with behaviors and

oral clinical changes [28,50-53]. Thus, although these variables was not evaluated in this study, they may play a mediator role between caries experience (DMFT index) and changes in OHRQoL over time, as observed in the present study.

Several authors emphasize the importance of incorporate socioeconomic variables in longitudinal assessments of OHRQoL, as they influence the construction of the subjective perception of OHRQoL [1,2]. For this purpose, the present study included this variable in the regression model, in order to determine its strength as predictors in improvement or deterioration in OHRQoL. It's interesting to note that, despite cross-sectional studies have found associations between socioenvironmental conditions and OHRQoL [12,13,26,54], the present study has a longitudinal design, found that the only the caries experience of the baseline that remained as a predictor of OHRQoL, after three years, and highlighting the strong impact of clinical conditions over time in OHRQoL. This fact highlights to the importance of health professional use a sociodental approach, through normative and subjectives variables, to evaluate and implement oral health actions with adolescents [8,20,55].

On the other hand another malocclusion despite clinical variable to be included, it was found that it was not a predictor for changes in OHRQoL after 3 years. In our view, this may have occurred because the proportion of adolescents assessed at baseline and at follow-up that they had needs for orthodontic treatment was much lower than those requiring treatment for dental caries. Differed from the study of observational profile, clinical studies with assessments post-orthodontic treatment, show divergent results of this study, as they conclude that aspects of malocclusion impact on OHRQoL [37-43]. However, this comparison between different design studies should be made with caution, since the intervention with dental treatment can determine change in OHRQoL much clearer and relatively expected as opposed to observational evaluation with no interference of researcher.

From the point of view salutogenic [56], in which the focus is on protective factors to prevent specific illness or disease, we found that the totally caries-free

schoolchildren at baseline (DMFT equal to zero) possessed more likely to have improvement in their OHRQoL from 12 to 15 years old than their counterparts. This finding makes us reflect on the importance of preventive and health-promoting with adolescents, since it is known that this age group is more vulnerable to the presence of caries [29,34]. Furthermore, aspects at the sense of coherence (SOC) and general resistance resources (GRRs), claiming that peoples' life orientation will have an impact on health should be used in planning health-promoting interventions for this age group in order to promote improvements in OHRQoL [51].

The results of this study should be evaluated with caution since one of the limitations was that we use the total value of CPQ₁₁₋₁₄ instrument as the dependent variable, and not by domains. Furthermore, the sample loss should be evaluated carefully because even considering the difficulty in gathering the sample again after three years, it was possible that adolescents with better health was more interested in participate in research and in their own oral health in relation to that adolescents that were not found or did not want to continue participating.

Conclusion

It is concluded that the caries experience was a predictor for worsening OHRQoL over 3 years.

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Table 1 - Descriptive data of the sample followed (n = 170) and comparison between proportions of clinical characteristics, socio-environmental and perceptions of parents in moments Baseline and Follow-up.

		2009		2012		Chi-square test to compare proportions	
		n	%	N	%	X ²	p
D of DMFT	> 0	29	17.1%	34	20.0%	0.487	0.5766
	= 0 (without carie)	141	82.9%	136	80.0%		
	TOTAL	170	100.0%	170	100.0%		
DMFT	> 0	56	32.9%	77	45.3%	5.446	0.0262
	= 0 (without caries experience)	114	67.1%	93	54.7%		
	TOTAL	170	100.0%	170	100.0%		
Bleeding	Yes	21	12.4%	34	20.0%	3.666	0.0772
	No	149	87.6%	136	80.0%		
	TOTAL	170	100.0%	170	100.0%		
Orthodontic treatment need	Yes	39	22.9%	9	5.3%	21.832	<0.0001
	No	131	77.1%	161	94.7%		
	TOTAL	170	100.0%	170	100.0%		
Father's Education	≤ 4 anos	48	28.2%	38	25.2%	0.384	0.6216
	> 4anos	122	71.8%	113	74.8%		
	TOTAL	170	100.0%	151*	100%		
Mother's Education	≤ 4 anos	56	32.9%	48	31.0%	0.145	0.7934
	> 4anos	114	67.1%	107	69.0%		
	TOTAL	170	100.0%	155**	100.0%		
Home ownership	No	77	45.3%	58	37.0%	2.208	0.1697
	Yes	93	54.7%	98	63.0%		
	TOTAL	170	100.0%	156***	100.0%		
Number of siblings	None	19	11.2%	10	5.9%	3.054	0.1204
	1 or more	151	88.8%	160	94.1%		
	TOTAL	170	100.0%	170	100.0%		
Chindren's perception of their oral health	Fair/Poor	63	37.1%	67	39.4%	0.199	0.7378
	Excellent/very good/good	107	62.9%	103	60.6%		
	TOTAL	170	100.0%	170	100.0%		

* 19 not informed at follow-up; ** 15 not informed at follow-up; ***14 not informed at follow-up

Table 2 – Relationship between putative confounders/effect modifiers and change in CPQ₁₁₋₁₄ in “no improvement” and “improvement”.

Variables	Categories	TOTAL	ORAL HEALTH RELATED-QUALITY OF LIFE					
			NO IMPROVEMENT		IMPROVEMENT		OR crude	CI95%
			N	%	N	%		
Gender	Boy	92	41	44.6%	51	55.4%	1.219	0.661-2.248
	Girl	78	31	39.7%	47	60.3%		
Father’s Education	≤ 4 anos	48	21	43.8%	27	56.3%	1.083	0.552-2.125
	> 4anos	122	51	41.8%	71	58.2%		
Mother’s Education	≤ 4 anos	56	27	48.2%	29	51.8%	1.428	0.749-2.720
	> 4anos	114	45	39.5%	69	60.5%		
Home ownership	No	77	32	41.6%	45	58.4%	0.942	0.511-1.737
	Yes	93	40	43.0%	53	57.0%		
Number of siblings	None	19	9	47.4%	10	52.6%	1.257	0.483-3.273
	1 or more	151	63	41.7%	88	58.3%		
Chindren’s perception of their oral health	Fair/Poor	63	26	41.3%	37	58.7%	0.932	0.496-1.751
	Excellent/very good/good	107	46	43.0%	61	57.0%		
Orthodontic treatment need	Yes	39	14	35.9%	25	64.1%	0.705	0.336-1.477
	No	131	58	44.3%	73	55.7%		
Bleeding	Yes	21	9	42.9%	12	57.1%	1.024	0.407-2.578
	No	149	63	42.3%	86	57.7%		
D of DMFT	> 0	29	14	48.3%	15	51.7%	1.336	0.599-2.978
	= 0 (without carie)	141	58	41.1%	83	58.9%		
DMFT	>0	56	31	55.4%	25	44.6%	2.208	1.151-4.234
	= 0 (without caries experience)	114	41	36.0%	73	64.0%		

Table 3 - Logistic regression model with predictor of improvement in oral health related-quality of life after three years.

Variable	Estimative	Standart Error	Chi-square	p-value
Intercept	-0.2151	0.2688	0.6404	0.4236
DMFT	0.7920	0.3322	5.6843	0.0171

CAPÍTULO 4⁴

Longitudinal impact of caries incidence on oral health-related quality of life of adolescents

Janice Simpson de Paula, Fabio Luiz Mialhe

Abstract

Objectives: 1) To evaluate the changes in Oral Health-related Quality of Life (OHRQoL) of adolescents in a follow-up exam after three years; 2) impact of caries incidence on their OHRQoL and 3) longitudinal properties (responsiveness to change) of the CPQ₁₁₋₁₄.

Methods: A sample of 515 adolescents from Juiz de Fora, Minas Gerais, Brazil were evaluated clinically for oral status in 2009 and 2012 according the DMFT index. OHRQoL data were collected using CPQ₁₁₋₁₄, including global questions and global transitions judgment (GTJ).

Results: The changes in overall CPQ₁₁₋₁₄ and in their Emotional Well Being and Social Well Being domains were statistically significant ($p < 0.0001$) between the baseline and follow up. The effect size of CPQ₁₁₋₁₄ was considered small. The longitudinal construct validity demonstrated that CPQ₁₁₋₁₄ is responsive to change. The group with DMFT increment presented worse OHRQoL in the overall scores, especially in the functional limitations and social well-being domains of CPQ₁₁₋₁₄ ($p < 0.05$). Furthermore, the group “without DMFT increment” presented improvement in OHRQoL, in overall scores and all domains of CPQ₁₁₋₁₄ ($p < 0.05$).

Conclusion: There was an improvement in the OHRQoL of adolescents in general over the course of time evaluated. However, the group that presented DMFT increment showed deterioration in their OHRQoL compared with the group without DMFT increment. According to the Longitudinal Construct Validity, the instrument

⁴ Artigo redigido de acordo com as normas do periódico Journal Public Health Dentistry e submetido. (ANEXO 16)

is responsive to change, however, the longitudinal psychometric properties of CPQ₁₁₋₁₄ demonstrated a small effect size.

Keywords: responsiveness; quality of life; caries incidence; adolescent .

Introduction

During the last few decades, several studies have focused on subjective perceptions of patients as regards their oral health condition for clinical trials, epidemiologic research and evaluation of health care programs (1). This tendency has been supported by an increased awareness of the limitations of normative measures to promote the patient's wellbeing and full satisfaction with health care (2,3). Since then, the field of oral health-related quality of life (OHRQoL) has been intensively investigated and important contributions have been made to the planning and evaluation of public health and health promotion programs (1).

In this context, special attention has been dedicated to the physical and psychological impact of oral disorders reported by children and adolescents on their OHRQoL (4,5). However, the majority of these studies used the cross-sectional method, in which there is a single temporal assessment of participants, making it difficult to investigate causal inferences. Therefore, it is increasingly necessary to develop longitudinal studies for more accurate investigation into the impact of clinical changes on the quality of life experienced.

Moreover, it is important to evaluate the psychometric properties of these instruments in longitudinal studies in order to measure their performance over time, and this is usually calculated by responsiveness measures. Responsiveness measures make it possible for changes in the scores of the instrument to be detected, based on its reapplication over time (2,6). The analysis of the responsiveness facilitates the interpretation of quality of life scores over time and determines the magnitude of the change detected/measured by a specific questionnaire (6).

Although there have been some publications with longitudinal assessments of perceptions of OHRQoL (2,7,8), there are still no longitudinal studies investigating the responsiveness properties of the Brazilian version of CPQ₁₁₋₁₄. To date, there are only two known studies about the responsiveness of CPQ₁₁₋₁₄: the study who evaluated Cambodian children, participants of basic dental care (9), and who evaluated the New Zealand population (10). Both studies affirmed that the CPQ₁₁₋₁₄ appears to be responsive for evaluating changes over time.

In addition, Foster Page and Thomson (2) emphasized the need for studies investigating the true usefulness of OHRQoL measures in longitudinal studies in order to evaluate their association with caries incidence. Moreover, differently from most studies using clinical trial methodology, observational studies of populations are necessary, to demonstrate the changes in oral health that occur naturally, as may be found in the studies with elderly people (11) and adolescents of New Zealand (2,10).

The present study had three objectives: 1) to assess changes in the OHRQoL of adolescents in a follow-up exam after three years ; 2) to evaluate the longitudinal properties (responsiveness to change) of the questionnaire CPQ₁₁₋₁₄, and 3) to evaluate the impact of caries incidence on the OHRQoL of adolescents.

Methods

This study was approved by the Research Ethics Committee of Piracicaba Dental School, University of Campinas, Brazil, Protocol No. 147/2012. The consent of parents/guardians was obtained.

In 2009, a baseline sample of 515 adolescents, representative of the 12-year-old population in the city of Juiz de Fora, Minas Gerais, Brazil were evaluated. The detailed methodology used in the mentioned study has previously been published (5).

After three years (2012), all 515 adolescent initially evaluated at baseline were contacted again to participate in the study.

Measures

The clinical evaluation was performed according to the recommendations of the World Health Organization (12). All adolescents were assessed in the school environment, under natural light, using Community Periodontal Index (CPI) probes (ball-point) and mirrors. Assessments at both time points were performed by a single investigator, whose calibration scores reached a kappa value of over 0.91

Both in 2009 (baseline) and in 2012 (follow-up) the DMFT index (sum of decayed, missing and filled teeth in the permanent dentition) was used to assess caries experience at the D3 threshold using the WHO criteria (12). To compare the impact of the DMFT increment on the OHRQoL of adolescent, they were reassessed in 2012 and then divided into 2 groups according to the incidence of caries: G1 - without DMFT increment and G2 - with DMFT increment. The DMFT increment was calculated by subtracting the mean caries prevalence values found on follow-up from the mean caries prevalence at baseline.

The OHRQoL data were collected using CPQ₁₁₋₁₄ instrument (13,14). The CPQ₁₁₋₁₄ has 37 questions answered on a Likert scale, ranging from 0 (never) to 4 (every day or almost every day). The sum of the responses can be calculated among all issues (overall CPQ₁₁₋₁₄) or for domains (Oral Symptoms - OS, Functional Limitations -FL, Emotional Well-being - EWB, Social Well-being - SWB). The maximum range of the sum of questions per domain is given by: OS-6 questions (0-24); FL- 9 questions (0-36); EWB- 9 questions (0-36); SWB-13 questions (0-52); Overall - 37 questions (0-148). Lower values represent better oral health related quality of life related. The CPQ₁₁₋₁₄ questionnaire also has global issues relating to the adolescents' perception of their oral health (answers from 'excellent' to 'poor') and their perception of how the oral condition affect their life overall (responses 'not at all' to 'very much'). The questionnaire was self-administered within the school environment with the help of the researcher (15).

At the time of reassessment in 2012 (follow-up), we included the questions called Global Transitions Judgment (GTJ) in the questionnaire. These questions assess the changes perceived by the adolescents over the course of time, with regard to their oral health condition and well-being, i.e., whether it improved,

worsened or remained the same since the last assessment (2,7,10). The GTJ are considered the 'Gold Standard' for assessing changes in subjective perceptions as regards OHRQoL, since these measurements suffer less influence of individual's mood, differently from the set of 37 questions of the CPQ₁₁₋₁₄ (7).

Data Analysis

Statistical analysis was performed using descriptive and inferential analyses. Descriptive data from the baseline and follow-up were compared using the chi-square test and Student's-*t* test, with a level of significance of 5%.

The scores of CPQ₁₁₋₁₄ were initially tested for normality (Kolmogorov-Smirnov test) and we found that the null hypothesis was rejected with a level of significance less than 0.01. In this case, the most appropriate statistical tests would be the non-parametric type, used for samples with asymmetrical score distributions. Thus, the CPQ₁₁₋₁₄ scores (domains and overall) for all participants were evaluated over the course of time by the nonparametric Wilcoxon test.

To evaluate the responsiveness to change in this study, the measures of effect size and longitudinal construct validity were used.

The effect size measure was adopted to establish the magnitude of change observed in CPQ₁₁₋₁₄ over time (16). The following formula, "mean baseline score – mean follow-up score/standard deviation of baseline score" (17). The author also states that the effect size (magnitude of change) of less a 0.2 is considered small, from 0.3 to 0.7 moderate, and 0.8 or above is considered large.

The longitudinal construct validity was evaluated by means of the Kruskal-Wallis one-way analysis of variance. The mean change in CPQ₁₁₋₁₄ scores (score after subtraction = baseline - follow-up) in adolescents was evaluated according global transition judgment (GTJ), considered the 'Gold Standard' measure for assessing changes in QoL over time, as previously described (7). According to this methodology, the adolescents who reported worsened OHRQoL over time would present a negative value after subtraction; adolescents who reported no change would present a value close to zero after subtraction and adolescents who reported improvement in their OHRQoL would present a positive value after

subtraction. The GTJ was evaluated in 2012 by application of the following question: “Since I examined you at age 12, has the health of your teeth, lips, jaws or mouth changed?”, with response options “no change”, “worsened” or “improvement” (2)

Finally, for comparison of OHRQoL between the group of adolescents without DMFT increment (G1) and the group with DMFT increment (G2) (independent groups), we used the nonparametric Mann-Whitney test. We investigated the longitudinal intra-group differences (dependent groups) with the Wilcoxon test. Data were analyzed with the SPSS 17.0 statistical software program, with an alpha value of 0.05.

Results

The final sample, reevaluated 3 years after the baseline exam, was composed of 291 adolescents, and represented a follow-up rate of 56.5%. Of these, 150 (51.5%) were female and 238 (81.8%) studied at public schools.

The clinical characteristics of the 291 adolescents followed-up between 2009 and 2012 may be observed in Table 1. In 2009, only 44 (15.12%) of the 291 participants who were reassessed in 2012 had carious lesions. When comparing the mean DMFT values between the baseline and follow up of these adolescents, it was observed that the mean DMFT value of 1.02 (SD 1.67) in 2009 had changed to 1.84 (SD 2.26) in 2012, showing a mean caries increment of 0.82. It was, however, noted that 225 (77.35%) adolescents had no increment in the decayed component of the DMFT index. The filled component continued to represent the highest proportion of the DMFT index between 2009 and 2012.

Table 2 presents the descriptive results of the adolescents as regards responses to the global questions of CPQ₁₁₋₁₄ at baseline and follow-up, and Global Transition Judgment (GTJ) on follow-up. An improvement was observed in the adolescents’ perception with regard to oral health status, which showed statistically significant changes ($p < 0.05$) over the three years. However, the

perception of the impact of oral health status on overall quality of life did not change ($p>0.05$).

With reference to evaluation of the longitudinal properties of the CPQ₁₁₋₁₄ over the three years, Table 3 shows a reduction in the overall and CPQ₁₁₋₁₄ domain scores in the sample assessed, which means improvement in OHRQoL reported by adolescents 3 years after the first assessment. However, only the changes in overall CPQ₁₁₋₁₄ and in the EWB and SWB domains were statistically significant.

Table 3 also shows the values of the effect size scores (ES) of CPQ₁₁₋₁₄. We verified that the magnitude of change of the instrument was considered small for overall and all domains of CPQ₁₁₋₁₄.

According to Table 4, the longitudinal construct validity proved that CPQ₁₁₋₁₄ was responsive to change. The Global Transition Judgment (GJT) analysis demonstrated that half of sample (50.5%) reported no change in their oral health condition, and also presented results of the mean value close to zero for oral symptoms and functional limitation. It was observed that 11% of adolescents related worsened GTJ with regard to the oral health condition, and a negative value was verified for overall CPQ₁₁₋₁₄, oral symptoms and functional limitations. However, in the follow-up after 3 years, 38.5% of participants reported improvement in OHRQoL in all domains and overall CPQ₁₁₋₁₄; and presented positive GTJ values, confirming the improvement related to GTJ over the 3 years. The oral symptoms, functional limitation and social well-being domains and overall score of CPQ₁₁₋₁₄ showed statistically significant differences in mean values after subtraction between GTJ groups.

With reference to impact of caries incidence on OHRQoL, Table 5 shows the results related to changes in perceptions of OHRQoL among the individuals in G1 (without DMFT increment) and G2 (with DMFT increment) over the 3 years of follow up. A total of 291 individuals were re-evaluated in 2012 and 190 (65.3%) showed no DMFT increment and 101 (34.7%) presented DMFT increment.

According to the intra-group analysis results, a decline could be seen in the CPQ₁₁₋₁₄ scores over 3 years for Group G1, demonstrating an improvement in

OHRQoL. This improvement was statistically significant in comparison with the baseline values, and this was detected for both the overall score and all the domains of the CPQ₁₁₋₁₄ instrument. On the other hand, for Group G2, there was an increase in the overall score and in the domains of CPQ₁₁₋₁₄, meaning a deteriorating OHRQoL reported by these adolescents over time. However the differences between the baseline and follow-up values were statistically significant only for the functional limitations and social well-being domains ($p < 0.05$).

The inter-group comparison of the CPQ₁₁₋₁₄ scores demonstrated that at baseline, there was no significant difference between the groups of adolescents for the Oral Symptoms and Social well-being domains. However, on follow-up, we observed a statistically significant difference in overall and all CPQ₁₁₋₁₄ domain scores between the Groups G1 and G2 (groups without and with DMFT increment, respectively).

Discussion

To our knowledge, this is the first Brazilian cohort study in which adolescents were followed-up with regard to their subjective OHRQoL over 3 years, and in which the impact of caries increment on their OHRQoL was evaluated, using the Brazilian version of the CPQ₁₁₋₁₄. Considering the international studies, only three studies presented a cohort follow-up using similar methodology (2, 10, 18).

With reference to the prevalence and incidence of caries in the adolescents evaluated in the present study, the values found are considered lower than those of other studies on caries experience in Brazil (19,20). The majority of adolescents (77.35%) showed no increment of the decayed component of the DMFT index in 2012, and much of the change in DMFT was due to an increase in the filled component of the index. Some contextual variables may have influenced caries experience, such as implementation of the National Oral Health Policy in Brazil. Since 2004, there has been a declining trend in dental caries among children and adolescents due to more extensive public water supply fluoridation. The city of Juiz

de Fora offers 98.91% of its total population a fluoridated water supply. Moreover, the distribution of oral hygiene kits by primary health care units, and increasing access of this population to public dental services, may have impacted the epidemiological profile of the population (21). In the present study, it was observed that 58.9% of adolescents reported having been to the dentist in the last three years and this might be have an important impact on their oral health.

According to the analysis of clinical conditions and subjective perceptions, in spite of there being a DMFT increment, the adolescents reported improvement in their oral health assessed by the global questions and GTJ. These data corroborate those of other studies in which emphasis on the patient's subjective criteria did not always coincide with the health professional's normative evaluation (3).

By evaluating the scores of the CPQ₁₁₋₁₄ instrument, an improvement could be detected in the self-perception of the adolescents. The hypothesis, based on the theoretical aspects of construction of the concept of OHRQoL (1,8,18), is that this improvement may have occurred due to changes in psychological, social and environmental factors of adolescents, which may have directly influenced their OHRQoL. In addition, the clinical aspects of access to dental treatment may also have impacted this improvement in OHRQoL.

Despite the reduction in the total CPQ₁₁₋₁₄ scores and domains in the sample, the changes in total CPQ₁₁₋₁₄ scores and in the emotional well-being and social well-being domains may have occurred due to the clinical and socioenvironmental changes experienced by adolescents over the three-year follow-up. For example, at baseline it was observed that the adolescents had low prevalence of oral diseases, and at that time, there was no association between caries and OHRQoL, as verified by the authors in previous studies (5,22). In addition, the incidence of caries in adolescents was much lower than that found in other Brazilian regions, and even in comparison with other international studies (2,20). Corroborating our hypothesis, the Thai children study indicated that the use

of CPQ₁₁₋₁₄ may not be responsive to change or sensitive to the impact of untreated decay at low levels of disease (18).

Furthermore, it was possible to detect an increase in the component F of the DMFT index in 29.2% of the sample, demonstrating that they had access to curative dental services. This may also have interfered in the CPQ₁₁₋₁₄ domains of social and emotional well-being, as they included questions related to missing school due to toothache, feeling insecure because of oral conditions or difficulties in practicing sports, in having conversations or playing instruments.

Evaluation of the longitudinal psychometric properties of CPQ₁₁₋₁₄ showed that the effect size was small, following the same tendency observed in longitudinal studies of OHRQoL using other instruments (7,9,11,23). In the present study, the small effect size found, especially in regard to oral symptom and functional limitation domains may have occurred due to the low incidence of caries observed over the years, reducing the accuracy of the instrument in detecting changes in OHRQoL over the three years (18). From this point of view we can infer that the CPQ₁₁₋₁₄ questionnaire, in the case of samples with low prevalence and incidence of caries, is more sensitive for detecting differences between groups in cross-sectional studies than detecting changes that naturally occur in the subject herself over time.

On the other hand, based on the comparison between the Global Transition Judgment (GTJ), considered the Gold Standard measure to evaluate changes in OHRQoL (7), and the results in the CPQ₁₁₋₁₄ domains in the longitudinal evaluation, we can infer that the instrument is responsive to change, since there was agreement among the expected values (negative, close to zero, positive) and the results of GTJ. The GTJ is considered the best opinion to evaluate the responsiveness to change of the measures of OHRQoL instruments (7,16).

We observed that the longitudinal properties of CPQ₁₁₋₁₄ in the present study were lower than those obtained in clinical trials (9,24). Thus, it should be clarified that this difference may be due to the type of methodology used in our investigation, which was an observational design, in which there was no

intervention on the oral health of the participants, as observed in other studies (9,24). According to a recent review about the quality of the measures of OHRQoL for children (25), there are still doubts about the ability of OHRQoL questionnaires to assess longitudinal changes in the perception of children about their OHRQoL. In order to remedy these issues, the authors recommended that further studies should focus on this type of evaluation. They also emphasized that in their review they found 117 cross-sectional studies, and only 3 with a longitudinal design, to assess the OHRQoL in children, and none of them evaluated the responsiveness to change of the research instrument used. Thus, we consider that the present study makes an important contribution to filling this gap. However, it is necessary for our findings to be either corroborated or not, by the results of other studies with adolescents with higher caries prevalence and incidence.

In spite of a small increase in caries being observed among the participants, the differences between groups with and without DMFT increment were statistically significant. Thus, adolescents who had DMFT increment over the three years experienced deterioration in their OHRQoL (increase in CPQ₁₁₋₁₄ scores) in comparison with adolescents who showed no new carious lesions. This finding corroborates the important relationship between caries experience and their clinical and subjective sequelae, such as deterioration in children and adolescents OHRQoL, as has been observed in previous studies (4,24,26,27).

It should, however, be noted that none of the existing longitudinal studies cited (2,10,18) divided the sample into two groups with different caries experience in order to investigate the impact of these characteristics on the CPQ₁₁₋₁₄ results over time for each group, as was done in this study. Thus, our study reinforces the strong impact of oral health problems on OHRQoL, as has been observed in other studies (9,24).

Among the limitations of this study, we emphasize that the changes observed in CPQ₁₁₋₁₄ may have been influenced by social and environmental factors not measured by the instrument used for data collection (5,22). Moreover, the low prevalence and incidence of dental caries in the population studied may

have influenced the psychometric capacity of CPQ₁₁₋₁₄ to detect longitudinal changes in the clinical characteristics evaluated, a fact that should be taken into consideration in future studies using the same instrument.

In conclusion, there was an improvement in the OHRQoL of adolescents in general over the time evaluated. However, the group that presented DMFT increment showed a worsening in their OHRQoL compared with the group without DMFT increment. The longitudinal psychometric properties of CPQ₁₁₋₁₄, demonstrated a small effect size, however, according to the Longitudinal Construct Validity, the instrument is responsive to change. This may be due to the difficulty of the instrument to detect longitudinal changes in OHRQoL in a sample of adolescents with low prevalence and incidence of caries.

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Conflicts of interest

The authors declare that they have no conflicts of interests.

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Table 1 – Mean and standard deviation of clinical data according to the DMFT index at Baseline and Follow-up (n = 291)

	D		M		F		DMFT	
	2009	2012	2009	2012	2009	2012	2009	2012
Mean	0.30	0.56	0.03	0.06	0.69	1.24	1.02	1.84
Standard Deviation	0.80	1.21	0.23	0.27	1.30	1.69	1.67	2.26
<i>p-value*</i>	<i>p= 0.0005</i>		<i>p=0.0042</i>		<i>p<0.0001</i>		<i>p<0.0001</i>	

*Paired t-Student test

Table 2 – Comparison of the responses to global questions of CPQ₁₁₋₁₄ at baseline (2009) and follow-up (2012) and descriptive results of Global Transition Judgment (2012) for final sample of adolescents (n=291)

GLOBAL QUESTIONS OF CPQ₁₁₋₁₄						
	Answer	2009		2012		p-value*
		n	%	n	%	
Self-rated oral health	Excellent	31	10.7%	48	16.5%	<0.0001
	Very good	49	16.8%	97	33.3%	
	Good	97	33.3%	97	33.3%	
	Fair	91	31.3%	45	15.5%	
	Poor	23	7.9%	4	1.4%	
Global impact of oral health on quality of life	Not at all	103	35.4%	119	40.9%	0.4042
	Very little	91	31.3%	87	29.9%	
	Some	73	25.1%	65	22.3%	
	A lot	16	5.5%	17	5.8%	
	Very much	8	2.7%	3	1.0%	
GLOBAL TRANSITION JUDGMENT (GTJ)						
	Answer			2012		
Since I examined you at age 12, has the health of your teeth, lips, jaws or mouth changed ?	No change	-	-	147	50.5%	
	Worsened	-	-	32	11.0%	
	Improvement	-	-	112	38.5%	
Have you been to the dentist in the last three years?	No	-	-	117	40.2%	
	Yes	-	-	174	59.8%	

* Chi-Square test

Table 3 - Mean, standard deviation, median, range scores of overall and domains of CPQ₁₁₋₁₄ of adolescents of Juiz de Fora, Brazil, at baseline and after 3-year follow-up for sample (n=291).

	Baseline (2009)			Follow-up (2012)			p-value ¹	ES ²
	Mean (SD)	Median	Range	Mean (SD)	Median	Range		
CPQ ₈₋₁₀ (overall score)	25.47 (23.43)	18	0-106	20.89 (19.72)	15	0-90	<0.0001	0.20
<i>Domains</i>								
Oral Symptoms	5.82 (3.93)	5	0-24	5.45 (4.17)	5	0-18	0.0821	0.09
Functional limitation	5.16 (5.60)	3	0-28	4.78 (5.21)	3	0-24	0.2334	0.07
Emotional well-being	8.44 (8.73)	5	0-35	6.48 (7.82)	3	0-35	<0.0001	0.22
Social well-being	6.04 (7.97)	3	0-38	4.18 (6.14)	1	0-26	<0.0001	0.23

¹Wilcoxon test: evaluation of significant difference between baseline and follow-up scores

²Effect sizes for CPQ₁₁₋₁₄ and its domain

Table 4 – Global Transition Judgment from baseline to follow-up with change in overall and CPQ₁₁₋₁₄ domain scores (n=291)

		Number of subjects	Mean of Difference (= score baseline– score follow-up)				
			CPQ ₁₁₋₁₄	Oral Symptoms	Functional Limitation	Emotional well-being	Social well-being
	TOTAL	291 (100%)	4.58	0.37	0.38	1.96	1.87
Global	No change	147 (50.5%)	4.82 ^a	0.81 ^a	0.93 ^a	1.33	1.75
Transition	Worsened	32 (11%)	-5.16 ^b	-2.81 ^b	-3.41 ^b	0.88	0.19 ^a
Judgement	Improvement	112 (38.5%)	7.05 ^a	0.70 ^a	0.74 ^a	3.11	2.51 ^b
<i>p</i>	<i>Kruskal-Wallis test</i>		<0.0001	<0.0001	<0.0001	0.1721	0.0299

Table 5 - Mean, standard deviation, median, range of CPQ₁₁₋₁₄ and domain scores according to groups of participants (G1 – without DMFT increment; G2 – with DMFT increment)

Groups		Baseline			Follow-up			Intra-group p-value ¹
		Mean (SD)	Median	Range* *	Mean (SD)	Median	Range	
G1 - without DMFT increment	CPQ ₈₋₁₀ (overall score)	25.8 (24.2) ^a	17	0-106	18.4 (18.6) ^c	13	0-84	<0.0001
	<i>Domains</i>							
	Oral Symptoms	5.7 (4.1) ^a	5	0-24	4.8 (4.2) ^c	4	0-16	0.0013
	Functional limitation	5.4 (5.9) ^a	3	0-28	4.3 (4.9) ^c	2	0-24	0.0031
	Emotional well-being	8.6 (8.9) ^a	5	0-35	5.6 (7.3) ^c	2	0-32	<0.0001
	Social well-being	6 (8.2) ^a	2	0-38	3.7 (5.7) ^c	1	0-26	<0.0001
G2 - with DMFT increment	CPQ ₈₋₁₀ (overall score)	24.9 (21.9) ^d	19	0-94	27.7 (20.1) ^d	21	2-87	0.1627
	<i>Domains</i>							
	Oral Symptoms	6.0 (3.6) ^a	5	0-15	6.6 (3.9) ^d	6	0-18	0.0945
	Functional limitation	4.7 (5.0) ^b	3	0-20	5.7 (5.6) ^d	5	0-24	0.0330
	Emotional well-being	8.2 (8.5) ^d	6	0-33	8.2 (8.5) ^d	7	0-35	0.4737
	Social well-being	6.1 (7.6) ^a	3	0-36	5.2 (6.8) ^d	2	0-26	0.0397

Inter-group differences (Mann-Whitney non-parametric test): the same letters = no statistically significant differences ($p > 0.05$); different letters = statistically significant differences ($p < 0.05$)

¹ longitudinal intra-group differences: p value of Wilcoxon non-parametric test

** Range: Minimum value- Maximum value, considering the variation of 0-148 in which 0 is considered good OHRQoL and 100 is considered poor OHRQoL

CAPÍTULO 5⁵

Oral health, socio-economic and home environmental factors associated with general and oral-health related quality of life and convergent validity of two instruments

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ABSTRACT

Background: The objective of this study was to evaluate the convergent validity between the domains of the Autoquestionnaire Qualité de Vie Enfant image (AUQUEI) and the Child Perceptions Questionnaire instrument (CPQ₁₁₋₁₄) among schoolchildren and to assess the difference between socio-economic and clinical variables associated with their scores. **Methods:** An analytical cross-sectional study was conducted in Juiz de Fora, Minas Gerais, Brazil, with 515 schoolchildren aged 12 years from 22 public and private schools, selected with the use of a random multistage sampling design. They were clinically examined for dental caries experience (DMFT and dmft index) and orthodontic treatments needs (DAI index) and were asked to complete the Brazilian versions of Child Perception Questionnaire (CPQ₁₁₋₁₄) and Autoquestionnaire Qualité de Vie Enfant image (AUQUEI). In addition, a questionnaire was sent to their parents inquiring about their socio-economic status and home characteristics. The convergent validity of the Brazilian versions of CPQ₁₁₋₁₄ and AUQUEI instruments was analyzed by Spearman's correlation coefficients. For comparison between the summarized scores of each questionnaire with regard to the schoolchildren's socio-environmental and clinical aspects the nonparametric Mann-Whitney was used at level of significance of 5 %. **Results:** The mean DMFT index was 1.09 and 125 (24.3%) children had orthodontic treatment needs (DAI \geq 31). There was a similarity and a weak correlation between the scores of the domains of CPQ₁₁₋₁₄ and AUQUEI (r ranged between -0.006 and 0.0296). In addition, a significant difference was found between the scores of the two instruments according to the socio-economic variables ($p < 0.05$) and presence of teeth with carious lesions ($p < 0.05$). **Conclusion:** The general and oral health-related quality of life instruments AUQUEI and CPQ₁₁₋₁₄ were both found to be useful, and significant influence of socio-economic and clinical variables were detected with both instruments.

Key-words: quality of life, oral health, children, AUQUEI, CPQ₁₁₋₁₄

Background

The study of quality of life in populations has become common in recent decades [1,2], motivated by a broader conception of the health and disease process, which takes into account the perception of individuals within the context of their values, expectations, and concerns [3].

Thus, normative clinical evaluation alone has become inadequate to enable professionals to provide the best diagnosis and treatment plan for their patients, because patients' self-reports with regard to their health outcomes do not always coincide with the clinical evaluation made by professionals[1]. Therefore, it is essential to incorporate the physical, social and psychological variables of patients into clinical management in order to promote the therapeutic process that is best for them[4,5,6,7,8].

To achieve these goals, the aim of several studies has been to evaluate the health-related quality of life (HRQoL) in a generic manner, using the World Health Organization Group of Quality of Life questionnaires [1,3,9].

As regards measurement of the perception of health-related quality of life in children and adolescents, several instruments have been developed. There are generic instruments that evaluate measures of quality of life in general, with no link to a specific disease, and other instruments related to specific conditions [10-13]. The generic HRQoL instruments are focused on general living conditions. On the other hand, the specific instruments target certain health condition and are able to detect special situations, for example, the impact of oral diseases on the quality of life of children and adolescents[14].

Among the generic HRQoL questionnaires for children and adolescent, there is the Autoquestionnaire Qualité de Vie Enfant image (AUQUEI), a quality of life scale developed in France by Manificat and Dazord[10] that evaluates the subjective perception of quality of life of children and adolescents from 4 to 12 years-old. It has been translated and validated for the Brazilian Portuguese language by Assumpção Jr. et al [33].The AUQUEI instrument evaluates satisfaction, from the child's point of view, associated with various domains of life

and consists of 26 questions related to family and social relationships, leisure, autonomy, among others. It is considered a complete tool for evaluating aspects related to quality of life defined in theoretical models [1,10,14,15] but has rarely been used in the literature up to date. However, given the growing interest of public health managers and professionals in assessing the quality of life of children and adolescents for planning medical interventions, it is increasingly necessary to test and define the possibilities and advantages of using these instruments for this purpose. In addition, Solans et al[16] have emphasized the importance of the use of generic and specific questionnaires to assess the conditions of quality of life of children and adolescents in clinical practice and the need to investigate the psychometric adequacy of the instrument.

Therefore, in view of the inseparable association between oral health and systemic health, we must consider that the oral health status of children and adolescents can have great impact on their quality of life as a whole[16]. Thus, specific and generic measures could be used as tools to assess the impact of oral conditions on the quality of life of this population[17]. Given the peculiar advantages and disadvantages of each of these instruments, it is important to evaluate the relationship between self-reports presented in response to a specific health-related quality of life instrument (i.e. oral health conditions) and a generic instrument.

In the field of oral health, specific instruments have been developed to evaluate the impact of clinical factors and social determinants of health in oral health-related quality of life [18,19,20].

Among them, there is the Child Perception Questionnaire instrument (CPQ₁₁₋₁₄) developed by a group of Canadian researchers, with the purpose of assessing the oral health-related quality of life (OHRQoL) in children and adolescents between 11-14 years of age, and measures their OHRQoL in four domains: oral symptoms, functional limitations, emotional wellbeing and social welfare [18,21-26].

In order to better understand the impact that certain oral conditions cause on the overall quality of life, some researchers have evaluated associations between the results of specific with generic health-related quality of life (HRQoL) instruments [17,27-31].

However, there are very few published studies that have investigated these associations, and to our knowledge, so far no study comparing the results of the CPQ₁₁₋₁₄(OHRQoL) and AUQUEI (HRQoL) instruments has been published. Therefore, although the psychometric properties of both questionnaires have previously been tested and validated in a Brazilian population [32,33], the objective of this study was to investigate whether there is convergent validity between the two instruments.

In the literature, it is clear that the social determinants of health influence the disease process, health of populations and their subjective perceptions of OHRQoL and HRQoL[20,25,26,34].

Therefore, the aims of this study were: 1) to test the convergent validity between the domains of AUQUEI and CPQ₁₁₋₁₄; 2) to assess the difference between the socio-economic, home environmental and clinical variables associated with these instruments.

Methods

Ethical Aspects

The research Project was submitted to the Research Ethics Committee of the Piracicaba Dental School, University of Campinas, Brazil, and approved under Protocol No. 055/2009. The consent of parents/guardians was obtained.

Subjects

This was a cross-sectional study with cluster sampling in a representative subsample of the adolescent population of the city of Juiz de Fora, Minas Gerais, Brazil. To calculate the probability of error, a 95% confidence interval level was adopted, 20% accuracy and design effect (deff) of 2. The sample size calculation

was based on the DMFT(2.3) and standard deviation (2.72) of an epidemiological survey previously conducted. In addition, the calculation to estimate the sample size was based on the effect of socio-economic and home environmental and clinical characteristics of the OHRQoL, considering a power of 80%, confidence level of 95% and a prevalence ratio to be detected of at least 1.5.

Thus, 12-year-old schoolchildren attending 22 public and private schools were selected according in the conglomerate analysis, based on a random multistage sampling design. First, schools were randomly selected, and in each school schoolchildren who fulfilled the inclusion criteria were included in the sample. A total of 515 schoolchildren, considered representative of the city, were evaluated. Details related to sample calculation have been presented in previous studies [25,26].

Outcome Measures

The schoolchildren were clinically examined at school by two calibrated examiners, in an outdoor setting, under natural light. Community Periodontal Index (CPI) probes (ball-point) and intraoral mirrors were used, in accordance with the World Health Organization recommendations for epidemiological surveys [35].

For the evaluation of caries experience, the DMFT /dmft indices (number of decayed, missing and filled permanent and deciduous teeth) were used and for assessing the need for orthodontic treatment, the DAI index (Dental Aesthetic Index) was used in accordance with the WHO criteria [35]. Before the survey, there was a calibration stage for all clinical variables, performed by a gold standard examiner and good intra-examiner reproducibility (Kappa > 0.91) was reached. The calibration process for data collection is available in Paula et al [26].

One examiner evaluated the children's caries experience by means of the DMFT index while the second examiner collected data related to the DAI index.

For the purposes of statistical data analyses, we used component D of the DMFT index, which was dichotomized into absence of carious lesions (D = 0) and presence of caries (D > 0). In addition, the DAI index scores were categorized

according to Estioko et al [36] into 'without orthodontic treatment need' (DAI <31) and 'in need of orthodontic treatment (DAI ≥ 31).

To obtain the socio-economic data, a questionnaire containing questions about family income and the mother's education was sent to the children's parents. After the clinical examination, in the school environment, the schoolchildren filled in another questionnaire about family environment, such as household overcrowding, number of siblings and with whom the children live (with both biological parents or not) [26].

The application of Autoquestionnaire Qualité de Vie Enfant Imagé (AUQUEI) followed the methodology proposed by the authors [33] and the schoolchildren were asked to tick off the answer that corresponded to their feelings against the 4 proposed domains in the questionnaire. The questionnaire consisted of 26 questions including the domain of autonomy (independence issues, relationships with peers), leisure (questions related to holidays, birthday and relationship with grandparents), functions (questions related to activity in school, meals, bedtime, going to the doctor.) and family (questions as regards parental figures and herself/himself). The domains were scored individually according to values in a Likert scale: 0 (very sad), 1 (sad), 2 (Happy) and 3 (very happy) and total scores range from 0 to 78 - the lower the value, the worse the quality of life. The AUQUEI was applied to the schoolchildren by a single researcher in the school environment.

The Child Perception Questionnaire (CPQ₁₁₋₁₄) is an instrument used for the specific evaluation of OHRQoL and has been translated and validated for the Brazilian Portuguese language by Barbosa et al [32]. The instrument consists of 35 questions divided into four domains: oral symptoms, functional limitations, emotional well-being and welfare. Scores are attributed on a Likert scale, 0-4 (based on the number of points in the scale: "Never" = 0; "Once or twice" = 1; "Sometimes" = 2; "Often" = 3; and "Very often" = 4) so that the score of the entire questionnaire may total from 0-140 points, and higher scores mean worse OHRQoL. The questionnaire was applied in the school environment and answered

by the children themselves, according to the methodology of Ramos-Jorge et al [37].

Data Analysis

Descriptive statistics were used to determine the measures of central tendency and dispersion of the results of the questionnaires. Furthermore, the relative frequency of schoolchildren with no influence on their quality of life was calculated for both instruments.

In order to develop a first comparison between the results of AUQUEI and CPQ₁₁₋₁₄ we made a division of the sample into 4 groups: G1 = good HRQoL (AUQUEI) and OHRQOL (CPQ₁₁₋₁₄) reported; G2 = good HRQoL reported and bad OHRQOL; G3 = both bad generic HRQoL and OHRQOL reported; G4 = bad generic HRQoL reported and good OHRQOL. This categorization was based in the concept of the Importance-Performance Analysis (IPA) method with the aim of dividing the sample into groups, in which HQoL and OHRQoL showed similar results (both good or bad) [38].

The convergence validity between the scores (total and by domain) of the two instruments applied was evaluated by means of the Spearman correlation, which is considered a nonparametric test in order to determine the degree of correlation between two measured variables at ordinal level and arranged in ordered positions in two series. It is considered that r values differing from zero represent the correlation between scores.

As the instruments investigated in this study have inverse scales (higher values of AUQUEI scores represent better health-related quality of life, while higher values of CPQ₁₁₋₁₄ scores represent poorer oral health-related quality of life), for analysis we followed the recommendation given in the study of de Quadros Coelho et al [39]. This evaluates the correlations between two instruments for measuring quality of life (WHOQOL-HIV BREF and OHIP-14) presenting inverse score scales. According to de Quadros Coelho et al [39], *to assess the strength of the correlation, the signs of the coefficients need not be evaluated. The signs show if the variables change in the same direction or in the opposite direction.*

For comparison between the summarized scores of each questionnaire (AUQUEI and CPQ₁₁₋₁₄) with regard to socio-environmental and clinical variables, the median was calculated and the nonparametric Mann-Whitney test was used to determine statistically significant differences between the categories between the questionnaires.

The statistical package SPSS 15.0 (SPSS Inc., Chicago, IL, USA) software program was used for analysis and a p-value <0.05 was regarded as being statistically significant.

Results

Among the 515 schoolchildren participating, 363 (70.5%) were enrolled in public schools; 152 (29.5%) in private schools, and 290 (56.3%) of the children were girls. The mean DMFT index was 1.09 (SD 1.70) and mean dmft index was 0.85 (SD 1.42). Among participants, 85 (16.5%) presented teeth with caries lesions. DAI scores ranged from 14.98 to 56.46 with a mean of 26.04 (SD 6.48) and 125 (24.3%) children had orthodontic treatment needs (DAI ≥ 31).

According to the descriptive data presented in Table 1, the mean total score of AUQUEI instrument was 54 and ranged from 8 to 76. None of the participants reported the condition of "very happy" in all 26 questions of AUQUEI, indicating that all participants showed changes in some quality of life domains proposed by the instrument. With regard to the OHRQoL instrument (CPQ₁₁₋₁₄) the mean of total score was 23, ranging from 0 to 106, and 3.3% (17) of the schoolchildren marked the option "never" to all questions of the instrument, indicating that they did not have any functional or wellness change related to oral health in any domain of the CPQ₁₁₋₁₄ instrument.

Table 2 shows the division of the sample into groups according to the results of CPQ₁₁₋₁₄ and AUQUEI. It was observed that 39.03% of the sample in G1 group - reported good perception for both overall quality of life (AUQUEI) and oral health-related quality of life (CPQ₁₁₋₁₄) and 22.52% of schoolchildren reported poor quality of life with both instruments (G3). In contrast, 38.25% of schoolchildren presented

differences in the results of quality of life between the generic and specific questionnaire (G2 + G4).

Table 3 presents the results of the correlation between the domains and overall scores of AUQUEI and CPQ₁₁₋₁₄ questionnaires. We found negative correlations for almost all domain scores of the questionnaires, except for the Leisure domain of the AUQUEI instrument, which did not present statistically significant correlations with the Functional Limitations, Emotional Wellbeing and Social Welfare domains of CPQ₁₁₋₁₄ and their overall scores.

Table 4 presents the comparison of the scores of AUQUEI and CPQ₁₁₋₁₄ as regards the socio-economic, demographic and clinical characteristics of the sample. With regard to AUQUEI, no significant differences were observed between genders and among schoolchildren with and without orthodontic treatment ($p > 0.05$). In contrast, for the CPQ₁₁₋₁₄ questionnaire, we observed statistically significant differences in the perception of quality of life related to oral health of adolescents, associated with all independent variables.

Thus, in the analysis performed for each variable individually, we observed that children from public schools, females, who did not live with their biological parents; whose household overcrowding exceeded one person per room; who had more than two siblings; whose family income was less than 4 minimum wages; whose mother had less than eight years of schooling; and children who had caries and orthodontic treatment needs, presented the worst CPQ₁₁₋₁₄ values.

With reference to the clinical data, it was observed that the AUQUEI median scores for children with caries was 50 and for those without caries, 55. Taking into account that for AUQUEI the lower the score values, the worse the self-reported quality of life, the results of the general health-related quality of life instrument (AUQUEI) were shown to differ statistically between children with presence and absence of carious lesions ($p < 0.0001$). Similarly, it was noted that the median scores of the oral health-related quality of life instrument (CPQ₁₁₋₁₄) in schoolchildren with caries was 21, and for those without caries it was 15.5. Taking into account that for CPQ₁₁₋₁₄ the higher the value, the worse the self-reported

quality of life, we observed that the results of OHRQoL were statistically different for children with the presence and absence of caries lesions ($p < 0.05$). Therefore, the presence of caries was associated with a worse self-perception of both general HRQoL and OHRQoL.

As regards the results on the need for orthodontic treatment, defined by DAI index, it was observed that there was no statistically significant difference between the scores of AUQUEI of schoolchildren with and without orthodontic treatment needs ($p = 0.0763$). On the other hand, this difference was statistically significant ($p < 0.0001$) with regard to the values of CPQ₁₁₋₁₄.

Discussion

To our knowledge, this is the first study that has made comparisons between the characteristics of the AUQUEI and CPQ₁₁₋₁₄ instruments. It is also the first time that social and environmental variables associated with a generic and a specific questionnaire have been compared.

The consistency between the results of AUQUEI and CPQ₁₁₋₁₄ could be verified by the percentage of schoolchildren whose reports were good for both instruments, or conversely, whose reports were also considered bad for both. As shown in Table 2, we found that 61.75% of them showed similarity in the interpretation of the AUQUEI and CPQ₁₁₋₁₄ answers. This same convergence of results was also observed for the analysis shown in Table 4. By means of the Spearman correlation, convergent validity values were found between almost all of the domains of AUQUEI and CPQ₁₁₋₁₄.

The methodology of interpretation of associations using positive and negative correlation to compare specific and generic quality of life questionnaires in cases in which the instruments presented inverse scales, by using the Spearman correlation test, has also been used in other studies, such as Santos et al [29] and de Quadros Coelho et al [39]. However, since this is the first study that evaluated the correlation between the results of CPQ₁₁₋₁₄ and AUQUEI instruments, it is not possible to draw direct comparisons with pre-existing studies in the literature.

Nevertheless, the few studies that have evaluated the correlation between generic HRQoL with specific OHRQoL instruments have also found values close to those of the present study. In the study by Santos et al [29] comparing the WHOQOL-Bref and the OHIP-14, correlations ranging from -0.1 to -0.2 were found. The study of de Quadros Coelho et al [39] found correlation ranging from -0.107 to -0.3. In the present study the correlation ranged from 0.0 to -0.2. Considering that there is perfect negative correlation with values of -1 and perfect positive correlation with +1, the correlations closer to zero are considered weaker. In the present study and in similar articles found in the literature, using the same methodology of analysis, a statistically significant, but weak correlation was observed between the instruments (ranging from -0.006 to - 0.296, mean of - 0.1943). Therefore, our findings corroborate the hypothesis of the aforementioned authors that these instruments measure different domains of quality of life with distinct constructs. However, it is necessary the application of these instruments in populations with other socio-economic status, cultures and dental status in order to support or refute the evidence found here.

The results of this study revealed that the social determinants of health, including socio-economic and environmental factors were strongly associated with the subjective perceptions of schoolchildren, whether they were related to the results of CPQ₁₁₋₁₄ or AUQUEI. It was clear that subjective perceptions of quality of life (generic or specific) were associated with the social, environmental, cultural and political context of each individual [26,40,41].

With respect to the clinical variables, we found that dental caries experience was strongly associated with a worse perception of overall quality of life, as measured by AUQUEI, and as can be seen in the proportion between groups and the results of the nonparametric test (Table 4). These findings corroborate those reported by Ribeiro et al [42] who found that severe caries in preschoolers impaired their overall quality of life, which was measured by the AUQUEI instrument, unlike caries-free children. However, to our knowledge, this is the first

study to assess the difference in oral health on overall quality of life measured by the instrument AUQUEI in schoolchildren aged 12 years.

Easton et al [43] also used a generic quality of life questionnaire (Toddler Child Quality of Life Questionnaire – ITQOL) and found that caries-free preschool children showed better quality of life reports compared with those who had acute or chronic caries with pain. In addition, the study of Fontanive et al [44], in which adults and elderly persons answered the WHOQOL-Bref questionnaire, one of the most important generic quality of life questionnaires used by researchers, reported the association of caries and the need for prostheses with quality of life. Thus, our results provide important information on the influence of dental caries on overall quality of life of schoolchildren, confirming the findings of Vazquez et al [45] whose study found an association between oral conditions and WHOQOL-Bref.

With regard to the oral health related quality of life instrument, the differences observed in the results of CPQ₁₁₋₁₄ scores were also statistically significant for the absence versus presence of caries. This finding is in agreement with numerous other published studies that found associations between oral health and OHRQoL [21-26,45] and highlights the influence of oral health on daily activities of children and adolescents and the importance of these measures for clinical practice.

Furthermore, considering the clinical variables, the results of application of the CPQ₁₁₋₁₄ instrument showed statistically significant associations between the perceptions of schoolchildren about the influence of their conditions of malocclusion on OHRQoL. Other studies have also found associations between these variables, such as those of Zhang et al [46], Locker et al [24] and Paula et al [26]. Bernabé et al [27] highlighted the ability of OHRQoL instruments to detect the impact of conditions of malocclusion on the lives of adolescents and found that those with normative need for orthodontic treatment (DAI index) reported the worst OHRQoL.

On the other hand, there were no statistically significant differences between the scores of AUQUEI for participants with and without orthodontic treatment

needs. One hypothesis for this finding is that the goals of the AUQUEI and CPQ₁₁₋₁₄ questionnaires are different, and so are their questions and domains. This would make it difficult for AUQUEI to adequately measure subjective perceptions related to dental aesthetics comprised by the DAI index, contrary to that which occurs with carious lesions, which are more likely to generate pain and discomfort, and consequently have a greater influence on quality of life. Liu et al [47] presented a review of the literature on the subject and concluded that there was association between malocclusion / treatment needs and quality of life (by means of a generic or specific questionnaire), but it was weak. The authors also emphasized that the result of this association may be influenced by the type of questionnaire adopted. In this regard, Locker et al [24] reaffirmed the need for a specific instrument, such as CPQ₁₁₋₁₄ for a more accurate evaluation of the different perceptions of orthodontic conditions, and in turn, emphasized the need for further studies on the usefulness of these instruments. This fact must be taken into consideration by researchers and clinicians when selecting a generic quality of life tool to assess the impact of a specific disease on HRQoL, because the association will be not always found [13].

To date, only one study has investigated the association between the results of the CPQ₁₁₋₁₄ and AUQUEI to evaluate the quality of life of its participants [48]. The aim of the mentioned study was to assess the general and specific oral health related quality of life of HIV-infected children. However, the authors did not investigate the difference in social and environmental aspects as confounders in the model of association between OHRQoL and HRQoL, as was done in the present study. In the abovementioned study, the authors observed that there was an association between the condition of being HIV positive and the subjects' general and specific OHRQoL measured by means of the AUQUEI and CPQ₁₁₋₁₄ instruments.

Other studies that have investigated the associations between generic and specific OHRQoL instruments, such as Fontanive et al [44], who investigated associations between clinical oral variables and the WHOQOL, and Santos et al

[29] who compared two generic measures (short form CPQ₁₁₋₁₄ and WHOQOL-Bref) also observed the same associations.

As shown in Table 4, it was verified that socio-economic and family aspects presented a strong association with general and oral health-related quality of life. Despite the lack of studies comparing the results of AUQUEI scores in different social and environmental conditions, the association between quality of life and social determinants of health has been extensively studied in the scientific literature and should be taken into account when formulating any public health policy.

Based on the differences and similarities of the results found for the measures evaluated, we concluded that both questionnaires are useful and important in order to implement holistic strategies for oral health promotion based on a sociodental approach [4,6]. Moreover, irrespective of the quality of life questionnaire applied, aspects related to the social determinants of health should be observed, since the present study makes clear the influence of these factors on the results measured by the two types of instruments.

The results of the present study should be considered within some limitations, such as the low prevalence of oral diseases, which may have influenced the strength of the association found. In addition, we did not evaluate the presence of general diseases or health problems that could have influenced the results of AUQUEI, and the cross-sectional study design did not allow us to assess a dynamic relationship of cause and effect over time between independent variables and the results of AUQUEI and CPQ₁₁₋₁₄.

Conclusion

In conclusion, the generic (AUQUEI) and the specific oral health-related (CPQ₁₁₋₁₄) quality of life instruments showed correlation, with weak association, and the analysis of socio-economic and home environmental and clinical variables showed association when measured with both instruments

Supporting Data

The authors declare that they have no supporting data for this study.

List of abbreviations

AUQUEI – Autoquestionnaire Qualité de Vie Enfant image (AUQUEI);

CPQ₁₁₋₁₄ – Child Perception Questionnaire

DMFT and dmft index – number of decayed, missing and filled permanent and deciduous teeth

DAI index – Dental Aesthetic Index

HRQoL – Health-related quality of life

OHRQoL – Oral health-related quality of life

Competing interests

The authors declare that they have no competing interests.

Authors' contributions

JSP and ACP participated in the conception and design of the study. JSP participated in the data interpretation, data acquisition, drafting the manuscript and data analyses. MCM and FLM participated in the conception and design of the study and critical revision of manuscript. All authors read and approved the final manuscript.

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Table 1 – Descriptive statistics for AUQUEI and CPQ₁₁₋₁₄ scores

Measures	AUQUEI¹	CPQ₁₁₋₁₄²
Mean	54.03	23.24
SD	9.14	21.94
Median	55	16
Range	8-76	0-106
Absence of impact	0%with score 78	3.3% with score 0

¹smaller scores means worse generic quality of life, range from 0 to 78.

²higher scores means worse specific quality of life (oral health related), range from 0 to106

Table 2 – Absolute and relative frequency categories of associations between the two quality of life instruments used: HRQoL– AUQUEI andOHRQoL– CPQ₁₁₋₁₄

GROUPS		n	%
G1	HRQoL good OHRQoL good	201	39.03%
G2	HRQoL good OHRQoL bad	81	15.73%
G3	HRQoL bad OHRQoL bad	117	22.72%
G4	HRQoL bad OHRQoL good	116	22.52%
	TOTAL	515	100.00%

Table 3 - Spearman's correlation coefficients between the AUQUEI and CPQ₁₁₋₁₄ instruments (n = 515).

		Domains CPQ ₁₁₋₁₄				TOTAL CPQ ₁₁₋₁₄
		Oral Symptoms	Functional Limitations	Emotional Well-being	Social Well-being	
Domains AUQUEI	Autonomy	- 0.232**	- 0.225**	-0.258**	-0.244**	-0.266**
	Leisure	- 0.110*	-0.045 ^{ns}	-0.006 ^{ns}	-0.074 ^{ns}	- 0.066 ^{ns}
	Functions	- 0.235**	- 0.273**	- 0.271**	- 0.275**	- 0.296**
	Family	- 0.190**	- 0.133**	- 0.093*	- 0.117**	- 0.144**
Total AUQUEI		- 0.266**	- 0.251**	- 0.244**	- 0.256**	- 0.288**

*p-value <0.05

**p-value <0.01

^{ns}not statistically significant

Table 4 – Difference between the scores of AUQUEI e CPQ₁₁₋₁₄ for clinical and socio-environmental aspects

		TOTAL	AUQUEI		CPQ ₁₁₋₁₄	
			Median	p-value*	Median	p-value*
Gender	Female	290	55	p = 0.6649	18	p=0.04
	Male	225	54		13	
School type	Public	363	53	p<0.0001	23	p<0.0001
	Private	152	56		6	
Children lives with both biological parents	No	193	52	p=0.0003	22	p<0.0001
	Yes	322	56		12	
Household overcrowding	More 1person/room	76	51	p=0.0031	25	p<0.0001
	≤ 1person/room	439	55		15	
Number of siblings	2or more	259	53	p=0.0037	20	p<0.0001
	≤ 2	256	56		10	
Monthly Family income [#]	≤ 4minimum wages	239	55	p=0.0008	21	p<0.0001
	> 4 minimum wages	44	59		4	
Mother´s education	≤ 8years	141	54	p=0.0017	24	p<0.0001
	> 8 years	142	56		12	
Presence of caries lesion	Yes	85	50	p<0.0001	21	p=0.0334
	No	430	55		15	
Orthodontic treatment need	Yes	125	56	p=0.0736	23	p<0.0001
	No	390	54		14	

* Mann-Whitney, nonparametric test for scores comparison

[#]Minimum wage at the time of data collection, approximately US\$ 290.00

CAPÍTULO 6⁶

A longitudinal evaluation of the impact of dental caries treatment on oral health-related quality of life among schoolchildren

running title: A longitudinal impact of dental caries treatment on OHRQoL

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Paula JS, Sarracini KLM, Meneghim MC, Pereira AC, Ortega EMM, Martins NS, Mialhe FL. A longitudinal evaluation of the impact of dental caries treatment on oral health-related quality of life among schoolchildren. *Eur J Oral Sci*.

Abstract

This study aimed to evaluate the impact of dental caries treatment on oral health-related quality of life (OHRQoL) among schoolchildren and the responsiveness of the CPQ₈₋₁₀ instrument. Brazilian schoolchildren aged 8–10 years were randomly selected and assigned to two groups (n=186) — dental caries treatment (DCT) and caries-free (CF) — according to their caries experience (dmft and DMFT values equal to or above zero). The Child Perception Questionnaire - CPQ₈₋₁₀ instrument was administered at baseline and in a follow-up time. Chi-square, Mann-Whitney, Wilcoxon, Effect size and Kruskal-Wallis tests were used for the statistical analysis. In the DCT group, increases in CPQ₈₋₁₀ scores were observed between the baseline and follow-up ($p \leq 0.0001$). No statistically significant difference ($p > 0.0001$) was observed in the results of CPQ₈₋₁₀ scores concerning the longitudinal evaluation of the CF group. Responsiveness of the CPQ₈₋₁₀ instrument (magnitude of change in CPQ₈₋₁₀ scores) in the DCT group was greater (effect size > 0.7) than that observed in the CF group. The findings of this study demonstrate that dental caries treatment has an important impact on OHRQoL of children and the CPQ₈₋₁₀ was considered an acceptable instrument for longitudinal measurement of changes in OHRQoL.

Key words: Quality of Life, Dental caries, Dental care, Longitudinal study.

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Introduction

Oral diseases are widely prevalent among children and adolescents and are considered a public health problem worldwide. They have a profound impact on the functional and psychosocial aspects of individuals and, consequently, on their quality of life (1, 2-7). Therefore, there is growing interest among researchers in incorporating people's perception of their feelings of well-being into the concept of health (8,9). Studies focusing on the role of oral health on quality of life (OHRQoL) have emphasized in its conceptualization (1,8,10,11). Based on information from specific instruments, such as the Child Perceptions Questionnaire - CPQ₈₋₁₀ (2) and the Oral Health Impact Profile (OHIP), studies have shown that oral diseases can have a negative impact on the individuals' self-perception of OHRQoL (3,4,6,11-13,14).

Therefore, instruments aimed at assessing OHRQoL can generally be used in research and clinical practice, and studies have shown that the CPQ₈₋₁₀ has been considered an adequate instrument for a subjective assessment of oral health evaluation in different clinical conditions (11,14). This instrument was already translated and validated for the Brazilian population (1). However, no reports concerning the characteristics of the CPQ₈₋₁₀ instrument for testing responsiveness have been found in the literature.

Although orthodontic and periodontal treatments have been associated with quality of life (15-21), little is known about the impact of dental caries treatment on the OHRQoL of schoolchildren (22). TURTON *et al.* (23), in a longitudinal evaluation of OHRQoL in Cambodian children undergoing basic dental care, verified that the dental services improved the children's OHRQoL.

Studies on OHRQoL in children have evaluated the impact of treatment of early childhood caries on their OHRQoL (22,24,25), considering the perceptions of parents and/or changes in OHRQoL after atraumatic restorative treatment (26,27). Moreover, most studies comparing OHRQoL characteristics among children with untreated and treated caries are cross-sectional, and were unable to demonstrate a causal relationship between an intervention and an outcome (28,29).

For this reason, longitudinal evaluation of changes in OHRQoL using analysis of the responsiveness of the CPQ₈₋₁₀, may allow us to gain a better understanding of changes in the subjective perception of schoolchildren with caries experience. Furthermore, in order to generate the best evidence, it is important that the methodological design of study includes a control group (caries-free), allowing a more accurate assessment of whether changes in OHRQoL occur due to chance or due to dental caries treatment.

The objective of this longitudinal study was [1] to evaluate the impact of dental caries treatment on OHRQoL among schoolchildren and [2] the responsiveness of the CPQ₈₋₁₀.

Materials and Methods

The project was approved by the Research Ethics Committee (No. 111/2010) of Piracicaba Dental School, University of Campinas. Written consent for the children to participate in the study was provided by the children's parents or guardians.

The original population from which the sample was drawn involved 1,215 schoolchildren, aged 6–10 years, and 10 schools participating in the “Always Smiling Project”, developed by Piracicaba Dental School, University of Campinas, Brazil. The objective of the project is to offer preventive and dental care to children from low income families and areas of greater social exclusion (30, 31).

All schoolchildren were clinically examined at the beginning of the study for the presence of decayed, missing and filled teeth in permanent and primary dentition using the DMFT and dmft indexes (32). Four calibrated dentists carried out the dental examinations under natural light, outside the classrooms, using the Community Periodontal Index probes and plane surface mouth mirrors (Golgran®, São Paulo, SP, Brazil); such procedures were in accord with the World Health Organization (WHO) recommendations for epidemiological studies (32).

Before the survey, a Gold Standard examiner, experienced in epidemiological surveys, conducted all phases of the calibration process,

comprising 24 hours of practical and theoretical activities. Intra-examiner reliability was assessed; a percentage agreement (95%) was noted and considered satisfactory. The theoretical stage (four hours) involved discussions about the criteria of the indexes used. The clinical training exercises were conducted in an outdoor setting and consisted of 5 sessions of 4 hours each. Each dentist examined 15 to 20 children per session. Duplicate examinations were performed with 10% of the sample after an interval of two weeks to monitor the inter-examiner variation during the survey. The mean inter-examiner agreement obtained for this activity was Kappa=0.87.

Since all schools are attended by children with similar clinical and sociodemographic characteristics, all children aged 8 to 10 years from the first 3 schools that participated in the “Always Smiling Project” throughout the year of 2011 were invited to participate in the present study. This was done to give the researchers time to re-examine all children with caries four weeks after completion of their dental treatment and before the children’s school vacations.

Based on previous studies (26, 33), a power of 0.8 was used to calculate the sample size of the present study. The outcome measure used for the sample size calculation was the mean values and standard deviation (SD) of the quality of life measures, based on the difference in the outcome measured between the two groups of children. The inclusion criteria were: the child was participating in the “Always Smiling Project” and parents or guardian consented to his/her participation in the research.

Of all children aged eight-to-ten-year-olds selected from the three schools 186 were found to require dental treatment (DTC). Another 186 caries-free (CF) children (dmft and DMFT = 0), with matching gender and age, were randomly selected from the same schools and used as the control. Individuals were then assigned to two groups (n=186): dental caries treatment and caries-free (control). Dental treatment was carried out in accordance with protocols established by Piracicaba Dental School - University of Campinas, Brazil. Demographic data and

information on the schoolchildren' perceptions about their oral health were collected at baseline.

The Child Perceptions Questionnaire (CPQ₈₋₁₀) was used to evaluate OHRQoL in both groups. This questionnaire consists of 4 domains: oral symptoms (OS), functional limitation (FL), emotional well-being (EWB), and social well-being (SWB) (1,2). The CPQ₈₋₁₀ was developed by JOKOVIC *et al.* (2) and translated and validated in Brazil by Barbosa *et al.* (1) in a cross-sectional study. The CPQ₈₋₁₀ instrument may be self-administered or interviewer-administered with small differences in the results of scores.

In the present study, the self-administered mode was applied in the school environment — in the classroom. Each child returned the questionnaire to the researcher, who checked whether all the questions had been answered properly. In the few cases where the schoolchildren skipped a question, they were asked to complete it.

To evaluate changes in the schoolchildren's OHRQoL (both groups), the CPQ₈₋₁₀ instrument was applied in the school environment at baseline and during follow-up (four weeks after completion of dental treatment). In addition to the 25 items of the CPQ₈₋₁₀, global questions about oral health perception (very good, good, fair, and poor) were included at baseline and follow-up, in the latter of which the only difference was that global ratings were replaced with global transition judgment (GTJ)(2). The participants' perception of change (GTJ) in their oral health since their recruitment was expressed by the following response options: improvement, no change, or a worsened condition.

The SPSS 17.0 software program was used to compare the results (37). The data were submitted to the chi-square test (descriptive analysis) to evaluate the association between the groups at a significance level of 5%.

Non-parametric tests were used to determine the significance in the difference of scores obtained for domain and overall CPQ₈₋₁₀, between and within the groups. Previously, the normality of the sample (presuppositions for MANOVA)

was tested using the univariate Shapiro-Wilk test and the Royston's Multivariate Normality Test (comparison between groups).

The non-parametric Wilcoxon test for two paired or related groups (baseline and follow-up) and non-parametric Mann-Whitney test for independent groups (caries-free and dental caries treatment) were applied.

The changes in OHRQoL were determined by the changes in the CPQ₈₋₁₀ scores and GTJ. The changes in the CPQ₈₋₁₀ scores were analyzed according to the results of subtraction of baseline from follow-up measures in the two groups, and defined as worsened (values below zero), no change (values close to zero) and improvement (values higher than zero).

To evaluate the responsiveness of the CPQ₈₋₁₀, the effect size was adopted to establish the minimal important difference with the use of the Distribution-based approach (35). The formula (36) used was: “mean baseline score – mean follow-up score/standard deviation of baseline score”. The effect size is defined according to the magnitude of change: 0.2 - small; 0.5 – moderate; and 0.8 or above – large.

To evaluate the longitudinal construct validity, the Kruskal-Wallis test were used, and the minimal important difference was calculated by the Anchor-based approach (37). The mean change in the CPQ₈₋₁₀ scores (subtraction score = baseline and follow-up) was evaluated based on the GTJ, according to which, a negative value after subtraction indicates a worsened condition, a value close to zero after subtraction signals no change, and a positive value after subtraction reveals improvement.

Results

The characteristics of the children's age, gender and responses to subjective perception of oral health obtained at baseline are shown in Table 1. The mean dmft and DMFT values concerning the 186 children with caries were 1.9 ± 2.1 and 0.6 ± 1.7 , respectively.

The descriptive data of the overall CPQ₈₋₁₀ scores and the domains (OS, FL, EWB and SWB) are shown in Table 2. Statistically significant difference ($p \leq 0.0001$)

was observed between the groups — caries-free (CF) and dental caries treatment (DCT) — while intra-group differences ($p \leq 0.0001$) were observed only for DCT, considering the two evaluation time intervals (baseline and follow-up).

According to the CPQ₈₋₁₀ scores, we observed that schoolchildren with caries experience reported more impact on their oral symptoms domain, such as toothache or bad breath; and functional limitations domain, such as difficulty with chewing, than their counterparts. They also reported more discomfort with their oral conditions (EWB) and difficulties in socializing with other children due to some disease process (SWB), when compared to the caries-free schoolchildren. Therefore, children without caries experience reported fewer problems in the social and emotional domains of CPQ₈₋₁₀ than their counterparts.

When the baseline and follow-up CPQ₈₋₁₀ scores were subtracted, 12 (6.5%) individuals in the CF group showed negative scores; 154 (82.8%) zero, and 20 (10.8%) positive. In the DCT group, 20 (10.8%) individuals revealed negative scores; 6 (3.3%) zero, and 160 (86.0%) positive.

With regard to the minimal important difference, concerning the DCT group, the magnitude of change in CPQ₈₋₁₀ scores was large (>0.7). In the CF group, the effect size was small for the overall scores and domains of the CPQ₈₋₁₀ (Table 3).

Table 4 shows the changes in global transition judgment (GTJ) and the mean values of domains and overall CPQ₈₋₁₀ change scores. In the CF group, 169 (91%) schoolchildren reported no change; in the DCT group, 131 (70.4%) reported improvement in OHRQoL. In the CF group, the mean difference in the total group was close to zero, with little difference between follow-up and baseline scores. In the DCT group, this value after subtraction was high, representing a great improvement in the values of OHRQoL.

With regard to the dental caries treatment, five (2.6%) schoolchildren received resin composite restorations in their anterior teeth and forty-two (22.6%) in their posterior teeth; fifteen (8.1%) received amalgam and sixty-nine (37.1%) glass-ionomer cement restorations in their posterior teeth. Endodontic therapy (pulpectomy/pulpotomy) was performed in ten (5.4%) schoolchildren; forty-five

(24.2%) had tooth extractions (43 deciduous and 2 permanent teeth). The duration of the dental caries treatment was approximately 3 weeks for each child.

In the evaluation of categories of response, concerning the GTJ (Table 4), the schoolchildren who reported improvement in OHRQoL in both groups assessed showed positive values after subtraction. In the CF group, the schoolchildren who reported no change had a mean difference in values close to zero, the schoolchildren who reported a worsened condition presented negative values only for the OS domain. For the DCT group, participants who reported no change showed positive values, and those who reported a worsened condition revealed negative values only in the SWB domain.

Discussion

The present study confirmed the literature data on the impact of oral health conditions on children's OHRQoL (2-4,12,13,38-41) and highlights the importance of dental health programs in providing dental caries treatment aimed at improving people's OHRQoL. It also shows new evidence on the responsiveness of the CPQ₈₋₁₀.

However, our findings should be viewed within some limitations, due the fact that all the schoolchildren were from areas with lower socioeconomic status and were enrolled at public schools, which may compromise the external validity of findings. In addition, 68.4% of the dental caries treatment group has restorative dental treatment needs for cavitated caries lesions. Therefore, further studies should be conducted to evaluate other types of professional interventions for dental caries, such as preventive dentistry or minimally invasive dentistry, and longer periods of evaluation time, in order to expand our knowledge about the impact of dental caries treatments on schoolchildren's OHRQoL.

The treatment of dental caries and its sequelae, provided by the "*Always Smiling Project*" had impacted not only the clinical measures of children with caries experience, but also their OHRQoL. However, even after having undergone dental treatment, those children with cavitated caries lesions reported poor OHRQoL than

caries free children. This finding suggests that health promotion interventions in school settings should focus on the maintaining of a sound dentition than on repairing the sequel of dental caries, in order to achieve the best level of OHRQoL for schoolchildren (42).

The CPQ₈₋₁₀ was found to have acceptable responsiveness evaluated through effect size and GTJ; this is in agreement with previous studies on responsiveness of OHRQoL instruments with children (33,43,44). In relation to the CPQ instruments, TURTON *et al.* (23) observed that the CPQ₁₁₋₁₄ instrument was valid and responsive to change. To our knowledge, the present study is the first to evaluate the responsiveness of the CPQ₈₋₁₀ and to show evidences that this instrument is reliable towards a longitudinal measurement of changes in children's OHRQoL, especially before and after dental treatment.

As observed in Table 4, it was expected that schoolchildren who reported worsening in the GTJ would show negative values in the mean of CPQ₈₋₁₀ domains (when baseline and follow-up scores were compared). Considering the CF group, some participants who reported worsened GTJ showed a negative value in the oral symptoms domain, i.e., the reported deterioration was also found by the values of the CPQ₈₋₁₀ in the oral symptoms domain. In the case of present study, we observed that this was associated with an increase in Likert scale responses to the questions about food remainders in the mouth and bad breath in the oral symptoms domain of the CPQ on follow-up. This may probably have occurred due to better self-knowledge of their problems and oral symptoms, which were not self-perceived before the educational activities provided by the "*Always Smiling Project*".

Therefore, the longitudinal construct validity findings of the present study should be viewed with caution, since the mean differences in scores were not exactly as expected, as we observed positive findings for children who reported worsening of their GTJ. This ambiguity in GTJ related to OHRQoL instruments has also been related in other studies (23,33,44) which recommend the need for further studies on the subject, with larger sample sizes.

In conclusion, we observed that access to dental treatment can have a positive impact on the OHRQoL of children with dental caries experience and the CPQ₈₋₁₀ proved to be an acceptable instrument for longitudinal measurement of changes in OHRQoL.

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Conflicts of interest

The authors declare that they have no conflicts of interests.

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Table 1. Characteristics of children's age, gender and their responses to the global questions of oral health: comparison of the proportions between the "caries-free" and "with dental caries treatment" groups of children at baseline survey (total n=372).

Variables	Category	Caries-free N(%)	Dental caries treatment N(%)	N total	p-value*
Child's age	8 years	15 (8.0)	9 (4.8)	24	p=0.1786
	9 years	75 (40.4)	65 (35.0)	140	
	10 years	96 (51.6)	112 (60.2)	208	
Gender	Female	85 (45.7)	77(41.4)	162	p=0.4642
	Male	101 (54.3)	109 (58.6)	210	
Global questions of oral health	Very good	54 (29)	52 (28)	106	p=0.0382
	Good	60 (32)	39 (21)	99	
	Fair	43 (23)	63 (34)	106	
	Poor	29 (16)	32 (17)	61	

*chi-square test

Table 2. Mean, standard deviation, median, range scores of CPQ₈₋₁₀ and subscales according to groups of participants (caries-free group baseline and follow-up; dental caries treatment group baseline and follow-up).

		Baseline			Follow-up		
		Mean (SD)	Median	Range**	Mean (SD)	Median	Range
	CPQ ₈₋₁₀ (overall score)	16.2 (9.5)	16.0	0-46	15.9 (9.3) ^b	16.0	0-46
	<i>Subscales</i>						
Caries-free group*	Oral Symptoms	3.9 (3.6)	3.0	0-13	3.6 (3.5) ^b	3.0	0-13
	Functional limitation	3.4 (2.9)	4.0	0-10	3.4 (2.9) ^b	4.0	0-10
	Emotional well-being	3.5 (4.6)	1.0	0-17	3.4 (4.0) ^b	1.0	0-16
	Social well-being	5.3 (4.9)	5.0	0-19	5.5 (4.9) ^b	5.0	0-19
	CPQ ₈₋₁₀ (overall score)	42.0 (15.6) ^a	40.0	12-100	20.8 (13.3) ^c	19.0	0-63
	<i>Subscales</i>						
Dental caries treatment group	Oral Symptoms	9.8 (4.9) ^a	10.0	2-20	5.6 (4.7) ^c	5.0	0-16
	Functional limitation	9.0 (3.1) ^a	9.0	2-20	3.5 (3.3) ^c	4.0	0-13
	Emotional well-being	8.9 (4.4) ^a	8.0	1-20	2.8 (3.0) ^c	2.0	0-9
	Social well-being	14.3 (7.3) ^a	12.0	0-40	8.8 (8.3) ^c	8.0	0-40

^a significant difference between caries-free and dental caries treatment group at baseline (Mann-Whitney test, $p < 0.0001$)

^b significant difference between caries-free and dental caries treatment group in follow-up (Mann-Whitney test, $p < 0.0001$)

^c significant difference between baseline and follow-up survey in dental caries treatment group (Wilcoxon test, $p < 0.0001$)

* no significant difference was found between baseline and follow-up survey in caries-free group (Wilcoxon test, $p > 0.0001$)

** Range: Minimum value- Maximum value, considering the variation of 0-100 that 0 is good OHRQoL and 100 is poor OHRQoL

Table 3. Effect size for CPQ₈₋₁₀ and its domains, for “caries-free” and “with dental caries treatment” groups of children.

	CPQ₈₋₁₀	Oral Symptoms	Functional Limitation	Emotional well-being	Social well-being
Caries-free group	0.0*	0.1*	0.0*	0.0*	0.0*
Dental caries treatment group	1.4**	1.3**	1.8**	1.4**	0.7**

* small; ** large

Table 4. Mean values of domains and overall CPQ₈₋₁₀ change scores by global transition judgment for “caries-free” and “dental treatment” groups of children.

	Global transition judgment	Number of subjects	Mean of Difference (=baseline score–follow-up score)				
			CPQ ₈₋₁₀	Oral Symptoms	Functional Limitation	Emotional well-being	Social well-being
Caries-free group	TOTAL	186	0.3	0.3	0.0	0.2	-0.2
	Worsened	4	2.3	-1.8 ^b	5.3	1.3	4.5
	No change	169	0.1	0.3 ^a	-0.2	0.1	-0.6 ^b
	Improvement	13	1.9	0.6	1.6	0.8	3.5 ^a
	p-value*		0.8	0.0	0.0	0.1	0.0
Dental caries treatment group	TOTAL	186	21.3	4.2	5.5	6.1	5.5
	Worsened	9	8.2	1.0	2.7	7.8	-3.2 ^a
	No change	46	19.2	3.5	5.3	5.9	4.6 ^b
	Improvement	131	22.9	4.7	5.8	6.1	6.4 ^b
	p-value*		0.1	0.3	0.2	0.8	0.0

* *Kruskal-Wallis test*

CONSIDERAÇÕES

Os estudos apresentados na presente Tese destacam a importância de pesquisas que não se limitem apenas à avaliação clínica de doenças bucais. É possível constatar que os resultados apresentados nos seis artigos científicos direcionam ações e novas perspectivas nos estudos sobre saúde bucal, rendimento escolar e qualidade de vida, considerando continuamente os Determinantes Sociais de Saúde.

Em estudo transversal (CAPÍTULO 1) foi possível avaliar o impacto das condições socioambientais na experiência de cárie em escolares, utilizando para isso uma metodologia de análise estatística inovadora neste tipo de avaliação (modelo de regressão múltipla hierárquica PROC GLIMMIX). Variáveis proximais e distais (demográfica, socioeconômicas, do ambiente familiar e percepções subjetivas) foram incluídas no modelo em quatro níveis diferentes e constatou-se que o tipo de escola (pública) e a renda familiar foram associados à experiência de cárie (CPOD>0). Estes resultados indicam a necessidade de uma agenda de promoção de saúde bucal em que os determinantes sociais de saúde estejam incluídos, direcionando ações intersetoriais e estratégicas em todos os níveis. Além disso, permitem inferir que os aspectos socioeconômicos apresentaram maior impacto na experiência de cárie em comparação com o ambiente familiar e as percepções subjetivas dos pais e escolares.

Também foi possível constatar que a experiência de cárie apresentou impacto significativo no rendimento escolar de crianças (CAPÍTULO 2), mesmo considerando no modelo de regressão logística outros fatores relacionados aos determinantes sociais de saúde. Apesar de já ser reconhecido o impacto de aspectos funcionais, emocionais e sociais no rendimento escolar, os resultados deste estudo são inovadores já que se avaliaram alunos que passaram por tratamento odontológico e que, mesmo tendo as lesões de cárie tratadas, ainda apresentaram desempenho escolar inferior aos escolares livres de cárie. As

conclusões desta pesquisa ressaltam a necessidade de envolvimento constante e efetivo entre os setores de educação e de saúde, já que aspectos relacionados à saúde bucal e sistêmica apresentam impacto no rendimento e, posteriormente, na vida adulta destes escolares.

Diante da fundamentação teórica sobre o impacto dos determinantes sociais, o terceiro estudo (CAPÍTULO 3) teve como objetivo avaliar os fatores preditores para mudanças na qualidade de vida relacionada à saúde bucal (QVRSB) ao longo de 3 anos. Apesar de serem incluídos aspectos referentes aos determinantes sociais de saúde no modelo estatístico de avaliação, observa-se que os aspectos clínicos foram relevantes: a experiência de cárie no momento inicial da pesquisa foi o único fator preditor para piora ou manutenção da percepção de QVRSB em adolescentes. Este resultado pode ser observado pelo ponto de vista salutogênico, em que a ausência de experiência de cárie representa um fator de proteção para a melhora da QVRSB. Destaca-se ainda que este é um estudo longitudinal pioneiro no Brasil, com delineamento observacional e utilização do CPQ₁₁₋₁₄.

Não obstante as discussões constantes na literatura sobre o tema, o uso de questionários de QVRSB em estudos longitudinais deve ser avaliado criteriosamente, já que estes podem não detectar adequadamente as mudanças ocorridas ao longo do tempo. Para isso realizou-se duas avaliações das propriedades psicométricas chamadas *responsiveness*: uma para o questionário CPQ₈₋₁₀ e outra para CPQ₁₁₋₁₄.

A avaliação longitudinal da QVRSB de adolescentes (CAPÍTULO 4), feita por meio do questionário CPQ₁₁₋₁₄ em Juiz de Fora, Minas Gerais, detectou-se mudanças entre os escores ao longo dos três anos. Contudo, observa-se que houve menor responsividade do CPQ₁₁₋₁₄, possivelmente devido ao delineamento observacional, em que se analisaram as mudanças ocorridas naturalmente ao longo do tempo.

Além disso, realizando a comparação entre um questionário genérico de qualidade de vida (AUQUEI) e outro específico para saúde bucal (CPQ₁₁₋₁₄),

constata-se que houve uma correlação entre os dois instrumentos (CAPÍTULO 5). Definiu-se, ainda, que os resultados dos escores de cada um dos instrumentos foram impactados pelos determinantes sociais de saúde e pelas condições bucais dos adolescentes. De acordo com os resultados alcançados é possível concluir que ambos os questionários devem ser adotados para que estratégias holísticas sejam implementadas com base na abordagem à promoção da saúde.

Finalmente, para testar a capacidade do CPQ₈₋₁₀ de detectar mudanças ao longo do tempo, foram avaliados escolares antes e depois de uma intervenção com tratamento odontológico (CAPÍTULO 6). O questionário demonstrou-se responsivo às mudanças e, observou-se melhora na QVRSB entre os escolares submetidos ao tratamento odontológico. Além de definir os *responsiveness* do CPQ₈₋₁₀, o presente estudo ressalta a valorização das ações de promoção de saúde bucal para redução de iniquidades em saúde, como vem sendo realizado pelo Programa Sempre Sorrindo em Piracicaba, São Paulo.

CONCLUSÃO

Observaram-se associações entre determinantes sociais e cárie dentária, e que ambos estiveram associados a um pior rendimento escolar em escolares. Da mesma forma, verificou-se que a qualidade de vida relacionada à saúde bucal esteve correlacionada à qualidade de vida nesta população.

Quando avaliadas longitudinalmente, constatou-se que a experiência de cárie foi um preditor importante para mudanças da qualidade de vida relacionada à saúde bucal ao longo do tempo nesta população, mensurados pelos questionários Child Perception Questionnaire, que apresentaram boas propriedades psicométricas de responsividade às mudanças de qualidade de vida relacionada à saúde bucal.

Dentro deste contexto, entretanto, o acesso ao tratamento odontológico foi um importante fator para a melhoria da qualidade de vida relacionada à saúde bucal de escolares com nível socioeconômico mais baixo.

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ANEXO 1 – APROVAÇÃO DO ESTUDO EM PIRACICABA/SP NO COMITE DE ÉTICA EM PESQUISA



COMITÊ DE ÉTICA EM PESQUISA FACULDADE DE ODONTOLOGIA DE PIRACICABA UNIVERSIDADE ESTADUAL DE CAMPINAS




CERTIFICADO

O Comitê de Ética em Pesquisa da FOP-UNICAMP certifica que o projeto de pesquisa "**Avaliação do impacto do tratamento odontológico sobre a qualidade de vida e o rendimento escolar**", protocolo nº 111/2010, dos pesquisadores Janice Simpson de Paula, Cristina Martins Lisboa, Fábio Luiz Mialhe e Karin Luciana Migliato Sarracini, satisfaz as exigências do Conselho Nacional de Saúde - Ministério da Saúde para as pesquisas em seres humanos e foi aprovado por este comitê em 25/04/2012.

The Ethics Committee in Research of the School of Dentistry of Piracicaba - State University of Campinas, certify that the project "**Evaluation of the impact of dental treatment on quality of life and school performance**", register number 111/2010, of Janice Simpson de Paula, Cristina Martins Lisboa, Fábio Luiz Mialhe and Karin Luciana Migliato Sarracini, comply with the recommendations of the National Health Council - Ministry of Health of Brazil for research in human subjects and therefore was approved by this committee at 04/25/2012.


Profa. Dra. Livia Maria Andaló Tenuta
Secretária
CEP/FOP/UNICAMP


Prof. Dr. Jacks Jorge Junior
Coordenador
CEP/FOP/UNICAMP

Nota: O título do protocolo aparece como fornecido pelos pesquisadores, sem qualquer edição.
Notice: The title of the project appears as provided by the authors, without editing.

ANEXO 2 – APROVAÇÃO DO ESTUDO TRANSVERSAL EM JUIZ DE FORA/SP NO COMITE DE ÉTICA EM PESQUISA



**COMITÊ DE ÉTICA EM PESQUISA
FACULDADE DE ODONTOLOGIA DE PIRACICABA
UNIVERSIDADE ESTADUAL DE CAMPINAS**



CERTIFICADO

O Comitê de Ética em Pesquisa da FOP-UNICAMP certifica que o projeto de pesquisa **"Saúde bucal e qualidade de vida em adolescentes"**, protocolo nº 055/2009, dos pesquisadores Janice Simpson de Paula e Fábio Luiz Mialhe, satisfaz as exigências do Conselho Nacional de Saúde - Ministério da Saúde para as pesquisas em seres humanos e foi aprovado por este comitê em 25/06/2009.

The Ethics Committee in Research of the School of Dentistry of Piracicaba - State University of Campinas, certify that the project **"Oral health and quality of life in adolescents"**, register number 055/2009, of Janice Simpson de Paula and Fábio Luiz Mialhe, comply with the recommendations of the National Health Council - Ministry of Health of Brazil for research in human subjects and therefore was approved by this committee at 06/25/2009.

Prof. Dr. Pablo Agustin Vargas
Secretário
CEP/FOP/UNICAMP

Prof. Dr. Jacks Jorge Junior
Coordenador
CEP/FOP/UNICAMP

Nota: O título do protocolo aparece como fornecido pelos pesquisadores, sem qualquer edição.
Notice: The title of the project appears as provided by the authors, without editing.

ANEXO 3 – APROVAÇÃO DO ESTUDO LONGITUDINAL EM JUIZ DE FORA/SP NO COMITE DE ÉTICA EM PESQUISA



COMITÊ DE ÉTICA EM PESQUISA FACULDADE DE ODONTOLOGIA DE PIRACICABA UNIVERSIDADE ESTADUAL DE CAMPINAS




CERTIFICADO

O Comitê de Ética em Pesquisa da FOP-UNICAMP certifica que o projeto de pesquisa "**Avaliação longitudinal de fatores relacionados à saúde bucal, ao rendimento escolar e à qualidade de vida em crianças e adolescentes**", protocolo nº 147/2012, dos pesquisadores Janice Simpson de Paula e Fábio Luiz Mialhe, satisfaz as exigências do Conselho Nacional de Saúde - Ministério da Saúde para as pesquisas em seres humanos e foi aprovado por este comitê em 18/01/2013.

The Ethics Committee in Research of the Piracicaba Dental School - University of Campinas, certify that the project "**Longitudinal evaluation of factors related to oral health, school performance and quality of life in children and adolescents**", register number 147/2012, of Janice Simpson de Paula and Fábio Luiz Mialhe, comply with the recommendations of the National Health Council - Ministry of Health of Brazil for research in human subjects and therefore was approved by this committee on Jan 18, 2013.


Profa. Dra. Livia Maria Andaló Tenuta
Secretária
CEP/FOP/UNICAMP


Prof. Dr. Jacks Jorge Junior
Coordenador
CEP/FOP/UNICAMP

Nota: O título do protocolo aparece como fornecido pelos pesquisadores, sem qualquer edição.
Notice: The title of the project appears as provided by the authors, without editing.

ANEXO 4 – TCLE Estudo 1 _Piracicaba/SP



UNIVERSIDADE ESTADUAL DE CAMPINAS
FACULDADE DE ODONTOLOGIA DE PIRACICABA



TERMO DE CONSENTIMENTO LIVRE E ESCLARECIDO

Projeto: “AVALIAÇÃO DO IMPACTO DO TRATAMENTO ODONTOLÓGICO SOBRE A QUALIDADE DE VIDA E O RENDIMENTO ESCOLAR”

Seu filho(a) está sendo convidado(a) a participar da pesquisa intitulada “AVALIAÇÃO DO IMPACTO DO TRATAMENTO ODONTOLÓGICO SOBRE A QUALIDADE DE VIDA E O RENDIMENTO ESCOLAR”. Se decidir participar, é importante que leia estas informações sobre o estudo e o seu papel nesta pesquisa.

1) Justificativa da pesquisa

Esta pesquisa será realizada com o objetivo de avaliar o impacto do tratamento odontológico na qualidade de vida relacionada à saúde bucal e no rendimento dos alunos na escola. Além disso, será avaliado o perfil socioeconômico dos pais.

Justifica-se a realização desta pesquisa, pois atualmente se sabe que as condições bucais influenciam a qualidade de vida das pessoas. Portanto, o tratamento odontológico destas pode contribuir com a melhora da qualidade de vida, influenciando de modo positivo o dia-a-dia da criança e sua família.

A criança será avaliada por meio de questionário aplicado a ela e ao Sr.(a) (responsável), em seguida, caso necessite, será realizado o tratamento odontológico sob responsabilidade do projeto “Sempre Sorrindo” e previamente autorizado pelo Sr.(a). Após 4 semanas a criança responderá novamente ao questionário na própria escola, para verificar se houve modificação na qualidade de vida. Além disso, as notas na escola referentes ao ano letivo será avaliada antes e após o tratamento.

A qualquer momento o(a) Sr. (a) poderá desistir de participar e retirar seu consentimento. A recusa não trará nenhum prejuízo na relação com o pesquisador ou com a escola e a criança não será prejudicada caso tenha que fazer o tratamento odontológico no projeto “Sempre Sorrindo”. É preciso entender a natureza da participação de seu filho(a) e assinar este Termo de Consentimento Livre e Esclarecido (TCLE).

2) Procedimento do Estudo

Após concordar em participar deste estudo, seu filho(a) passará pelos seguintes procedimentos:

QUALIDADE DE VIDA – Para avaliar a percepção sobre qualidade de vida as crianças responderão a Questionários de Saúde Oral da Criança. A criança terá liberdade de responder as perguntas ou não, serão devidamente instruídos antes do preenchimento e esclarecidos quando surgirem dúvidas.

NIVEL SOCIOECONÔMICO – Para avaliar a percepção sobre qualidade de vida as crianças responderão a Questionários de Saúde Oral da Criança. A criança terá liberdade de responder as perguntas ou não, serão devidamente instruídos antes do preenchimento e esclarecidos quando surgirem dúvidas.

TRATAMENTO ODONTOLÓGICO – Caso necessite, a criança passará por tratamento odontológico sob responsabilidade do projeto “Sempre Sorrindo”, em parceria com a Faculdade de Odontologia de Piracicaba e a prefeitura, já previamente autorizado pelo Sr(a)

junto a escola onde seu filho(a) estuda. Este tratamento será realizado independente da participação na pesquisa.

RENDIMENTO ESCOLAR – Dados sobre o rendimento escolar de cada aluno serão obtidos nas escolas. As notas finais das disciplinas cursadas pelo aluno serão coletadas com as/os professores(as) no final do ano.

3) Grupos – Não há grupo controle ou placebo neste estudo.

4) Métodos alternativos – Não existem métodos alternativos para obtenção das informações desejadas.

5) Riscos e desconfortos – Não há riscos previsíveis, pois os procedimentos são simples. O questionário será respondido pela criança e seu responsável, pela leitura e marcação das respostas, com liberdade de responder ou não. Os atendimentos clínicos realizados nas crianças serão de responsabilidade do projeto “Sempre Sorrindo” e seguirão os passos de rotina odontológica e as normas biossegurança e limpeza do instrumental utilizado.

6) Benefícios – Garante-se que a participação na pesquisa não acarretará gastos aos voluntários e os sujeitos não receberão nenhum benefício direto pela participação na mesma. Os resultados deste estudo permitirão avaliar o impacto do tratamento odontológico na qualidade de vida relacionada à saúde bucal e no rendimento escolar das crianças, direcionando o planejamento de ações em promoção de saúde para população em geral.

7) Forma de acompanhamento e assistência – O atendimento para a pesquisa será realizado nas próprias escolas, em período que não interfira no horário escolar, e nos horários de espera para atendimento no projeto “Sempre Sorrindo”.

8) Esclarecimentos – Você e seu filho(a) receberão respostas a qualquer pergunta ou esclarecimento sobre qualquer dúvida acerca dos procedimentos, riscos e benefícios empregados neste documento e outros assuntos relacionados à pesquisa antes, durante ou após a realização da mesma. Também serão dadas informações sobre o tratamento odontológico.

9) Retirada do consentimento – O responsável pela criança tem a liberdade de retirar o consentimento a qualquer momento e deixar de participar do estudo sem qualquer punição ou prejuízo. Não haverá qualquer prejuízo ou dano nas escolas e no tratamento odontológico.

10) Sigilo dos dados – As informações obtidas da participação neste estudo serão mantidas estritamente confidenciais, sendo que os resultados divulgados nunca identificarão a criança. Além dos profissionais de saúde que farão as avaliações, agências governamentais locais, o Comitê de Ética em Pesquisa da instituição onde o estudo está sendo realizado podem precisar consultar os registros. A criança não será identificado quando o material de seu registro for utilizado, seja para propósitos de publicação científica ou educativa.

11) Despesas – O voluntário não terá gastos ou cobranças pela participação no estudo.

12) Previsão de indenização – Não há previsão de indenização, pois a pesquisa não oferece riscos previsíveis. No entanto, os pesquisadores responsáveis se encontram comprometidos com o Conselho Nacional de Saúde na observação e cumprimento das normas e diretrizes regulamentadoras da pesquisa em seres humanos.

13) Critérios para suspender ou encerrar a pesquisa – Não havendo riscos previsíveis a pesquisa só será encerrada quando as informações desejadas forem obtidas.

14) Entrega do TCLE – o responsável receberá uma cópia deste termo onde consta o telefone e o endereço do pesquisador principal, podendo tirar suas dúvidas sobre o projeto e sua participação agora ou qualquer momento. Caso você tenha mais perguntas sobre o estudo, por favor faça os seguintes contatos:

Pesquisadores: Profº Fabio Luiz Mialhe / CD Janice Simpson de Paula / CD Cristina Lisboa /CD Karin Migliato

Fone: (19)2106-5279/(19)3422-5347(Prédio Central da FOP-UNICAMP). FOP: Avenida Limeira 901 - Bairro Areão. Piracicaba, SP. CEP: 13414-903. E-mail: janicesimpson@fop.unicamp.br

15) Declaração de consentimento

Li as informações contidas neste documento antes de assinar este termo de consentimento. Declaro que fui informado(a) sobre os métodos, as inconveniências, riscos, benefícios e eventos adversos que podem vir a ocorrer em consequência dos procedimentos.

Declaro que tive tempo suficiente para ler e entender as informações acima. Declaro também que toda a linguagem técnica utilizada na descrição deste estudo de pesquisa foi satisfatoriamente explicada e que recebi respostas para todas as minhas dúvidas. Confirmando também que recebi uma cópia deste formulário de consentimento. Compreendo que sou livre para retirar a criança do estudo em qualquer momento, se por minha vontade ou pela própria vontade da criança, sem perda de benefícios ou qualquer outra penalidade.

Dou meu consentimento de livre e espontânea vontade para o menor sob minha responsabilidade participar como voluntário deste estudo.

Nome da criança: _____

Nome do responsável: _____ Tel: _____

Endereço: _____

Data ___/___/_____

Assinatura do responsável: _____

Assinatura do pesquisador responsável: _____ Data ___/___/_____

ATENÇÃO: A sua participação em qualquer outra pesquisa é voluntária. Em caso de dúvida quanto aos seus direitos, escreva para o Comitê de Ética em Pesquisa da FOP-UNICAMP.

Endereço: Av. Limeira, 901-CEP: 13.414-900 / Piracicaba/SP. Tel/Fax: (0xx19) 2106-5349 / FOP: (0xx19) 2106-5218 E-mail: cep@fop.unicamp.br – website: www.fop.unicamp.br/cep

ANEXO 5 – TCLE Estudo 2 _ juiz de Fora/MG



UNIVERSIDADE ESTADUAL DE CAMPINAS
FACULDADE DE ODONTOLOGIA DE PIRACICABA



TERMO DE CONSENTIMENTO LIVRE E ESCLARECIDO

Projeto: “Avaliação longitudinal de fatores relacionados à saúde bucal, ao rendimento escolar e à qualidade de vida em crianças e adolescentes”

Seu filho(a) está sendo convidado(a) a continuar participando da pesquisa iniciada em 2009 intitulada “AVALIAÇÃO LONGITUDINAL DE FATORES RELACIONADOS À SAÚDE BUCAL, AO RENDIMENTO ESCOLAR E À QUALIDADE DE VIDA EM CRIANÇAS E ADOLESCENTES”. Se decidir participar, é importante que leia estas informações sobre o estudo e o seu papel nesta pesquisa.

1) Justificativa da pesquisa

Esta pesquisa será realizada com o objetivo de conhecer a incidência (se houveram casos novos) de cárie, problemas gengivais, alterações nas posições dos dentes, defeitos no esmalte do dente e fraturas dentárias. Além disso, será testada a existência de associações entre essas doenças bucais, o nível socioeconômico, a qualidade de vida e o rendimento escolar.

Justifica-se a realização desta pesquisa, pois atualmente se sabe que as condições bucais influenciam a qualidade de vida das pessoas. Portanto, a detecção destas alterações pode contribuir com a melhora da qualidade de vida, pois se essas forem solucionadas, podem influenciar de modo positivo a vida cotidiana do adolescente e sua família.

O adolescente será avaliado por meio de questionário aplicado a ele e ao Sr.(a) (responsável), em seguida será realizado exame clínico que identificará a presença de alterações bucais.

A qualquer momento o(a) Sr. (a) poderá desistir de participar e retirar seu consentimento. A recusa não trará nenhum prejuízo na relação com o pesquisador ou com a instituição. É preciso entender a natureza da participação de seu filho(a) e assinar este Termo de Consentimento Livre e Esclarecido (TCLE).

2) Procedimento do Estudo

Após concordar em participar deste estudo, seu filho(a) passará pelos seguintes procedimentos:

QUALIDADE DE VIDA – Para avaliar a percepção sobre qualidade de vida e os fatores relacionados, os adolescentes e os Sr.(a) responsáveis responderão aos questionários sobre a Saúde do Adolescente, sua Qualidade de Vida e sua Família (ambiente familiar e condições socioeconômicas). O adolescente e o Sr.(a) terão liberdade de responder as perguntas ou não, serão devidamente instruídos antes do preenchimento e esclarecidos quando surgirem dúvidas.

EXAME CLÍNICO BUCAL – Serão verificadas as condições dos dentes (número de dentes cariados, perdidos e obturados, fraturas e defeitos no esmalte) e gengiva, além de exame para verificar a posição dos dentes, se estão em posição correta ou não.

RENDIMENTO ESCOLAR – Dados sobre o rendimento escolar de cada aluno serão obtidos nas escolas. As notas finais de cada aluno serão coletadas com as/os professores(as) no final do ano.

3) Grupos – Não há grupo controle ou placebo neste estudo.

4) Métodos alternativos – Não existem métodos alternativos para obtenção das informações desejadas.

5) Riscos e desconfortos – não há riscos e desconfortos previsíveis, pois os procedimentos são simples. Os questionários serão respondido pelo adolescente e seu responsável, pela leitura e marcação das respostas, com liberdade de responder ou não. O questionário é respondido pelos próprios participantes, em aproximadamente 30 minutos. Os exames clínicos seguem os passos de rotina odontológica e as normas de biossegurança e limpeza do instrumental utilizado seguem as normas preconizadas pela Organização Mundial de Saúde para levantamentos epidemiológicos. O tempo estimado para realização dos exames clínicos é de 15 minutos.

6) Benefícios – As avaliações que serão realizadas permitirão o diagnóstico de possíveis alterações na cavidade bucal e seus anexos. O voluntário portador destas alterações receberá informações e orientações em relação ao problema e ao tratamento, sendo informado quais profissionais estariam indicados. Os voluntários que apresentarem necessidades de tratamento curativo serão devidamente encaminhados para atendimento odontológico na Faculdade de Odontologia da Universidade Federal de Juiz de Fora. Garante-se que a participação na pesquisa não acarretará gastos aos voluntários, assim como em relação a qualquer procedimento de exame clínico.

7) Forma de acompanhamento e assistência – O atendimento para a pesquisa será realizado nas próprias escolas em período que não interfira no horário escolar.

8) Esclarecimentos – Você e seu filho(a) receberão respostas a qualquer pergunta ou esclarecimento sobre qualquer dúvida acerca dos procedimentos, riscos e benefícios empregados neste documento e outros assuntos relacionados à pesquisa antes, durante ou após a realização da mesma. Também serão dadas informações sobre o diagnóstico das alterações detectadas e o prognóstico. Essas informações serão passadas aos professores e pais por escrito e verbalmente.

9) Retirada do consentimento – O responsável pelo adolescente tem a liberdade de retirar o consentimento a qualquer momento e deixar de participar do estudo sem qualquer punição ou prejuízo.

10) Sigilo dos dados – As informações obtidas da participação neste estudo serão mantidas estritamente confidenciais, sendo que os resultados divulgados nunca identificarão o adolescente. Além dos profissionais de saúde que farão as avaliações, agências governamentais locais, o Comitê de Ética em Pesquisa da instituição onde o estudo está sendo realizado podem precisar consultar os registros. O adolescente não será identificado quando o material de seu registro for utilizado, seja para propósitos de publicação científica ou educativa.

11) Despesas – O voluntário não terá gastos ou cobranças pela participação no estudo.

12) Previsão de indenização – Não há previsão de indenização, pois a pesquisa não oferece riscos previsíveis. No entanto, os pesquisadores responsáveis se encontram comprometidos com o Conselho Nacional de Saúde na observação e cumprimento das normas e diretrizes regulamentadoras da pesquisa em seres humanos.

13) Critérios para suspender ou encerrar a pesquisa – Não havendo riscos previsíveis a pesquisa só será encerrada quando as informações desejadas forem obtidas.

14) Entrega do TCLE

O responsável receberá uma cópia deste termo onde consta o telefone e o endereço do pesquisador principal, podendo tirar suas dúvidas sobre o projeto e sua participação agora ou qualquer momento. Caso você tenha mais perguntas sobre o estudo, por favor faça os seguintes contatos:

Dados dos pesquisadores: Profº Fabio Luis Mialhe / CD Janice Simpson de Paula
Fone: (19)2106-5279/(32)3331-3963/(32)9906-9722. Avenida Limeira 901 - Bairro Areão. Piracicaba, SP. CEP: 13414-903. E-mail: janicesimpsondp@yahoo.com.br

14) Declaração de consentimento

Li as informações contidas neste documento antes de assinar este termo de consentimento. Declaro que fui informado(a) sobre os métodos, as inconveniências, riscos, benefícios e eventos adversos que podem vir a ocorrer em consequência dos procedimentos.

Declaro que tive tempo suficiente para ler e entender as informações acima. Declaro também que toda a linguagem técnica utilizada na descrição deste estudo de pesquisa foi satisfatoriamente explicada e que recebi respostas para todas as minhas dúvidas. Confirmando também que recebi uma cópia deste formulário de consentimento. Compreendo que sou livre para retirar o adolescente do estudo em qualquer momento, se por minha vontade ou pela própria vontade do adolescente, sem perda de benefícios ou qualquer outra penalidade.

Dou meu consentimento de livre e espontânea vontade para o menor sob minha responsabilidade participar como voluntário deste estudo.

Nome do adolescente: _____
Nome do responsável: _____ Tel: _____
Endereço: _____

Data ____/____/____

Assinatura do responsável: _____

Assinatura do pesquisador responsável: _____ Data ____/____/____

ATENÇÃO: A sua participação em qualquer outra pesquisa é voluntária. Em caso de dúvida quanto aos seus direitos, escreva para o Comitê de Ética em Pesquisa da FOP-UNICAMP.

Endereço: Av. Limeira, 901-CEP: 13.414-900 / Piracicaba/SP. Tel/Fax: (0xx19) 2106-5349 / FOP: (0xx19) 2106-5218 E-mail: cep@fop.unicamp.br – website: www.fop.unicamp.br/cep

ANEXO 6 – Ficha de Avaliação Estudo 1


FICHA ODONTOLÓGICA - (escola)

USF:

Escola: _____
Série: _____
Período: _____

Examinador: _____
Data: _____

Nome	S e x o	Idade	Registrar a quantidade dentes acometidos							Responder com S (sim) ou N (não)						Risco *	Trat PC	Dentes Decid. ART ***
			c	e	o	ceod	C	P	O	CPOD	Cárie aguda	Cárie Crônica	Selante **	MBa	Placa			

+Escrever a quantidade de dentes.
 * CRITÉRIOS PARA A AVALIAÇÃO DE RISCO INDIVIDUAL: A – ausência de doenças bucais (tudo OK); B – somente dentes restaurados; C – somente cárie crônica; D – presença de placa, gengivite e/ou mancha branca; E – somente cárie aguda; F – urgência (dor, abscesso).
 **CRITÉRIOS PARA A AVALIAÇÃO DO SELANTE: 0 – não tem e não precisa; 1 – Necessita; 2 – Presente.
 ***CRITÉRIOS PARA INDICAÇÃO DO ART: Escrever o número dos dentes.
 ****CRITÉRIOS URGÊNCIA: Quando urgência escrever se é por dor ou por abscesso: D=dor; A=abscesso; D/A=dor e abscesso.

ANEXO 7 – Ficha de Avaliação Clínica Estudo 2



UNIVERSIDADE ESTADUAL DE CAMPINAS
FACULDADE DE ODONTOLOGIA DE PIRACICABA
 Projeto: "Qualidade de Vida e Saúde Bucal em Adolescentes"



Ficha nº: _____ Nome: _____ Examinador: _____
 Sexo: () F () M Nasç.: ____/____/____ Idade: ____ anos Data do Exame: ____/____/2009
 Escola: _____ Série: _____

CÁRIE DENTÁRIA/FRATURA

CODIGO		CONDIÇÃO/ESTADO
DEC.	PERM.	
Coroa		
A	0	higido
B	1	cariado
C	2	restaurado, com cárie
D	3	restaurado, sem cárie
E	4	ausente, devido a cárie
-	5	ausente, por outros
F	6	selante de fissura
G	7	suporte para prótese, coroa protética ou
-	8	não erupcionado
T	T	traumatismo (fratura)
-	9	não registrado

TRATAMENTO
0 = Nenhum
P = Cuidado preventivo/ cariostático
F = Selante
1 = Restauração 1 face
2 = Restauração 2 ou mais faces
3 = Coroa por qualquer motivo
4 = Faceta laminada
5 = Tratamento pulpar e restauração
6 = Extração
7 = Outros cuidados
8 = Outros cuidados
9 = Sem registro

55 54 53 52 51 18 17 16 15 14 13 12 11	61 62 63 64 65 21 22 23 24 25 26 27 28

RISCO*

OPACIDADE / HIPOPLASIA DO ESMALTE

Dentes permanentes
 0 = Normal
 1 = Opacidade delimitada
 2 = Opacidade difusa
 3 = Hipoplasia
 4 = Outros defeitos
 5 = Opacidades difusas e delimitadas
 6 = Opacidades delimitadas e hipoplasia
 7 = Opacidades difusas e hipoplasia
 8 = Todas as três condições
 9 = Sem registro

14 13 12 11 21 22 23 24	46	36

ÍNDICE PERIODONTAL COMUNITÁRIO (CPI)

0 = Higido
 1 = Sangramento
 2 = Cálculo
 x = Sextante excluído
 9 = Sem registro

55/16	51/11	65/26

* CRITÉRIOS PARA A AVALIAÇÃO DE RISCO INDIVIDUAL: A – ausência de doenças bucais (tudo OK); B – somente dentes restaurados; C – somente cárie crônica; D – presença de placa, gengivite e/ou mancha branca; E – somente cárie aguda; F – urgência (dor, abscesso).

ANEXO 8 – Avaliação de má-oclusão Estudo 2

Anormalidades Dentofaciais

1. Dentição: na ausência de incisivos, caninos e pré-molares superiores e inferiores - escrever o número de dentes. O número de dentes ausentes nas arcadas superior e inferior deve ser registrado nos campos 1 e 2.

(1) (2)

2. Espaço:

Apinhamento na região de incisivos:

0 = Sem apinhamento

1 = Uma região com apinhamento

2 = Duas regiões com apinhamento

Espaçamento na região de incisivos:

0 = Sem espaçamento

1 = Uma região com espaçamento

2 = Duas regiões com espaçamento

Diastema em milímetros:

Desalinhamento maxilar anterior em mm:

Desalinhamento mandibular anterior em mm:

3. Oclusão:

Overjet maxilar anterior em mm:

Overjet mandibular anterior em mm:

Mordida aberta vertical anterior em mm:

Relação molar ântero-posterior:

0 = Normal

1 = Meia cúspide

2 = Cúspide inteira

M = Mesial

D = Distal

Overbite em mm:

Mordida cruzada posterior:

0 = Ausente

1 = Bilateral

2 = Unilateral direita

3 = Unilateral esquerda

ANEXO 9 – Questionários de QVRSB aplicado às crianças

Questionário de Saúde Bucal Infantil – 8 a 10 anos	Questionário de Saúde Bucal Infantil – 8 a 10 anos
<p>Olá,</p> <p>Obrigado por nos ajudar com nosso estudo! Estamos fazendo este estudo para entender melhor as coisas que podem acontecer com as crianças por causa de seus dentes e sua boca.</p> <p>POR FAVOR, LEMBRE-SE:</p> <ul style="list-style-type: none">☺ Não escreva seu nome no questionário.☺ Isto não é uma prova e não existem respostas certas ou erradas.☺ Responda o mais honestamente que puder.☺ Não converse com ninguém sobre as perguntas enquanto as estiver respondendo.☺ Ninguém que Você conhece verá suas respostas.☺ Leia cada pergunta cuidadosamente e pense sobre as coisas que aconteceram com Você nas últimas 4 semanas.☺ Antes de responder, pergunte a Você mesmo: “Isto acontece comigo por causa dos meus dentes ou da minha boca?”☺ Coloque um X na caixa (☐) à frente da resposta que for melhor para Você.	<p>Data de hoje: _____ / _____ / _____ <i>Dia Mês Ano</i></p> <div style="border: 1px solid black; padding: 5px; text-align: center;"><p>PRIMEIR , RESPONDA ALGUMAS PERGUNTAS SOBRE VOCÊ</p></div> <p>1. Você é um menino ou uma menina?</p> <ul style="list-style-type: none"><input type="checkbox"/> Menino<input type="checkbox"/> Menina <p>2. Quando você nasceu? _____ / _____ / _____ Idade _____ <i>Dia Mês Ano</i></p> <p>3. Quando você pensa em seus dentes ou boca, Você acha que eles são:</p> <ul style="list-style-type: none"><input type="checkbox"/> Muito bons<input type="checkbox"/> Bons<input type="checkbox"/> Mais ou menos<input type="checkbox"/> Ruins <p>4. Quanto seus dentes ou boca lhe incomodam no dia-a-dia?</p> <ul style="list-style-type: none"><input type="checkbox"/> Nem um pouco<input type="checkbox"/> Só um pouquinho<input type="checkbox"/> Mais ou menos<input type="checkbox"/> Muito <div style="border: 1px solid black; padding: 5px; text-align: center;"><p>AGORA RESPONDA ALGUMAS PERGUNTAS SOBRE O QUE ACONTECEU COM SEUS DENTES E SUA BOCA NAS ÚLTIMAS 4 SEMANAS</p></div> <p>5. Você teve dor em seus dentes ou em sua boca?</p> <ul style="list-style-type: none"><input type="checkbox"/> Nunca<input type="checkbox"/> Uma ou duas vezes<input type="checkbox"/> Algumas vezes<input type="checkbox"/> Várias vezes<input type="checkbox"/> Todos os dias ou quase todos os dias <p>6. Você teve locais doloridos em sua boca?</p> <ul style="list-style-type: none"><input type="checkbox"/> Nunca<input type="checkbox"/> Uma ou duas vezes<input type="checkbox"/> algumas vezes<input type="checkbox"/> Várias vezes<input type="checkbox"/> Todos os dias ou quase todos os dias

7. Você teve dor em seus dentes quando tomou bebidas geladas ou comeu alimentos quentes?

- Nunca
- Uma ou duas vezes
- Algumas vezes
- Várias vezes
- Todos os dias ou quase todos os dias

8. Você sentiu alimento grudado em seus dentes?

- Nunca
- Uma ou duas vezes
- Algumas vezes
- Várias vezes
- Todos os dias ou quase todos os dias

9. Você teve mau hálito?

- Nunca
- Uma ou duas vezes
- Algumas vezes
- Várias vezes
- Todos os dias ou quase todos os dias

10. Você precisou de mais tempo que os outros para comer seus alimentos devido aos seus dentes ou sua boca?

- Nunca
- Uma ou duas vezes
- Algumas vezes
- Várias vezes
- Todos os dias ou quase todos os dias

11. Você teve dificuldade para morder ou mastigar alimentos duros, como maçã, milho verde na espiga ou bife devido aos seus dentes ou sua boca?

- Nunca
- Uma ou duas vezes
- Algumas vezes
- Várias vezes
- Todos os dias ou quase todos os dias

12. Você teve dificuldade para comer o que gostaria devido a problemas nos seus dentes ou na sua boca?

- Nunca
- Uma ou duas vezes
- Algumas vezes
- Várias vezes
- Todos os dias ou quase todos os dias

13. Você teve dificuldade para dizer algumas palavras devido a problemas aos seus dentes ou sua boca?

- Nunca
- Uma ou duas vezes
- Algumas vezes
- Várias vezes
- Todos os dias ou quase todos os dias

14. Você teve problemas enquanto dormia devido aos seus dentes ou sua boca?

- Nunca
- Uma ou duas vezes
- Algumas vezes
- Várias vezes
- Todos os dias ou quase todos os dias

AGORA RESPONDA ALGUMAS PERGUNTAS SOBRE O QUE ACONTECEU COM SEUS SENTIMENTOS NAS ÚLTIMAS 4 SEMANAS

15. Você ficou triste devido aos seus dentes ou sua boca?

- Nunca
- Uma ou duas vezes
- Algumas vezes
- Várias vezes
- Todos os dias ou quase todos os dias

16. Você se sentiu aborrecido devido aos seus dentes ou sua boca?

- Nunca
- Uma ou duas vezes
- Algumas vezes
- Várias vezes
- Todos os dias ou quase todos os dias

17. Você ficou tímido devido aos seus dentes ou sua boca?

- Nunca
- Uma ou duas vezes
- Algumas vezes
- Várias vezes
- Todos os dias ou quase todos os dias

18. Você ficou preocupado com o que as outras pessoas pensam sobre seus dentes ou sua boca?

- Nunca
- Uma ou duas vezes
- Algumas vezes
- Várias vezes
- Todos os dias ou quase todos os dias

19. Você ficou preocupado porque Você não é tão bonito quanto os outros por causa de seus dentes ou sua boca nas últimas 4 semanas?

- Nunca
- Uma ou duas vezes
- Algumas vezes
- Várias vezes

RESPONDA ALGUMAS PERGUNTAS SOBRE O QUE ACONTECEU NA SUA ESCOLA **NAS ÚLTIMAS 4 SEMANAS**

- Todos os dias ou quase todos os dias

20. Você faltou à escola devido a problemas nos seus dentes ou na sua boca?

- Nunca
- Uma ou duas vezes
- Algumas vezes
- Várias vezes
- Todos os dias ou quase todos os dias

21. Você teve dificuldade para fazer sua lição de casa devido a problemas com seus dentes ou sua boca?

- Nunca
- Uma ou duas vezes
- Algumas vezes
- Várias vezes
- Todos os dias ou quase todos os dias

22. Você teve dificuldade para prestar atenção na aula devido a problemas nos seus dentes ou na sua boca?

- Nunca
- Uma ou duas vezes
- Algumas vezes
- Várias vezes
- Todos os dias ou quase todos os dias

23. Você não quis falar ou ler em voz alta na aula devido a problemas nos seus dentes ou na sua boca?

- Nunca
- Uma ou duas vezes
- Algumas vezes
- Várias vezes
- Todos os dias ou quase todos os dias

RESPONDA ALGUMAS PERGUNTAS SOBRE VOCÊ JUNTO COM OUTRAS PESSOAS **NAS ÚLTIMAS 4 SEMANAS**

24. Você não quis sorrir ou rir quando estava com outras crianças devido a problemas nos seus dentes ou na sua boca?

- Nunca
- Uma ou duas vezes
- Algumas vezes
- Várias vezes
- Todos os dias ou quase todos os dias

25. Você não quis conversar com outras crianças devido aos problemas com seus dentes ou boca?

- Nunca
- Uma ou duas vezes
- Algumas vezes
- Várias vezes
- Todos os dias ou quase todos os dias

26. Você não quis ficar perto de outras crianças devido aos seus dentes ou sua boca?

- Nunca
- Uma ou duas vezes
- Algumas vezes
- Várias vezes
- Todos os dias ou quase todos os dias

27. Você não quis participar de esportes e ir ao parque devido aos seus dentes ou sua boca?

- Nunca
- Uma ou duas vezes
- Algumas vezes
- Várias vezes
- Todos os dias ou quase todos os dias

28. Outras crianças tiraram sarro de você ou lhe apelidaram devido aos seus dentes ou sua boca?

- Nunca
- Uma ou duas vezes
- Algumas vezes
- Várias vezes
- Todos os dias ou quase todos os dias

29. Outras crianças fizeram perguntas sobre seus dentes ou boca?

- Nunca
- Uma ou duas vezes
- Algumas vezes
- Várias vezes
- Todos os dias ou quase todos os dias

ANEXO 10– Questionário aplicado aos adolescentes Estudo 2
QUESTIONÁRIO DE AVALIAÇÃO DA QUALIDADE DE VIDA EM
ADOLESCENTES

Diga como você se sente:	Muito infeliz	Infeliz	Feliz	Muito feliz
1. à mesa, junto com sua família	()	()	()	()
2. à noite, quando você se deita	()	()	()	()
3. se você tem irmãos, quando brinca com eles	()	()	()	()
4. à noite, ao dormir	()	()	()	()
5. na sala de aula	()	()	()	()
6. quando você vê uma fotografia sua	()	()	()	()
7. em momentos de brincadeira, durante o recreio escolar	()	()	()	()
8. quando você vai a uma consulta médica	()	()	()	()
9. quando você pratica um esporte	()	()	()	()
10. quando você pensa em seu pai	()	()	()	()
11. no dia do seu aniversário	()	()	()	()
12. quando você faz as lições de casa	()	()	()	()
13. quando você pensa em sua mãe	()	()	()	()
14. quando você fica internado no hospital	()	()	()	()
15. quando você brinca sozinho(a)	()	()	()	()
16. quando seu pai ou sua mãe falam de você	()	()	()	()
17. quando você dorme fora de casa	()	()	()	()
18. quando alguém te pede que mostre alguma coisa que você sabe fazer	()	()	()	()
19. quando os amigos falam de você	()	()	()	()
20. quando você toma os remédios	()	()	()	()
21. durante as férias	()	()	()	()
22. quando você pensa em quando tiver crescido	()	()	()	()
23. quando você está longe de sua família	()	()	()	()
24. quando você recebe as notas da escola	()	()	()	()
25. quando você está com seus avós	()	()	()	()
26. quando você assiste televisão	()	()	()	()

RESPONDA AS PERGUNTAS ABAIXO SOBRE VOCÊ:

1) Você considera a sua saúde em geral:

() Excelente () Muito boa () Boa () Regular () Ruim

2) Você considera a sua saúde bucal:

() Excelente () Muito boa () Boa () Regular () Ruim

3) Você esta contente com a aparência de seus dentes?

- estou muito contente
- estou contente
- não estou contente

4) Você acha que seus dentes mastigam bem os alimentos?

- mastigo muito bem
- mastigo bem
- não mastigo bem

5) Nos últimos 6 meses, quantas vezes você se sentiu nervoso?

- uma vez por dia
- uma vez por semana
- uma vez por mês
- raramente
- nunca

6) Você confia em você?

- sempre
- quase sempre
- raramente
- nunca

7) Você acha que seu corpo é:

- magro
- gordo
- no tamanho certo
- eu não penso sobre isso

8) Sua aparência é:

- Excelente Muito boa Boa Regular Ruim

9) É fácil ou difícil fazer amigos?

- Muito fácil Fácil Difícil Muito difícil

10) Quem são seus 3 melhores amigos aqui na escola? Escreva o nome todo deles abaixo:

EM RELAÇÃO AO AMBIENTE FAMILIAR

Indique com quem você mora:

- mãe e pai biológicos

- () só a mãe biológicas, os pais são separados
- () só a mãe biológica, o pai é falecido
- () só a mãe biológica, não sabe quem é o pai
- () mãe biológica e padrasto, pai falecido
- () mãe biológica e padrasto, pais separados
- () mãe biológica e padrasto, não sabe quem é o pai
- () mãe e pai adotivos
- () outros – especifique _____

Você tem irmãos?

() não () sim. Quantos? _____

Ao todo, quantas pessoas moram na casa? _____

Quantos cômodos tem sua casa? _____

ANEXO 11 – Questionário de QVRSB aplicado aos adolescente Estudo 2

Questionário de Saúde Bucal Infantil

Olá,

Obrigado por concordar em nos ajudar com nosso estudo!

Este estudo está sendo feito para que haja maior entendimento sobre os problemas que as crianças podem ter por causa de seus **dentes, boca, lábios e maxilares**. Respondendo às perguntas, você nos ajudará a aprender mais sobre as experiências dos jovens.

POR FAVOR, LEMBRE-SE:

- ☺ Não escreva seu nome no questionário.
- ☺ Isto **não é uma prova** e não existem respostas certas ou erradas.
- ☺ Responda o mais **honestamente** que puder.
- ☺ **Não converse com ninguém** sobre as perguntas enquanto as estiver respondendo. Suas respostas são **personais**; ninguém que você conhece verá suas respostas.
- ☺ Leia cada pergunta **cuidadosamente** e pense sobre as coisas que aconteceram com você **nos últimos 3 meses** enquanto estiver respondendo.
- ☺ Antes de responder, pergunte a você mesmo: **“Isto acontece comigo devido a problemas com meus dentes, lábios, boca ou maxilares?”**
- ☺ Coloque um **X** na caixa () à frente da resposta que for **melhor** para você.

QUESTIONÁRIO DE SAÚDE BUCAL INFANTIL 11-14 anos

Data de hoje: ____/____/____
DIA MÊS ANO

PRIMEIRO, RESPONDA ALGUMAS PERGUNTAS SOBRE VOCÊ

1. Você é um menino ou uma menina?

- Menino
- Menina

2. Quando você nasceu? ____/____/____
DIA MÊS ANO

3. Você acha que a saúde de seus dentes, lábios, maxilares e boca é:

- Excelente
- Muito boa
- Boa
- Mais ou menos
- Ruim

4. As condições (boas ou ruins) de seus dentes, lábios ou boca atrapalham sua vida no dia a dia?

- Nem um pouco
- Só um pouquinho

- Mais ou menos
- Muito
- MUITÍSSIMO

PERGUNTAS SOBRE PROBLEMAS BUCAIS

NOS ÚLTIMOS 3 MESES...

5. Você teve dor em seus dentes, lábios, maxilares ou boca?

- Nunca
- Uma ou duas vezes
- Algumas vezes
- Várias vezes
- Todos os dias ou quase todos os dias

6. Você teve sangramento na gengiva?

- Nunca
- Uma ou duas vezes
- Algumas vezes
- Várias vezes
- Todos os dias ou quase todos os dias

7. Você teve feridas em sua boca?

- Nunca
- Uma ou duas vezes
- Algumas vezes
- Várias vezes
- Todos os dias ou quase todos os dias

NOS ÚLTIMOS 3 MESES...

8. Você teve mau hálito?

- Nunca
- Uma ou duas vezes
- Algumas vezes
- Várias vezes
- Todos os dias ou quase todos os dias

9. Você teve alimento grudado dentro ou entre os dentes?

- Nunca
- Uma ou duas vezes
- Algumas vezes
- Várias vezes
- Todos os dias ou quase todos os dias

10. Você teve alimento preso no céu da boca?

- Nunca
- Uma ou duas vezes
- Algumas vezes
- Várias vezes
- Todos os dias ou quase todos os dias

11. Você costuma respirar pela boca (ou ficar de boca aberta) devido a problemas nos seus dentes, lábios, maxilares ou boca?

- Nunca
- Uma ou duas vezes
- Algumas vezes
- Várias vezes
- Todos os dias ou quase todos os dias

12. Você levou mais tempo que os outros para comer uma refeição devido aos seus dentes, lábios, maxilares ou boca?

- Nunca
- Uma ou duas vezes
- Algumas vezes
- Várias vezes
- Todos os dias ou quase todos os dias

13. Você teve problemas enquanto dormia devido aos seus dentes, lábios, maxilares ou boca?

- Nunca
- Uma ou duas vezes
- Algumas vezes
- Várias vezes
- Todos os dias ou quase todos os dias

14. Você teve dificuldade para morder ou mastigar alimentos como maçã, milho verde na espiga ou bife devido aos seus dentes, lábios, maxilares ou boca?

- Nunca
- Uma ou duas vezes
- Algumas vezes
- Várias vezes
- Todos os dias ou quase todos os dias

15. Você teve dificuldade para abrir bastante a boca devido aos seus dentes, lábios, maxilares ou boca?

- Nunca
- Uma ou duas vezes
- Algumas vezes
- Várias vezes
- Todos os dias ou quase todos os dias

16. Você teve dificuldade para dizer alguma palavra devido aos seus dentes, lábios, maxilares ou boca?

- Nunca

- Uma ou duas vezes
- Algumas vezes
- Várias vezes
- Todos os dias ou quase todos os dias

17. Você teve dificuldade para comer comidas que você gostaria de comer devido aos seus dentes, lábios, maxilares ou boca?

- Nunca
- Uma ou duas vezes
- Algumas vezes
- Várias vezes
- Todos os dias ou quase todos os dias

18. Você teve dificuldade para beber com canudinho devido aos seus dentes, lábios, maxilares ou boca?

- Nunca
- Uma ou duas vezes
- Algumas vezes
- Várias vezes
- Todos os dias ou quase todos os dias

19. Você teve dificuldade para beber ou comer alimentos quentes ou gelados devido aos seus dentes, lábios, maxilares ou boca?

- Nunca
- Uma ou duas vezes
- Algumas vezes
- Várias vezes
- Todos os dias ou quase todos os dias

PERGUNTAS SOBRE SENTIMENTOS

NOS ÚLTIMOS 3 MESES...

20. Você se sentiu irritado ou frustrado devido aos seus dentes, lábios, maxilares ou boca?

- Nunca
- Uma ou duas vezes
- Algumas vezes
- Várias vezes
- Todos os dias ou quase todos os dias

21. Você se sentiu inseguro devido aos seus dentes, lábios, maxilares ou boca?

- Nunca
- Uma ou duas vezes
- Algumas vezes

- Várias vezes
- Todos os dias ou quase todos os dias

22. Você se sentiu tímido ou envergonhado devido aos seus dentes, lábios, maxilares ou boca?

- Nunca
- Uma ou duas vezes
- Algumas vezes
- Várias vezes
- Todos os dias ou quase todos os dias

23. Você ficou preocupado com o que os outros pensam sobre seus dentes, lábios, boca ou maxilares?

- Nunca
- Uma ou duas vezes
- Algumas vezes
- Várias vezes
- Todos os dias ou quase todos os dias

24. Você se preocupou por não ter tão boa aparência como os outros devido aos seus dentes, lábios, maxilares ou boca?

- Nunca
- Uma ou duas vezes
- Algumas vezes
- Várias vezes
- Todos os dias ou quase todos os dias

25. Você ficou chateado devido aos seus dentes, lábios, maxilares ou boca?

- Nunca
- Uma ou duas vezes
- Algumas vezes
- Várias vezes
- Todos os dias ou quase todos os dias

26. Você se sentiu nervoso ou com medo devido aos seus dentes, lábios, maxilares ou boca?

- Nunca
- Uma ou duas vezes
- Algumas vezes
- Várias vezes
- Todos os dias ou quase todos os dias

27. Você se preocupou por não ser tão saudável quanto os outros devido aos seus dentes, lábios, maxilares ou boca?

- Nunca
- Uma ou duas vezes
- Algumas vezes
- Várias vezes
- Todos os dias ou quase todos os dias

28. Você se preocupou por ser diferente das outras pessoas devido aos seus dentes, lábios, maxilares ou boca?

- Nunca
- Uma ou duas vezes
- Algumas vezes
- Várias vezes
- Todos os dias ou quase todos os dias

PERGUNTAS SOBRE A ESCOLA

NOS ÚLTIMOS 3 MESES...

29. Você faltou na escola devido à dor de dente, consultas ao dentista ou cirurgias?

- Nunca
- Uma ou duas vezes
- Algumas vezes
- Várias vezes
- Todos os dias ou quase todos os dias

30. Você teve dificuldade para prestar atenção na aula devido aos seus dentes, lábios, maxilares ou boca?

- Nunca
- Uma ou duas vezes
- Algumas vezes
- Várias vezes
- Todos os dias ou quase todos os dias

31. Você teve dificuldade para fazer sua lição de casa devido aos seus dentes, lábios, maxilares ou boca?

- Nunca
- Uma ou duas vezes
- Algumas vezes
- Várias vezes
- Todos os dias ou quase todos os dias

32. Você não quis falar ou ler em voz alta na aula devido aos seus dentes, lábios, maxilares ou boca?

- Nunca
- Uma ou duas vezes
- Algumas vezes
- Várias vezes
- Todos os dias ou quase todos os dias

**PERGUNTAS SOBRE SUAS ATIVIDADES NO TEMPO LIVRE E SOBRE ESTAR COM
OUTRAS PESSOAS**

NOS ÚLTIMOS 3 MESES...

33. Você não quis participar de atividades como esportes, clubes, teatro, música, viagens escolares devido aos seus dentes, lábios, maxilares ou boca?

- Nunca
- Uma ou duas vezes
- Algumas vezes
- Várias vezes
- Todos os dias ou quase todos os dias

34. Você não quis conversar com outras crianças devido aos seus dentes, lábios, maxilares ou boca?

- Nunca
- Uma ou duas vezes
- Algumas vezes
- Várias vezes
- Todos os dias ou quase todos os dias

35. Você não quis sorrir ou rir quando estava perto de outras crianças devido aos seus dentes, lábios, maxilares ou boca?

- Nunca
- Uma ou duas vezes
- Algumas vezes
- Várias vezes
- Todos os dias ou quase todos os dias

36. Você teve dificuldade para tocar um instrumento musical como flauta ou gaita devido aos seus dentes, lábios, maxilares ou boca?

- Nunca
- Uma ou duas vezes
- Algumas vezes
- Várias vezes
- Todos os dias ou quase todos os dias

37. Você não quis passar tempo com outras crianças devido aos seus dentes, lábios, maxilares ou boca?

- Nunca
- Uma ou duas vezes
- Algumas vezes
- Várias vezes
- Todos os dias ou quase todos os dias

38. Você discutiu com outras crianças ou com sua família devido aos seus dentes, lábios, maxilares ou boca?

- Nunca
- Uma ou duas vezes
- Algumas vezes
- Várias vezes
- Todos os dias ou quase todos os dias

NOS ÚLTIMOS 3 MESES...

39. Outras crianças caçoaram (tiraram sarro) de você devido aos seus dentes, lábios, maxilares ou boca?

- Nunca
- Uma ou duas vezes
- Algumas vezes
- Várias vezes
- Todos os dias ou quase todos os dias

40. Outras crianças fizeram você se sentir excluído devido aos seus dentes, lábios, maxilares ou boca?

- Nunca
- Uma ou duas vezes
- Algumas vezes
- Várias vezes
- Todos os dias ou quase todos os dias

41. Outras crianças fizeram perguntas sobre seus dentes, lábios, maxilares ou boca?

- Nunca
- Uma ou duas vezes
- Algumas vezes
- Várias vezes
- Todos os dias ou quase todos os dias

PRONTO, ACABOU!

OBRIGADO POR NOS AJUDAR!

ANEXO 12 – Questionário aos pais (Estudo 1 e 2)
QUESTIONÁRIO AOS PAIS

Solicitamos PREENCHER COM “X” A LETRA CORRESPONDENTE A SUA RESPOSTA EM CADA QUESTÃO do presente questionário, sendo que os dados coletados serão tratados de forma estritamente confidencial, não sendo identificados em hipótese alguma.

NOME DO RESPONSÁVEL: _____

NOME DO ESCOLAR: _____ IDADE: ____

DATA: ___/___/___ ESCOLA: _____ ANO: _____

1. SITUAÇÃO ECONÔMICA DA FAMÍLIA (Renda familiar mensal):

- A. () até R\$520,00 (até 1 salário mínimo)
- B. () de R\$ 521,00 a R\$ 1040,00 (1 a 2 salários mínimos)
- C. () de R\$1041,00 a R\$ 1560,00 (2 a 3 salários mínimos)
- D. () de R\$ 1521,00 a R\$ 2600,00 (3 a 5 salários mínimos)
- E. () de R\$ 2601,00 a R\$ 3640,00 (5 a 7 salários mínimos)
- F. () de R\$ 3641,00 a R\$ 5200,00 (8 a 10 salários mínimos)
- G. () Acima de R\$ 5201,00 (acima de 10 salários mínimos)

2. NÚMERO DE PESSOAS NA FAMÍLIA (Residentes na mesma casa):

- A.() até 2 pessoas B.() 3 pessoas C.() 4 pessoas D.() 5 pessoas
- E.()6 pessoas F. () acima de 6 pessoas

3. GRAU DE INSTRUÇÃO DOS PAIS OU RESPONSÁVEIS

- | | PAI ou RESPONSÁVEL | MÃE |
|----|--------------------|--|
| A. | () | () Não alfabetizado |
| B. | () | () Alfabetizado |
| C. | () | () 1ª a 4ª série incompleta (antigo Primário) |
| D. | () | () 1ª a 4ª série completa (antigo Primário) |
| E. | () | () 5ª a 8ª série incompleta (antigo Ginásial) |
| F. | () | () 5ª a 8ª série completa (antigo Ginásial) |
| G. | () | () 2º Grau incompleto (antigo Colegial) |
| H. | () | () 2º Grau completo (antigo Colegial) |
| I. | () | () Superior incompleto |
| J. | () | () Superior completo (Faculdade) |

4. HABITAÇÃO (Moradia)

- A.() Residência própria quitada
- B.() Residência própria com financiamento a pagar
- C.() Residência cedida pelos pais ou parentes
- D.() Residência cedida em troca de trabalho
- E.() Residência alugada
- F.() Residência cedida por não ter onde morar

5. PROFISSÃO DO CHEFE DA FAMÍLIA (Mencionar mesmo que desempregado)

6. A FAMÍLIA RECEBE ALGUMA AJUDA DO GOVERNO?

- A. não
B. sim, bolsa família
C. sim, outra _____

7. INDIQUE COM QUEM SEU FILHO MORA:

- mãe e pai biológicos
 só a mãe biológicas, os pais são separados
 só a mãe biológica, o pai é falecido
 só a mãe biológica, não sabe quem é o pai
 mãe biológica e padrasto, pai falecido
 mãe biológica e padrasto, pais separados
 mãe biológica e padrasto, não sabe quem é o pai
 mãe e pai adotivos
 outros – especifique _____

8. DURANTE O PERÍODO EM QUE O ADOLESCENTE NÃO ESTÁ NA ESCOLA, ELE FICA SOB OS CUIDADOS DE QUEM?

- mãe pai avós vizinhos/amigos
 outros _____

9. VOCÊ CONSIDERA A SAÚDE GERAL DO SEU FILHO:

- Excelente Muito boa Boa Regular Ruim

10. E COMO VOCÊ CONSIDERA A SAÚDE BUCAL DO SEU FILHO:

- Excelente Muito boa Boa Regular Ruim

11. COMO É O COMPORTAMENTO DO SEU FILHO EM RELAÇÃO À HIGIENE BUCAL?

- Excelente Muito bom Bom Regular Ruim

12. NOS ÚLTIMOS 12 MESES, COMO VOCÊ DESCREVE O DESEMPENHO ESCOLAR DE SEU FILHO?

- Excelente Muito bom Bom Regular Ruim

13. SEU FILHO(A) APRESENTA ALGUM PROBLEMA DE SAÚDE GERAL?

Diabetes

Desnutrição

Rinite Alérgica

Asma brônquica

Sinusite

Usa óculos

Outro problema _____

ANEXO 13 – SUBMISSÃO DO ARTIGO REFERENTE AO CAPITULO 1

<http://mc.manuscriptcentral.com/doi-scielo>

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Brazilian Oral Research

Submission Confirmation

Thank you for submitting your revised manuscript to *Brazilian Oral Research*.

Manuscript ID: BOR-2014-0057.R1

Title: THE IMPACT OF SOCIAL DETERMINANTS ON SCHOOLCHILDREN'S ORAL
HEALTH IN BRAZIL

Authors: PAULA, JANICE
Ambrosano, Gláucia Maria
Mialhe, Fábio

Date Submitted: 28-Oct-2014

 Print

ANEXO 14 – SUBMISSÃO DO ARTIGO REFERENTE AO CAPITULO 2

Manuscript IJPD-11-14-4539 - International Journal of Paediatric Dentistry Compras *

ijpdedoffice@wiley.com 11 de Nov

Para eu

CC eu, cricaml@ig.com.br, meneghim@fop.unicamp.br, apereira@fop.unicamp.br, glaucia@fop.unicamp.br, e 2 mais...

11-Nov-2014

Dear Prof. Paula,

Your manuscript entitled "SCHOOL PERFORMANCE AND ORAL HEALTH CONDITIONS: ANALYSIS OF THE IMPACT MEDIATED BY SOCIAL AND ENVIRONMENTAL ASPECTS" has been successfully submitted online and is presently being given full consideration for publication in the International Journal of Paediatric Dentistry.

Your manuscript ID is IJPD-11-14-4539.

Please mention the above manuscript ID in all future correspondence or when calling the editorial office with questions. If there are any changes in your mailing or e-mail addresses, please log into ScholarOne Manuscripts (formerly known as Manuscript Central) at <https://mc.manuscriptcentral.com/ijpd> and edit your user information accordingly.

You can also view the status of your manuscript at any time by checking your Author Centre after logging into <https://mc.manuscriptcentral.com/ijpd>

Thank you for submitting your manuscript to the International Journal of Paediatric Dentistry.

Yours sincerely,

Mirlyn Consador
International Journal of Paediatric Dentistry Editorial Office

ANEXO 15 – SUBMISSÃO DO ARTIGO REFERENTE AO CAPITULO 3

- Confirmation of your submission to Health and Quality of Life Outcomes ★

BioMed Central Editorial Office

12 de Nov

Para eu

[Painel de mensagem](#)

Impact of oral diseases, socioeconomic and family environmental variables on Oral Health related Quality of Life in adolescents: a longitudinal analysis
Janice Simpson de Paula; José Nilton da Cruz; Thiago Gentil Ramires; Edwin Moysés Marco Ortega; Marcelo Castro Meneghim; Antônio Carlos Pereira; Fábio Luiz Mialhe
Health and Quality of Life Outcomes

Dear Ms Janice Paula,

Thank you for submitting your manuscript 'Impact of oral diseases, socioeconomic and family environmental variables on Oral Health related Quality of Life in adolescents: a longitudinal analysis' to Health and Quality of Life Outcomes.

During the review process, you can keep track of the status of your manuscript by accessing the following website:

<http://hqlo.edmgr.com/>

Your username is: Janice

Your password is: paula863744

Best wishes,

Editorial Office
BioMed Central

ANEXO 16 – SUBMISSÃO DO ARTIGO REFERENTE AO CAPITULO 4

• Manuscript ID JPHD-OA-09-14-0206 - Journal of Public Health Dentistry

★

jphdinfo@aaphd.org

30 de Set

Para janicesimpsondp@yahoo.com.br

CC janicesimpsondp@yahoo.com.br, mialhe@fop.unicamp.br

30-Sep-2014

Dear Prof. Paula:

Your manuscript entitled "Longitudinal impact of caries incidence on oral health-related quality of life of adolescents" by Paula, Janice, Mialhe, Fábio, has been successfully submitted online and is presently being given full consideration for publication in the Journal of Public Health Dentistry.

Co-authors: Please contact the Editorial Office as soon as possible if you disagree with being listed as a co-author for this manuscript.

Your manuscript ID is JPHD-OA-09-14-0206.

Please mention the above manuscript ID in all future correspondence or when calling the office for questions. If there are any changes in your street address or e-mail address, please log in to Manuscript Central at <http://mc.manuscriptcentral.com/jphd> and edit your user information as appropriate.

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Thank you for submitting your manuscript to the Journal of Public Health Dentistry.

Sincerely,
Journal of Public Health Dentistry Editorial Office

ANEXO 17 – SUBMISSÃO DO ARTIGO REFERENTE AO CAPITULO 5

5306800011447979 Resubmission 2 The impact of oral health and socioenvironmental conditions on general and oral...

*

BioMed Central Editorial

6 de Out

Para eu

CC: eu

Article title: The impact of oral health and socioenvironmental conditions on general and oral-health related quality of life and convergent validity of two instruments
MS ID : 5306800011447979
Authors : Janice S Paula, Marcelo C Meneghin, Antonio C Pereira and Fábio L Mialhe
Journal : BMC Oral Health

Dear Ms Paula

Thank you for submitting a new version of your article.

A pdf file has been generated from your submitted manuscript and figures.

http://www.biomedcentral.com/imedia/5306800011447979_article.pdf (117K)

For your records, please find below link(s) to the correspondence you uploaded with this submission. Please note there may be a short delay in creating this file.

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If the PDF does not contain the comments which you uploaded, please upload the cover letter again, click "Continue" at the bottom of the page, and then proceed with the manuscript submission again. If the letter will not upload, please send a copy to editorial@biomedcentral.com.

Painel de mensagem

Best wishes,

Ms Eloisa Nolasco

Tel: +44 (0) 20 3192 2013
e-mail: editorial@biomedcentral.com
Web: <http://www.biomedcentral.com/>

ANEXO 18 – SUBMISSÃO DO ARTIGO REFERENTE AO CAPITULO 6

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European Journal of
Oral Sciences

Main Menu / Corresponding Author Dashboard / **Submission Confirmation**

Submission Confirmation

Thank you for submitting your revised manuscript to *European Journal of Oral Sciences*.

Manuscript ID: EOS-7205-OA-14-R2
Title: A longitudinal evaluation of the impact of dental caries treatment on oral health-related quality of life among schoolchildren
Authors: Paula, Janice Sarracini, Karim Nereghini, Marcelo Pereira, Antonio Ortega, Edwin Martins, Natalia Mialhe, Fabio
Date Submitted: 24-Oct-2014
Print Return to Dashboard