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Impact of Malocclusion on Oral Health-Related Quality of Life of 8-12 Years Old Schoolchildren in Southern Brazil

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The aim of this study was to estimate the impact of malocclusion on the oral health-related quality of life (OHRQoL) of schoolchildren aged 8-12 years old in Southern Brazil. A two-stage cluster procedure was used to select 1,199 children in 20 public and private schools in Pelotas/Brazil. Cross-sectional data was collected, consisting of a socioeconomic questionnaire to parents, children's interview and clinical oral examination. The clinical variables were obtained from clinical examination, and the Child Perceptions Questionnaire (CPQ) was assessed during children's interview. To measure malocclusion and orthodontic treatment need the Dental Aesthetic Index was used. For data analysis multiple Poisson regression models estimating the rate ratios (RR) and their respective confidence intervals (95%CI) were used. Among 1,206 participants, 789 were aged 8-10 years and 417 between 11-12 years. The orthodontic treatment need was higher among the younger children (44.6%) than in the older ones (35.0%) (p value ≤0.05). There was a significant association in the CPQ social and emotional domains with malocclusion in the older schoolchildren. In the adjusted analysis (for socioeconomics and clinical variables) the effect of very severe malocclusion on OHRQoL was confirmed in both 8-10 and 11-12 age groups (RR(95%CI) of 1.24(1.02;1.51) and 1.28(1.01;1.62), respectively). The findings demonstrated that children with very severe malocclusion experienced greater negative impact on OHRQoL compared to those with mild or no malocclusion. The results suggest that malocclusion impacts the quality of life. The higher impact occurs in the social and emotional well-being domains.

Key Words: epidemiology, malocclusion, mixed dentition, quality of life.

Introduction

Worldwide health epidemiological surveys have been reporting a high prevalence of malocclusions in childhood and adolescence (1,2). In Brazil, data from the National Survey conducted in 2003 (SB-Brazil 2003) indicated a prevalence of severe and very severe malocclusion of 8.2% and 9.8%, respectively, among 12-year-old adolescents (3). Results of the latest Brazilian national survey (SB Brasil 2010) disclosed a prevalence of malocclusion at age 12 years slightly lower than in 2003: 7.1% severe and 6.5% very severe malocclusion (4). In both National Surveys occlusion was evaluated by the Dental Aesthetic Index (DAI) (5), a methodological tool to assess the priority of treatment based on objective clinical criteria. DAI is one of the most used indexes, and it is the instrument recommended by the World Health Organization (WHO) (5).

After being established, malocclusions may have consequences that go beyond the functional or aesthetic limitations, causing a negative impact on the individual's quality of life, affecting the self-esteem (6), the well being (7) and the ability to socialize. It has been shown that malocclusions are related to the occurrence of bullying, and that the teasing from others due to the teeth appearance influences the self-reported need for orthodontic treatment (8).

There is a growing concern related to patient-reported outcomes, comprising oral health-related quality of life (OHRQoL) symptoms, use of services and patient's satisfactions, and data from studies evaluating these outcomes are used to direct clinical decisions and health policies (9). The need to consider the patient's self-perception is becoming more evident, since instruments based exclusively on clinical criteria, *i.e.,* normative criteria, may overestimate the need for treatment due their inability to measure how certain condition affects daily life (10). Thus, for a more accurate definition of the patient's orthodontic treatment need, instruments to measure OHRQoL should be used as complementary to the clinical measures, since OHRQoL instruments add the patient's perspective on the impact of dental treatment (11).

The occlusion's assessment, considering aspects of public health, has two main purposes: to assess the need and priority to treatment and to get information to manage properly the resources for providing orthodontic treatment for the population (12). In this context, it becomes paramount to access the self-reported need for orthodontic treatment in order to provide the optimal

use of health public resources. It is worth noting that even in those countries where orthodontic treatment is a service provided by public health, the need for treatment indicated by normative criteria is greater than the available resources could supply (13).

Occlusal changes may occur in the mixed dentition, affecting children's self-image, as their feelings about dental appearance occur early, around 8 years of age (14). Therefore, it is important to evaluate the occlusion in the mixed dentition and early permanent dentition in order to avoid further functional and psychological harm. Moreover, there is lack of studies addressing the impact of malocclusion in the mixed dentition (15). In order to understand how malocclusion affects children's daily life, the objective of the present study was to evaluate the impact of malocclusions and the need for orthodontic treatment on the OHRQoL of schoolchildren in Southern Brazil. The study hypothesis was that the more severe the malocclusion, the greater the impact on the OHRQoL of schoolchildren.

Material and Methods

This school-based cross-sectional study comprised children aged 8 to 12 years old attending public and private schools in the urban area of Pelotas, Southern Brazil, in 2010. The exclusion criteria comprised children with any degree of mental or physical disability as reported by teachers, and children who experienced difficulty or were unable to answer the questionnaire. The study proposal was approved by the Human Research Ethics Committee of Federal University of Pelotas (protocol no. 101/2009) and all participants presented the informed consent form signed by parents or guardians. A detailed description of this multidisciplinary survey method is published elsewhere (16).

The sample size calculation was performed using the software Epi Info 6.0. The minimum sample size required (n=922) was obtained taking into account the following parameters: a prevalence of the main outcome of 10%, standard error of ≤3 %, 95% confidence level. As a cluster sample selection was used, the estimated design effect was 2. An increase of 20% in the sample was made to minimize potential non-responses. The sample size calculation was based on the prevalence of dental trauma, since the study was designed to evaluate several outcomes, such as malocclusion, dental trauma, periodontal disease and dental caries. Taking into consideration that dental trauma presents the lowest prevalence between the aforementioned outcomes, it was used for sample size calculation. The resulting sample had an 80% power to detect a minimum mean difference of 1.4 points in total CPQ scores.

A two-stage cluster sampling performed the sample recruitment. In the first stage, the schools were randomly selected, with probability proportional to the number of students enrolled in each school. There were 25 private and 91 public schools in Pelotas for children in this age range when the study conducted. Twenty schools, 5 private and 15 public, were chosen, which allowed for variability of the analyzed characteristics. In the second stage, the students were selected within the schools recruited by including one randomly selected grade class in each school year, between the 2nd and the 6th year. All students enrolled in the selected classes were invited to participate.

Data were collected between September and November 2010. Epidemiologically experienced dentists carried out the interviews and the oral examination. Previous to the fieldwork, the team was trained and calibrated, including 7 h of theoretical and clinical training and the examination of 20 children for calibration. The inter examiner Kappa value for the DAI was 0.72. Kappa value was assessed considering an examiner with previous experience of epidemiologic studies as the gold standard. Each school was visited as many times as necessary to ensure an absentee rate of no more than 10%. Information regarding socioeconomic characteristics, such as maternal education and family income, were collected by a questionnaire sent to the parents. Demographic information, such as gender, age and skin color, was assessed by children's interview.

The Brazilian version of the Child Perceptions Questionnaire (17), cross-culturally adapted and validated for Brazil (18), was employed to evaluate the impact of oral conditions on the quality of life of the schoolchildren. The scores were tabulated according to the numeric codes of the responses: "Every day/almost every day" accounts for 4, "Often" for 3, "Sometimes" stands for 2, "Once or twice" represents 1 and "Never", zero. It is worth noting that the CPQ8-10 and CPQ11-14 provide different overall scores, due to the different number of items in each tool, thereby the analysis was performed by subgroup, according to age group. The CPQ11-14 consists of 16 items distributed among 4 health domains: oral symptoms (4 questions), functional limitation (4 questions), emotional well-being (4 questions) and social well-being (4 questions). The CPQ8-10 comprises 25 questions organized into 4 domains: oral symptoms (5 questions), functional limitations (5 questions), emotional well-being (5 questions) and social well-being (10 questions). Answers were collected on a 5-point Likert scale, and the final score for each domain was computed summing all the answers. The overall CPQ11-14 ranges from 0 to 80 and the overall CPQ8-10 ranges from 0 to 100.

The oral clinical examination, performed according to the procedures recommended by the WHO (5), was

conducted by six examiners using individual protective equipment (gloves, mask and apron), artificial light, dental mirror and CPI probes. The need for orthodontic treatment was evaluated by means of the Dental Aesthetic Index (DAI) (5), dental trauma was assessed according to O'Brien criteria (19) and dental caries was evaluated using the DMFT index (5).

The DAI consists of an overall score of measures of 10 occlusal conditions related to dentofacial anomalies: missing teeth, crowded incisal segments, spaced incisal segments, midline diastema, anterior maxillary irregularity, anterior mandibular irregularity, maxillary overjet, mandibular overjet, anterior open bite and anteroposterior molar relationship. For such evaluation, the index categorizes malocclusion in 4 possible outcomes, according to the level of orthodontic treatment need. Orthodontic treatment is unnecessary in case of normal occlusion or minor malocclusion (DAI≤25). In the case of definite malocclusion (26≤DAI≤30), elective treatment was advised. In severe malocclusion (31≤DAI≤35), the treatment is highly desirable. For very severe or incapacitating malocclusion (DAI≥36), the treatment is mandatory (13). The variable DAI was dichotomized as without treatment need (DAI≤25) and with treatment need (DAI>25). To obtain the final DAI score calculation, the authors used a modified version of the DAI, adjusted for mixed dentition, taking into consideration that the study sample was predominantly in such dentition period.

Data Analysis

Data analysis was performed using Stata, version 12.0 (Stata Corporation, College Station, TX, USA) software. Overall scores and for domains of the CPQ8-10 and CPQ11-14 were calculated by summing the answers of each component. Data analysis consisted of a descriptive analysis, as well as bivariate and multivariate Possion regression analysis. Pearson's correlation coefficient was used to correlate the CPQ scores with the DAI index. The score for each component of the CPQ index, according to the need of orthodontic treatment presented by the children, was compared using the Kruskal-Wallis test. With the DAI score as a continuous variable, Poisson regression models with robust variance were made to estimate the rate ratios (RR). To analyze the potentially predictor factors of the OHRQoL impact, the independent variables were selected considering a hierarchical approach. The variables were inserted according to the pre-determined levels of causality, from distal factors to more proximal. The first level included demographic variables (gender, age and race), the next level of variables included socioeconomic characteristics (maternal education and family income) and the third level consisted of clinical variables (dental caries and dental trauma).

Results

Among the 1,744 schoolchildren eligible for the survey, 419 (24.0%) did not return the signed consent form and 114 (6.7%) were absent from school during the data collection. Thus, the final sample of the survey was 1,211 children. Out of those, 5 could not have their occlusal condition evaluated and so a total of 1,206 schoolchildren were included in this study, 789 in the age range between 8 and 10 years old and 417 of 11 or 12 years old. The gender distribution was balanced, either in the younger children (47.2% boys) and in the older ones (47.7% boys). The majority of the children at 8-10 and at 11-12 years old were Caucasian (76.2% and 66.5%, respectively) and have mothers with less than 8 years of education (65.5% and 60.3%, respectively). Orthodontic treatment need was higher among the young group (44.6%), decreasing to 35% in the older subsample (Table 1).

Among the younger group, the children presenting the worst DAI category (very severe malocclusion) presented higher CPQ means than those belonging to the other DAI categories.

Correlation coefficients between values of CPQ8-10 and CPQ11-14 are in Table 2. Correlations were not observed in the younger group. On the other hand, there was a statistically significant correlation in the older group with the overall CPQ value (p≤0.01), as well as with the functional (p≤0.05), social (p≤0.01) and emotional (p≤0.01) domains.

Table 3 shows the differences in the CPQ scores according to the occlusal condition. Among the children 8 to 10 years of age, there was no statistically significant difference, although an increase in the functional and emotional domain scores (p=0.07) was observed. Among the older children, there were differences in the social (p=0.02) and emotional components (p=0.03).

Tables 4 and 5 present the results of the crude and adjusted analyses evaluating the influence of socioeconomic and clinical variables on the CPQ scores at ages 8-10 and 11-12, respectively. In both age ranges, older children, non-Caucasian, with lower family income and with less years of maternal education presented higher CPQ scores. Regarding the clinical variables, presence of dental caries influenced the OHRQoL of younger children, but this did not happen among the older schoolchildren. The effect of very severe malocclusion on OHRQoL was confirmed in both age groups, even when adjusted for the demographic, socioeconomic and clinical variables.

Discussion

In the present study, children with very severe malocclusion presented negative impacts on OHRQoL in both evaluated age ranges. Schoolchildren aged 8-10 and

11-12 years old with very severe malocclusion presented, respectively, CPQ scores 24% and 28% higher than children with normal occlusion or mild malocclusion. These results are in accordance with a study conducted by O'Brien and colleagues, performed with children aged 8-10 years old, who observed that individuals with malocclusion suffered 30% more impact on the OHRQoL than those without such a disease (20). Corroborating this finding, Zhang et al. (19) found higher CPQ scores in children with a DAI score ≥31. Additionally, other studies suggested that unsatisfactory dental esthetics might impair the psychosocial well-being of the individuals (11), including a recently published systematic review of quantitative studies (21). In fact, it

Table 1. Distribution of the sample. Pelotas, Brazil, 2010 (n=1,206)

Variable/Category	8-10		11-12	
	n	%	n	%
Sex				
Male	372	47.15	199	47.72
Female	417	52.85	218	52.28
Age (years)				
8	182	23.07	-	-
9	312	39.54	-	-
10	295	37.39	-	-
11	-	-	256	61.39
12	-	-	161	38.61
Race				
Caucasian	583	76.21	270	66.50
Non-Caucasian	182	23.79	136	33.50
Family income				
4th quartile (1231-12000)	161	23.89	118	32.96
3rd quartile (741-1230)	160	23.74	80	22.35
2nd quartile (511-740)	183	27.15	86	24.02
1st quartile (0-510)	170	25.22	74	20.67
Maternal education (years)				
≥8	266	34.50	159	39.75
<8	505	65.50	241	60.25
Dental trauma				
Absent/Mild	704	89.34	349	83.69
Severe	84	10.66	68	16.31
Dental Caries (D>0)				
Absent	575	72.97	238	57.07
Present	213	27.03	179	42.93
DAI				
Normal/Mild malocclusion	445	56.40	271	64.99
Definite malocclusion	176	22.31	84	20.14
Severe malocclusion	87	11.03	26	6.24
Very severe malocclusion	81	10.27	36	8.63

Table 2. Pearson's correlation between CPQ8-10 and CPQ11-14 scores and DAI values (n=1,206)

	DAI	p
CPQ_{8-10} total	0.048	0.18
CPQ_{8-10} sub-scales:		
Oral symptoms	-0.0008	0.98
Functional limitations	0.060	0.09
Social well being	0.047	0.18
Emotional well being	0.0373	0.30
CPQ_{11-14} total	0.147	<0.01
CPQ_{11-14} sub-scales:		
Oral symptoms	0.052	0.29
Functional limitations	0.0936	0.05
Social well being	0.1743	<0.01
Emotional well being	0.1324	0.01

Table 3. Mean score of CPQ domains according to the DAI categories, to the ages of 8-10 years and 11 and 12 years. Pelotas, Brazil, 2010 (N=1,206)

DAI categories	CPQ Domains			
	Oral symptoms	Functional limitations	Social well-being	Emotional well-being
8-10	p=0.90	p=0.07	p=0.34	p=0.07
Normal	5.12 (3.06)	2.61 (2.95)	2.74 (3.90)	3.30 (3.77)
Definite	5.31 (2.89)	2.46 (2.84)	3.22 (4.14)	3.19 (3.74)
Severe	5.07 (3.01)	2.57 (2.77)	2.92 (4.07)	2.94 (3.33)
Very severe	5.19 (3.18)	3.53 (4.00)	3.52 (4.43)	4.42 (4.72)
Total	5.16 (3.18)	2.66 (3.03)	2.93 (4.03)	3.35 (3.83)
11-12	p=0.86	p=0.21	p=0.002	p=0.03
Normal	3.84 (2.47)	2.83 (3.61)	1.61 (2.21)	2.89 (3.13)
Definite	3.83 (2.34)	3.04 (3.38)	1.97 (2.37)	3.34 (3.71)
Severe	3.96 (2.58)	4.04 (4.66)	2.61 (2.20)	3.86 (3.55)
Very severe	4.21 (2.01)	3.85 (4.27)	3.09 (3.57)	4.52 (3.43)
Total	3.88 (2.41)	3.03 (3.72)	1.87 (2.41)	3.17 (3.31)

is understandable and it was expected that very severe malocclusion would impact on the OHRQoL, especially in the evaluated age range of the present study. The confirmation of the authors' hypothesis may be explained by the perspective that among children and early adolescents, additionally to potential functional difficulties, severe malocclusion can also be linked to aesthetic complains, which may in turn affect social relationships (21).

Schoolchildren in the age ranges of 8 to 10 years old and 11-12 years from low income family background were 69% and 79%, respectively, more prone to have experimented a negative impact on OHRQoL, compared with their counterparts. As already demonstrated by other Brazilian studies, socioeconomic and demographic factors

Table 4. Unadjusted and adjusted analysis of demographic, socioeconomic and clinical variables associated with total CPQ8-10 scores. Pelotas, Brazil, 2010 (n=792). Poisson regression analysis

Variable/Category	Model 1[c] RR (CI 95%)	p	Model 2 RR (CI 95%)	p	Model 3 RR (CI 95%)	P	Model 4 RR (CI 95%)	p
Sex								
Male	1.00	0.07	1.00	0.09	1.00	0.23	1.00	0.12
Female	1.11 (0.99-1.24)		1.10 (0.99-1.23)		1.07 (0.96-1.20)		1.10 (0.98-1.23)	
Age (years)								
8	1.00		1.00		1.00		1.00	
9	1.16 (1.00-1.35)	0.05	1.18 (1.01-1.36)	0.03	1.15 (1.00-1.34)	0.05	1.14 (0.99-1.32)	0.07
10	1.15 (0.99-1.33)	0.06	1.18 (1.01-1.36)	0.03	1.17 (1.01-1.36)	0.03	1.18 (1.02-1.33)	0.03
Race								
Caucasian	1.00	<0.01	1.00	<0.01	1.00	0.03	1.00	0.03
Non-Caucasian	1.30 (1.15-1.48)		1.31 (1.15-1.48)		1.16 (1.01-1.33)		1.15 (1.02-1.33)	
Family income								
4th quartile (1231-12000)	1.00				1.00		1.00	
3rd quartile (741-1230)	1.14 (0.96-1.34)	0.13			1.04 (0.88-1.24)	0.63	1.01 (0.86-1.20)	0.87
2nd quartile (511-740)	1.40 (1.18-1.65)	<0.01			1.19 (0.99-1.43)	0.07	1.15 (0.96-1.38)	0.13
1st quartile (0-510)	1.68 (1.43-1.98)	<0.01			1.47 (1.21-1.78)	<0.01	1.39 (1.14-1.69)	<0.01
Maternal education (years)								
≥ 8	1.00	<0.01			1.00	0.15	1.00	0.20
< 8	1.30 (1.17-1.46)				1.10 (0.97-1.26)		1.09 (0.95-1.25)	
Dental trauma								
Absent/Mild	1.00	0.29					1.00	0.19
Severe	1.22 (0.84-1.77)						1.23 (0.89-1.70)	
Dental Caries								
Absent	1.00	<0.01					1.00	0.02
Present	1.26 (1.22-1.42)						1.16 (1.03-1.32)	
DAI								
Normal/Mild malocclusion	1.00		1.00		1.00		1.00	
Definite malocclusion	1.03 (0.90-1.19)	0.64	1.06 (0.92-1.23)	0.43	1.08 (0.94-1.26)	0.26	1.10 (0.95-1.27)	0.22
Severe malocclusion	0.99 (0.83-1.18)	0.89	1.02 (0.86-1.22)	0.80	1.02 (0.85-1.21)	0.83	1.04 (0.87-1.24)	0.68
Very severe malocclusion	1.21 (1.00-1.47)	0.05	1.23 (1.01-1.50)	0.03	1.22 (1.00-1.48)	0.05	1.24 (1.02-1.51)	0.03

Model 1c presents Crude associations, Model 2 is ajusted for demographic variables (gender, age and race), Model 3 is adjusted for Model 2 variables plus socioeconomic characteristics (maternal education and family income) and Model 4 is adjusted for all the variables in the previous Models plus clinical variables (dental caries and dental trauma).

may influence the children's OHRQoL (15,22). In this study, non-Caucasians and children with mothers reporting lower education level had mean scores 30% higher than their peers. Indeed, it has been hypothesized that race could be linked to impaired OHRQoL by several pathways, like discrimination and racism (23). Additionally, the literature confirms that children from high-income families usually present better oral hygiene habits and have more access to prevention and dental treatment. These conditions may reflect in a better OHRQoL (24).

The need for orthodontic treatment was associated to the CPQ social and emotional domains on schoolchildren aged 11 and 12 years old, similar to previous studies (21,25). Within this age range, in the beginning of adolescence, social life becomes more intense and the appearance becomes more important for the young teenagers, and such

Table 5. Unadjusted and adjusted analysis of demographic, socioeconomic and clinical variables associated with total CPQ11-14 scores. Pelotas, Brazil, 2010 (N=411). Poisson regression analysis

Variable/Category	Model 1[c] RR (CI 95%)	p	Model 3 RR (CI 95%)	p	Model 4 RR (CI 95%)	p
Sex						
Male	1.00	0.04	1.00	0.04	1.00	0.06
Female	1.15 (1.01-1.31)		1.16 (1.00-1.33)		1.14 (0.99-1.31)	
Age (years)						
11	1.00	0.03	1.00	0.26	1.00	0.24
12	1.16 (1.01-1.32)	0.0	1.09 (0.94-1.26)		1.09 (0.94-1.27)	
Race						
Caucasian	1.00	<0.01	1.00	0.04	1.00	0.13
Non-Caucasian	1.20 (1.05-1.38)		1.11 (0.95-1.29)		1.13 (0.97-1.32)	
Family income						
4th quartile (1231-12000)	1.00		1.00		1.00	
3rd quartile (741-1230)	1.30 (1.05-1.61)	0.02	1.25 (1.00-1.56)	0.05	1.26 (1.00-1.58)	0.05
2nd quartile (511-740)	1.73 (1.40-2.13)	<0.01	1.64 (1.31-2.06)	<0.01	1.64 (1.30-2.06)	<0.01
1st quartile (0-510)	1.60 (1.30-1.96)	<0.01	1.40 (1.11-1.77)	<0.01	1.41 (1.11-1.79)	<0.01
Maternal education (years)						
≥ 8	1.00	<0.01	1.00	0.05	1.00	0.07
< 8	1.34 (1.18-1.53)		1.17 (1.00-1.36)		1.16 (0.99-1.35)	
Dental trauma						
Absent/Mild	1.00	0.57			1.00	0.12
Severe	1.09 (0.82-1.45)				1.02 (0.71-1.47)	
Dental Caries						
Absent	1.00	<0.01			1.00	0.08
Present	1.20 (1.05-1.38)				1.14 (0.98-1.35)	
DAI						
Normal/Mild malocclusion	1.00		1.00		1.00	
Definite malocclusion	1.08 (0.90-1.29)	0.41	1.10 (0.91-1.32)	0.33	1.09 (0.90-1.32)	0.39
Severe malocclusion	1.23 (0.96-1.58)	0.09	1.19 (0.91-1.56)	0.21	1.17 (0.89-1.54)	0.25
Very severe malocclusion	1.39 (1.12-1.72)	<0.01	1.28 (1.02-1.61)	0.03	1.28 (1.01-1.62)	0.04

Model 1[c] presents crude associations, Model 3 is adjusted for socioeconomic and demographic variables (sex, age, race, maternal education and family income) and Model 4 is adjusted for all the variables in the previous Models plus clinical variables (dental caries and dental trauma).

characteristics are closely related to the emotional well-being. It should be considered that certain occlusal conditions, like visible malocclusions, excessive overjet with incomplete lip closure, crowded incisors, and large diastema between incisors, may result in children teasing and bullying (8). This affects their social and emotional well-being, and results in a lower self-esteem (21). On the contrary, there was no association between malocclusion and oral symptoms and functional limitations in any of the age ranges evaluated in this study. The possible explanation for this finding is that only very severe occlusal problems would cause impact on such domains. Another reason would be that individuals with occlusal problems would probably present oral symptoms and functional limitations in older ages (in adulthood or even in the elderly), and not in a young age like evaluated in this study.

This study is not free of limitations. First, the cross-sectional study design limits the establishment of a temporal relationship between exposure and outcome, although malocclusion is a chronic condition and the CPQ reflects perceptions about the last three months. Also, CPQ is a generic instrument to evaluate OHRQoL and it is unspecific for malocclusion. However, the Child Oral Health Quality of Life Instrument (COHQoL) (17) was developed to measure the impact of oral health problems on the quality of life of children with dental and craniofacial disorders in the age range of 8 to 14 years old. The Child Perception Questionnaire (CPQ) is part of the COHQoL and has been widely used by researchers to evaluate the effects of malocclusion on the quality of life of children and adolescents, especially due to the good psychometric properties of the tool (14,25). In addition, was used the DAI index in a predominantly mixed dentition sample, and the tool was originally developed to be used in the permanent dentition (13). It has been objected that DAI can present a tendency to overestimate the malocclusion (26). Trying to avoid such problem, was used the DAI adjusted for mixed dentition (13). Besides being easy and fast for application in epidemiological studies, DAI is the index recommended by the World Health Organization for oral health surveys (5), facilitating international standardization of research. The external validity is one of the strengths of the study, which is supported both by information from the local authorities, indicating that nearly all children in this age range in Pelotas are enrolled in schools, and by methodological procedures, which ensured a representative sample of the population.The high response rate and the high inter-examiners reliability reinforce the internal validity of the research.

For the assumption of a cause-effect relationship, it should be emphasized the importance of further studies (especially with a longitudinal design), using standardized methodologies, to allow the comparability between studies, in an effort to build and consolidate this field of knowledge. the study's results are also important for public health policies establishment. Brazil has the largest public oral health system (SUS) in the world, providing free dental care not only for preventive or basic procedures, but also for more complex treatments, including some orthodontic procedures (27). Therefore, considering the prevalence and the impact of very severe malocclusion in OHRQoL of the affected children, such problems could be included as a priority when planning treatments covered by the SUS.

In sumary, the results of the present study suggest that malocclusion impacts on the OHRQoL, especially on the emotional and social well-being domains, and that this impact has higher effect on the children aged 11-12 years old than on their younger counterparts. Additionally, individuals with very severe malocclusion reported an impaired OHRQoL compared to the children with no or mild malocclusion.

Resumo

O ojetivo desse estudo foi ostimar o impacto da maloclusão na qualidade de vida relacionada à saúde bucal (QVRSB) de escolares de 8 a 12 anos de idade em Pelotas/ RS. Seleção amostral foi realizada através da técnica de conglomerado em duplo estágio, selecionando 1.199 crianças de 20 escolas públicas e privadas em Pelotas/Brasil. A coleta de dados foi realizada com uma abordagem transversal e consistiu em um questionário socioeconômico aos pais, entrevista com as crianças e exame clínico de saúde bucal. As variáveis clínicas foram obtidas através do exame clínico, e o Child Perceptions Questionnaire (CPQ) foi respondido através da entrevista com a criança. Para mensurar maloclusão e necessidade de tratamento ortodôntico, o Índice de Estética Dental foi usado. Para análise dos dados foram utilizados modelos de regressão de Poisson multivariados, a fim de estimar as razões de taxa e seus intervalos de confiança (95%). De 1.206 participantes, 789 tinham entre 8 e 10 anos de idade e 417 entre 11 e 12 anos. A necessidade de tratamento ortodôntico foi maior entre crianças mais jovens (44.6%) do que em mais velhas (35.0%) (p ≤0.05). Uma associação estatisticamente significante foi observada entre os domínios social e emocional do CPQ e a maloclusão em crianças mais velhas. Na análise ajustada (para variáveis socioeconômicas e clínicas), o efeito de maloclusão muito severa na QVRSB foi confirmado nos grupos etários de 8 a 10 e 11 a 12 (RR (IC95%) de 1,24(1,02;1,51) e 1,28(1,01;1,62), respectivamente . Os achados demostraram que crianças com maloclusão muito severa experienciaram maior impacto negativo na QVRSB comparadas com aquelas sem maloclusão ou com maloclusão leve. Os resultados sugerem que a maloclusão impacta na qualidade de vida. Um maior impacto acontece nos domínios de bem estar social e emocional.

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