

Original Article

Impact of Dental Caries on Quality of Life of School Children

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Abstract

Objective: To estimate the impact of dental caries on the oral health-related quality of life of school children of public schools of Tubarão, Santa Catarina, Brazil. **Material and Methods:** A cross-sectional study on a sample of 42310-15 years old students was carried out. The prevalence of dental caries, dental trauma and malocclusion was observed by oral examination based on WHO criteria. The Oral Impact on Daily Performance indicator was used to collect data about the impact on quality of life related to children's oral health. The Chi-square test was used for bivariate analysis with significance levels set at $p < 0.05$. Prevalence ratios (PR) and confidence intervals (95%) were estimated using log-linear Poisson regression with a robust estimator. **Results:** The prevalence of dental caries was 55.5%. The prevalence of impact on oral health related quality of life was 45.6%. OIDP dimensions significantly associated with dental caries were eating [PR = 1.45 (95%CI 1.06; 2.00)] ($p = 0.021$), sleeping [PR = 2.29 (95%CI 1.15; 4.56)] ($p = 0.018$) and performing daily activities [PR = 2.57 (95%CI 1.06; 6.22)] ($p = 0.036$) after adjusting for gender, age and presence of dental trauma and malocclusion. **Conclusion:** Dental caries was found to be significantly associated with oral health-related quality of life of children in activities such as eating, sleeping, and performing daily activities.

Keywords: Dental caries; Impact; Daily activities.

Introduction

Dental caries is a highly prevalent oral disease that can lead to pain and have a negative impact on the quality of life of children [1]. According to the Brazilian Ministry of Health [2] more than half of children under five years of age had an average of 2.3 decayed teeth. A similar average of decayed teeth was found among 12-year-old children. So, the disease is still very frequent among Brazilian children in both primary and permanent dentition.

Dental caries may influence children's development and their participation in important daily activities [3]. The presence of pain, infection, early tooth loss and chewing disturbances restrict the consumption of adequate food and affect growth, learning, communication, and recreation [4]. The severity with which dental caries affects primary dentition is still a major oral health problem, mainly in Northern and Northeastern Brazil [2].

However, oral health characteristics are generally analyzed through clinical and epidemiological indicators, without considering the consequences of dental problems for the routine activities of individuals. The evaluation of such impact is important, given that the interpretation of the health condition should be performed in various dimensions and needs to consider both biological and non-biological indicators to better support public health promotion policies [4]. The need to determine the impact of changes in the oral cavity on people's lives has led to the development of research evaluating oral health-related quality of life [5].

Therefore, the aim of this study was to estimate the impact of dental caries on oral health-related quality of life (OHRQoL) of public school students in the city of Tubarão, Santa Catarina, Brazil.

Material and Methods

An epidemiological cross-sectional study was performed on 10- to 15-year-old school children enrolled in public schools of Tubarão, Santa Catarina, in 2012. The following parameters for sample size calculation were used: a population of 6,554 students enrolled in schools in the study year; 95% confidence level, 5% relative error, and unknown prevalence of impact on oral-health related quality of life. 20% was added to the final number in order to compensate for possible refusals. The minimum sample size was 423 students who were randomly selected for the survey, keeping the proportion of students enrolled in small, medium and large schools. The size of the schools was determined by tertile distribution of the number of enrolled students. The participants were drawn from a list provided by the secretariats of each school.

Data collection included an interview with students, followed by an oral clinical examination. Individual interviews were conducted at school settings to obtain data on the impact on OHRQoL, by using the Oral Impact on Daily Performance (OIDP) [3] index validated in Brazil [6,7]. This instrument is composed of four questions related to eight daily activities: eating, speaking, teeth cleaning, sleeping, maintaining normal emotional state, smiling, performing daily activities, and social contact.

A pilot study was carried out involving 30 non-surveyed students in order to test the proposed methods. Results showed the study's methods to be appropriate to the local situation.

The oral examination was carried out in the classrooms by a team of four dentists and four assistants recording the observations. The examination following the criteria of the World Health Organization [8] for epidemiological surveys in oral health. Data on dental caries, dental trauma and malocclusion were collected. Data on dental trauma and malocclusion were collected as possible confounding variables. Prior to data collection, the team underwent a calibration training. Kappa values greater than 0.7 were obtained in both inter- and intra-examiner reliability.

The collected data were entered into a spreadsheet specifically designed for this study and then exported to SPSS 18.0 software, where they were analyzed. The chi-square test was used to assess the association between the dependent variable (impact on OHRQoL) and independent variables (dental caries, dental trauma and malocclusion prevalence, age and sex) with a significance level of 0.05. Prevalence ratios (PR) and their respective confidence intervals (95%) were estimated using log-linear Poisson regression with a robust estimator.

Ethical clearance to conduct this study was granted by the research ethics committee of the University of Southern Santa Catarina, under registration No. 11.142.4.02.III.

Results

A total of 389 schoolchildren were examined (response rate: 92.0%) of whom 59.6% were female and most (67.4%) were aged 10-12 years (Table 1). The prevalence of caries was 55.5% (95% CI 50.6; 60.4), dental trauma was 7.2% (95% CI 4.7;9.7) and malocclusion was 57.3 (95% CI 52.4;62.2). The prevalence of oral health-related quality of life was 45.6% (95% CI 40.7; 50.5). The mean OIDP score was 24.16 (SD=2.71) with a median of 25. Minimum and maximum OIDP scores were 10 and 30, respectively.

Table 1. Sample distribution according to gender, age and the presence of dental caries. Tubarão, Brazil, 2012.

Variables	n	%
Gender		
Female	232	59.6
Male	157	40.4
Age Group (Years)		
10-12	262	67.4
13-15	127	32.6
Dental Caries		
Yes	216	55.5
No	173	44.5
Dental Trauma		
Yes	28	7.2
No	361	92.8
Malocclusion		
Yes	223	57.3
No	166	42.7

The distribution of sampled students who reported an impact according to the OIDP activities is shown in Table 2. Dental caries was associated with the impact on oral health-related quality of life on “sleeping”(p=0.018), “eating” (p=0.023) and “performing daily tasks” (p=0.036). Those who had caries prevalence showed a 45% greater impact in “eating” activity compared to those without tooth decay [PR=1.45 (IC95% 1.05; 1.99)]. The prevalence ratio for “sleeping” activity was 2.29 (95% CI 1.15; 4.56) and for “performing daily activities” was 2.57 (95% CI 1.06; 6.22), regardless sex, age and presence of dental trauma and malocclusion.

Table 2. Oral impacts on daily performance (OIDP) and association with dental caries prevalence. Tubarão, Brazil, 2012.

Activity	n	Impact on Daily Performance		
		%	PR (CI95%)*	p
Eating	109	28.0	1.45 (1.05-1.99)	0.023
Speaking	23	5.9	2.17 (0.93-5.05)	0.072
Teethcleaning	76	19.5	1.22 (0.82-1.82)	0.329
Sleeping	34	8.7	2.29 (1.15-4.56)	0.018
Maintainingemotionalstate	76	19.5	1.35 (0.90-2.01)	0.147
Smiling	103	26.5	1.37 (0.99-1.90)	0.058
Performingdailyactivities	21	5.4	2.57 (1.06-6.22)	0.036
Social contact	76	19.5	2.14 (0.96-4.77)	0.063

*Reference group: no presence of dental caries; Adjusted for sex, age and presence of dental trauma and malocclusion.

Discussion

Studies evaluating quality of life are extremely important to promote health and well-being. Recent studies have shown significant correlation between dental problems and quality of life of children [9-12]. OHRQoL indices show buccal and dental disorders can impair social, psychological and physical activities, and disturb children’s functional performance such as eating and speaking, psychological performance such as showing teeth and smiling without embarrassment, and social performance by damaging their social life [9,11-18].

Cariou lesions are among the major oral health problems in children, leading to difficulties with chewing, weight loss, decreased appetite, trouble sleeping, changes in behavior and lower grades at school, damaging quality of life [9,17,19-22].

This study found significant and independent association between dental caries prevalence and children’s daily activities. There are clear reports in the literature about the negative impact dental caries may generate in children’s OHRQoL. The impact can range from functional limitations in daily activities to psychosocial impacts such as difficulties with socializing and feelings of guilt on the part of the family. Negative impacts of dental caries include difficulty with chewing, decreased appetite, weight loss, trouble sleeping, behavioral changes such as irritability, low self-esteem, and decrease in school performance [9,21-23]. Piovesan et al.[13] have pointed out that children with caries, especially in advanced stages, are more likely to report pain and difficulty with chewing and sleeping. Children with caries also feel more upset and concerned about their oral health, which further affects their quality of life. Studies by Gherunpong et. [24] support the results of this

research, citing the negative impact on young people's quality of life, by the presence of oral health problems, especially in activities such as "eating". Although in the field of hypotheses, it would not be difficult to propose that children with dental caries might be at greater risk for tooth pain [25] and, consequently, have difficulty with sleeping and performing daily activities.

Assessment of the impact of children's OHQoL is vital for managers and health professionals to develop public health policies and programs and to creating strategies for prevention and treatment of oral health disorders in children. These measures, in addition to solve or minimize oral problems are also necessary to restore quality of life. Implementing oral hygiene-based prevention programs, dietary advice and rational use of fluoride is effective and inexpensive [26].

In addition, studies on the impact of dental caries on quality of life are vital to parents' perceptions about their children's oral health. Given that parents are responsible for ensuring children's well being, it is important to explore their perceptions of children's oral health. These perceptions can affect preventive care at home and dental services provided by oral health professionals [20].

Further research should be carried out to cover a wider range of groups and directed to children living in other locations with the same social conditions. Limitations of this study include the use of an OHRQoL indicator not specifically designed for children that may have underestimated the generated impact. In addition, the cross-sectional design does not allow for cause/effect relationship that imposes the results to be interpreted with caution.

Based on the results, it can be concluded that dental caries have the potential to generate significant negative impact on children's OHRQoL, especially eating, sleeping, and performing daily activities.

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