EVALUATION OF DENTAL CARIES EXPERIENCE AND ORAL HEALTH-RELATED QUALITY OF LIFE IN SCHOOLCHILDREN

Avaliação da experiência de cárie e qualidade de vida relacionada à saúde bucal de escolares

Evaluación de la experiencia de caries y calidad de vida relacionada con la salud bucal de escolares

Original Article

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ABSTRACT

Objective: To assess the relationship between caries experience, oral health-related quality of life (OHRQoL) and socioeconomic factors in children from public municipal schools. **Methods:** This cross-sectional study was part of an oral health survey conducted during the year of 2012; it included 142 children aged 12 years to assess the OHRQoL using the Child Perceptions Questionnaire (CPQ_{11-14}) and the socioeconomic factors (parental education, family income, number of rooms and number of household members). Caries experience was assessed and expressed by DMFT and dmft indexes (number of decayed, missing and filled permanent and deciduous teeth, respectively). Statistical analysis consisted of descriptive statistics, the Chi-square, Mann-Whitney, and Spearman correlation tests. **Results:** In total, 58.5% (n=83) of the children had caries experience (DMFT+dmft≥1) and presented higher scores in the overall perception of oral health (2.6±0.9 x 2.1±0.8), in the total scale (33.0±22.6 x 21.9±14.5), in the emotional well-being (11.4±8.6 x 6.6±5.8), and social well-being (7.7±8.2 x 4.4±4.9) domains when compared to those without caries experience. A significant positive correlation was also noted between the number of people living in the household and the DMFT/dmft indexes (r=0.2670, p=0.003). **Conclusion:** Caries experience was related to a negative perception of oral health – particularly in the emotional and social aspects – and to the number of people living in the household.

Descriptors: Child; Dental Caries; Quality of Life.

RESUMO

Objetivo: *Avaliar a relação entre experiência de cárie, qualidade de vida relacionada à saúde bucal (QVRSB) e fatores socioeconômicos em escolares de rede municipal.* **Métodos:** *Este estudo, de corte transversal, realizado em um município paulista a partir de um levantamento de saúde bucal do ano de 2012, incluiu 142 escolares com 12 anos completos para avaliação da QVRSB por meio do Child Perceptions Questionnaire (CPQ_{11-14}) e de fatores socioeconômicos (escolaridade dos pais, renda, número de cômodos e número de pessoas que habitam o domicílio). A experiência de cárie foi avaliada e expressa pelo índice CPOD e ceo-d (número de dentes cariados, perdidos e obturados na dentição permanente e decídua, respectivamente). A análise consistiu de estatística descritiva, uso dos testes Qui-quadrado, Mann-Whitney e correlação de Spearman.* **Resultados:** *Do total, 58,5% (n=83) dos escolares apresentaram experiência de cárie (CPOD+ceo-d≥1), os quais também apresentaram maiores escores na percepção global em saúde bucal (2,6±0,9 x 2,1±0,8), na escala total (33,0±22,6 x 21,9±14,5) e nos domínios bem-estar emocional (11,4±8,6 x 6,6±5,8) e bem-estar social (7,7±8,2 x 4,4±4,9) quando comparados àqueles sem experiência de cárie. Observou-se também correlação positiva significativa entre o número de pessoas que habitavam o domicílio e o índice CPOD/ceo-d (r=0,2670; p=0,003).* **Conclusão:** *A experiência de cárie relacionou-se com uma percepção negativa da saúde bucal, principalmente nos aspectos emocional e social, e com o número de pessoas que habitavam o domicílio.*

Descritores: *Criança; Cárie Dentária; Qualidade de Vida.*

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RESUMEN

Objetivo: *Evaluar la relación entre la experiencia de caries, la calidad de vida relacionada con la salud bucal (CVRSB) y los factores socioeconómicos de escolares de la red municipal.* **Métodos:** *Este estudio de corte transversal realizado en un municipio se São Paulo a partir de datos secundarios sobre salud bucal del año de 2012, incluyó 142 escolares de 12 años completos para la evaluación de la CVRSB a través del Child Perceptions Questionnaire (CPQ_{11-14}) y de los factores socioeconómicos (escolaridad de los padres, renta, número de cómodos y número de personas que viven en el domicilio). La experiencia de caries fue evaluada y expresa por el CPOD y ceo-d (número de dientes cariados, los perdidos y los obturados en la dentición permanente y decidua, respectivamente). El análisis se dio por la estadística descriptiva, el uso de las pruebas de Cui-Cuadrado, Mann-Whitney y la correlación de Spearman.* **Resultados:** *Del total, el 58,5% (n=83) de los escolares presentaron la experiencia de caries (CPOD+ceo-d≥1) los cuales también presentaron mayores puntuaciones de la percepción global de salud bucal (2,6±0,9 x 2,1±0,8), en la escala total (33,0±22,6 x 21,9±14,5) y en los dominios bienestar emocional (11,4±8,6 x 6,6±5,8) y el bienestar social (7,7±8,2 x 4,4±4,9) al compararlos a los que no tuvieron la experiencia de caries. Se observo también la correlación positiva y significativa entre el número de personas que vivían en el domicilio y el índice CPOD/ceo-d (r=0,2670; p=0,003).* **Conclusión:** *La experiencia de caries se relacionó con una percepción negativa de la salud bucal, en especial para los aspectos emocional y social y con el número de personas que vivían en el domicilio.*

Descriptores: *Niño; Caries Dental; Calidad de Vida.*

INTRODUCTION

Dental caries continues to be a public health problem worldwide, and its occurrence has been associated with socioeconomic factors, due to the difficulty or impossibility of access to public services[1], resulting in disadvantage to the underprivileged population[2]. According to the last epidemiological survey on oral health conducted in Brazil[3], in the Southwestern region, caries experience has diminished over the years, but it was found in 51.1% of the children aged 12 years, demonstrating that there is still a demand for investments in this sector. A large portion of the Brazilian population has difficulty in gaining access to dental services, and oral problems such as dental caries have a negative impact on the well-being of children and their family members[4,5].

Over the course of the years, oral health has been exclusively evaluated by means of clinical criteria, which do not allow the real impact of oral problems on the day to day lives of individuals. The need for determining the impact of alterations in the oral cavity led to the development of instruments to evaluate oral health-related quality of life (OHRQoL), which have been used more frequently in dental researches nowadays[6].

The evaluation of the quality of life, the individual perception in their cultural context, the values in the environment in which persons live and their relations with their objectives, expectations, parameters and concepts have been included in the clinical evaluation as a way to prioritize treatments and implement oral health strategies[4,7,8]. There has been increasing interest in quality of life and oral health in children, since oral health disorders probably has a negative effect on their lives[9].

The Brazilian version of the *Child Perception Questionnaire* (CPQ) is a measurement instrument of OHRQoL that measures the impact of children's oral health on oral symptoms, functional limitations, emotional and social well-being[4,10], and the higher the score, the greater the impact perceived[10].

Health has a positive or negative influence on individual's quality of life, and oral health disorders, such as pain, discomfort, phonation and chewing disturbances[1] may lead to restrictions on their daily life activities and/or well-being. Past studies conducted in Brazil found association between caries experience, family income, mothers' educational level, and impacts on OHRQoL of children at both public[1,12,13] and private schools[1,14].

Although dental caries prevalence has shown decline over the last few years, the literature shows that there are population groups that are more predisposed to this disease[15]. The interdependent relationships between healthy habits, health and quality of life have shown that actions in the sphere of health education, whether educational, preventive or curative, are instruments of social transformation, favoring the reformulation of habits and attitudes[16].

There is a need to broaden the knowledge about the relationship that may exist between children's caries experience, perception of OHRQoL and socioeconomic conditions, which may subsidize health promotion practices and health care planning. Therefore, the aim of this study was to evaluate the relationship between caries experience, OHRQoL and socioeconomic factors in schoolchildren in the municipal network.

METHODS

This was a cross-sectional study conducted with data from an oral health survey in the municipality of Carapicuíba-SP, performed during the year 2012, involving schoolchildren who had completed 12 years of age, in the municipal public network.

The municipality of Carapicuíba is in the Metropolitan Region of São Paulo and has 387,622 inhabitants; with an illiteracy rate of 4.36%; Gross National Product (GNP) *per capita* of R$ 10.602.78, and it is ranked in 606th place among the 645 municipalities in the state of São Paulo[17,18].

For the oral health survey performed by the municipality, schoolchildren were selected from a universe of 6,383 children who had completed 12 years of age, and were enrolled at 38 schools at primary level. Seven schools were chosen by draw from various regions in the municipality, and the name of one out of every four children was selected (systematic sample) from a list of schoolchildren. The children were evaluated by two trained dentists from the municipality, totaling 320 children evaluated. The age of 12 years is internationally adopted as a basic parameter for the evaluation of dental health[19].

After consent from the Oral Health Coordinator of Carapicuíba and approval of the project by the Research Ethics Committee of the Universidade Federal de São Paulo, the parents or guardians were contacted and invited to participate. The Terms of Free and Informed Consent, an anamnesis chart for demographic survey data, and an OHRQoL questionnaire, all printed on paper, were given to the children to take to their parents. There was a positive return from 183 schoolchildren, who returned the signed and completely filled out forms. Those who returned incomplete charts and/or questionnaires were excluded. Therefore, the present study obtained a final sample of 142 schoolchildren who had completed the age of 12 years (children not referred for dental treatment).

The demographic data of the population studied were collected by means of an anamnesis form adopted by the Department of Pediatric Dentistry of the Piracicaba Dental School (UNICAMP), which had been delivered to the parents/guardians by the children themselves on return to their homes. The parents/guardians returned the filled forms to the school, but reminders were necessary to obtain the largest possible number within a period of one month after sending them. The following data were investigated: personal data, the children's pre-natal, natal and post-natal histories, and family socioeconomic factors. Among the socioeconomic factors, the following were assessed: a) educational level of the parents/guardians (primary school, high school, higher education/complete or incomplete); b) monthly family income (BRL); c) number of rooms in the home; d) number of persons who inhabited the home.

The oral health survey was conducted by two trained, calibrated dentists from the municipality of Carapicuíba, in a reserved classroom of the school, using a clinical mirror, exploratory probe, and disposable individual protective equipment (cap, mask, consultant coat and gloves). In the evaluation of caries experience, the DMFT and dmf-t (total number of decayed, missing/exfoliated and filled teeth) indexes for permanent and primary teeth, respectively, were used[19]. Thus, two groups were formed: G1) with caries experience: at least one carious, lost or filled tooth (DMFT+dmf-t≥1); G2) without caries experience: healthy teeth and absence of early loss (DMFT+dmf-t=0).

To evaluate the OHRQoL, the instrument *Child Perceptions Questionnaire* (CPQ_{11-14}), translated and validated for the Brazilian population[9] was applied. This instrument evaluates the impact of the children's oral condition in four domains of health (oral symptoms, functional limitations, emotional well-being and social well-being) in 36 items. The first two questions of the CPQ_{11-14} are with reference to the global perception of oral health and general well-being, with response options in a *Likert* type scale of 4 points. The other questions are also measured on a *Likert* scale of 4 points (0=never; 1=once or twice; 2=sometimes; 3=several times; 4=every day or almost every day). The total score is obtained by the sum of the scores of all the questions. The higher the score, the greater the impact on the child's quality of life. The CPQ_{11-14} instrument was answered by the children themselves (self-report), in a reserved room, under the researcher's supervision, after previously defined explanations to all the participants.

For statistical analysis of the data collected the statistical package BioEstat 5.3 (Mamirauá, Belém, PA, Brazil) was used, considering a p-value<0.05. The Kolmogorov-Smirnov normality test was used to verify the distribution of the variables. The data that presented deviation from normal distribution, non parametric tests (*Mann-Whitney* and *Spearman* correlation tests) were used. The descriptive statistics consisted of the means, standard deviations, medians and percentages. The frequency of genders in Groups 1 and 2 (with and without caries experience) was verified by the *Chi-square* – partition test. Using the *Mann-Whitney* test, the scores obtained in each domain and in the total scale were compared between the groups. A correlation matrix was obtained between the socioeconomic variables and the DMFT+dmf-t index (by the *Spearman* correlation test).

The information collected in the present research associated with the participants' identity were not revealed or consulted by third parties, and they were used only for statistical and scientific purposes, with complete privacy and anonymity being reserved. Because this was a study conducted in partnership with the Secretary for Health of Carapicuíba-SP, the children with dental caries were referred for treatment to the municipal health network. The present research project was approved by the Research Ethics Committee of the Universidade Federal de São Paulo (UNIFESP 16984113.9/0000.5505).

RESULTS

Of the 142 schoolchildren evaluated, 58.5% (n=83) had caries experience. Table I shows the frequencies found for gender and caries experience in the studied sample. The frequency of males and females sex was not dependent on groups formed by caries experience (p=0.9082).

Table II shows the descriptive data obtained in the OHRQoL evaluation, showing the scores of each domain, total score and items of global perception of both groups. Significant difference (p=0.0029) was found in the total score of CPQ_{11-14} when the groups with and without caries experience were compared.

Evaluation of each domain separately showed that the scores of the emotional and social well-being domains presented significant differences between groups (p=0.0012 and p=0.0051, respectively). The caries experience group showed higher scores of global perception in oral health in comparison with the children without caries experience (p=0.0013). In the aspect general well-being, no significant difference was observed (p=0.0540).

Table III shows the correlation coefficients obtained between socioeconomic factors and DMFT/dmf-t index. Among the coefficients obtained and of interest to the study, significant positive correlation was observed between the number of persons who inhabited the home and the DMFT/dmf-t index (r=0.2670; p=0.0030).

Table I - Frequency [n (%)] of gender and mean (±SD) of DMFT/dmf-t of the sample evaluated. Carapicuíba, SP, 2012.

	Groups		
	With caries experience 83 (58.5)	**Without caries experience 59 (41.5)**	**Total 142 (100)**
Sex*			
Male	40 (48.2)	27 (45.8)	67 (47.2)
Female	43 (51.8)	32 (54.2)	75 (52.8)
DMFT/dmf-t	3.7 (2.4)	-	2.1 (2.6)

SD: Standard Deviation; DMFT/dmf-t: number of decayed,missing, lost/exfoliated and filled teeth
*p= 0.9082 (Chi-square Test)

Table II - Mean (±SD) of domain scores, total score and items of overall perception of the *Child Perception Questionnaire* (CPQ_{11-14}) according to the groups. Carapicuíba, SP, 2012.

CPQ_{11-14}	**Number of items**	**With caries experience (n=83)**	**Without caries experience (n=59)**
Total [0-148]	37	33.0 (22.6)*	21.9 (14.5)*
Domains			
Oral symptoms [0-24]	6	6.9 (4.0)	6.0 (4,0)
Functional Limitations [0-36]	9	7.1 (6.1)	4.9 (3.7)
Emotional well-being [0-36]	9	11.4 (8.6)*	6.6 (5.8)*
Social well-being [0-52]	13	7.7 (8.2)*	4.4 (4.9)*
Global Perception			
Oral Health [0-4]	1	2.6 (0.9)*	2.1 (0.8)*
Social well-being [0-4]	1	1.1 (1.1)	0.8 (0.9)

$CPQ_{11-14:}$ *Child Perceptions Questionnaire;* [ ] possible variation in score; *p<0.01 (*Mann-Whitney* test*)*

Table III - Matrix of correlation between socio-economic factors and number of decayed, missing/exfoliated and filled teeth (n=142). Carapicuíba, SP, 2012.

r (p-value)	Number of persons	Total number of rooms	Father's Educational level	Mother's Educational level	DMFT/dmf-t
Income	-0.205 (0.034)*	0.268 (0.005)*	0.145 (0.144)	0.216 (0.027)*	-0.093 (0.327)
Number of persons		0.082 (0.368)	-0.025 (0.795)	-0.232 (0.013)*	0.267 (0.003)*
Total number of rooms			0.0674 (0.477)	-0.046 (0.625)	-0.042 (0.640)
Father's Educational level				0.323 (0.000)*	-0.050 (0.587)
Mother's Educational level					-0.002 (0.978)

DMFT/dmf-t: number of decayed missing/exfoliated and filled teeth; * p<0.05 (*Spearman* correlation test)

DISCUSSION

The present study was conducted with the aim of evaluating the relationship of caries experience with OHRQoL in schoolchildren of the public network of the municipality of Carapicuíba-SP. In addition, the relationship between the number of decayed, missing/exfoliated and filled teeth, and the socioeconomic factors was assessed.

Caries experience was found in 58.5% of the schoolchildren evaluated and a DMFT/dmf-t index equal to 2.1, which is higher than the mean value of 1,41[3] found in the state of São Paulo capital in the last epidemiological survey. In the Southwestern region, this survey found caries experience in 51.1% of the children aged 12 years[3], an index that has diminished over the years, but demonstrates that basic health care is still very important to diminish harm to children's oral health.

In the present research, the total score obtained by the instrument CPQ_{11-14} in schoolchildren with caries experience was observed to be significantly higher than it is in children without caries experience; moreover, there was significant difference in global perception of oral health between the groups. The relationship between dental caries and impact on quality of life is related to the experience of pain, difficulties with chewing, speech, and esthetic discomforts that directly or indirectly affect the daily lives of children and their family members[5,13,20-22]. Among children aged 8 to 10 years old, at public and private schools in Pelotas-RS, the presence of decayed teeth also had a negative influence on the OHRQoL, demonstrating the importance of preventive and therapeutic measures for this disease. The CPQ_{11-14} evaluates the children's own perception of how their oral health influences their physical and psychosocial functions[12], providing measurements that can be useful to develop oral health strategies[5,14].

Manifestations experienced by individuals are known to be determined not only by the nature of the disease, but also by their personal and environmental characteristics[1,12-14,23]. One study[24] showed that 8-year-old children were capable of reporting greater impacts on their emotional well-being due to their oral conditions, while 10-year-old children reported greater impacts on their social well being on account of their oral conditions. Perception differs between different ages, and may be even more diverse between different cultures and clinical conditions[1,25]. Individual evaluation of the perception of OHRQoL provides the opportunity to measure the extent to which a clinical condition is important to that individual, and what impact he/she would perceive when receiving a treatment, connecting health with environmental conditions and quality of life, and prioritizing health care for those with more compromised quality of life.

Children with harmed oral health are more predisposed to feel worried and upset about their oral health, and this could cause impact on their emotional domain[12] resulting from limitations of daily life activities that cause privations in their individual, environmental and social contexts[1,12]. This aspect was observed in the present study, in which children with caries experience presented higher scores in the "emotional well-being" domain, in comparison with those without this experience, so that children may become withdrawn and sad by the situation in which they find themselves[11].

Previous studies have observed impact on the emotional domain caused by caries when using both self-report[14,26] and the parents' report[22]. The self-report, as the instrument

used in the present study, appears to be more reliable in evaluating the child's quality of life than the parents' report, because the parents' report seems to have a bias toward the lack of representativeness of the child's reality and pressure related to social acceptability[27].

The majority of oral diseases are not inevitable, but cause morbidities that may compromise the individuals' life, thus impacting their social well-being[7,12-14,20,22]. In childhood, dental caries is considered the most common disease among those that do not regress spontaneously, and one of the possible consequences is the child's dissatisfaction with his/her appearance[5,7,12,14,20,22,26]. An unsatisfactory appearance of the mouth may be a reason for bullying[1], because it is very important for social experience, and the reaction of persons to visible facial and dental differences may lead to a negative social judgment, affecting his/her self-esteem[28]. The present study showed that 12-year-old children reported substantial impacts on the "social well-being" domain, corroborating a previous study that also emphasized that the presence of caries may compromise the interpretations and considerations that the children are forming with respect to themselves, harming their relationship with other children[11].

The study of risk factors for dental caries is relevant for developing strategies that may decrease its incidence. Other studies have found strong association between socioeconomic factors and caries experience, such as income, parents' educational level, mothers' occupation, number of persons living in the home, among others[14,29,30]. A study conducted in Recife-PE observed that living in the home with six or more persons, and having more than three persons per room, increased children's predisposition to caries experience[31]. The present study also observed that the number of decayed, missing and filled teeth was correlated with the number of persons living in the children's home. This probably has a significant impact on the access of health services, because the larger number of persons living in the home may be related to a division of income and health care, resulting in privation in daily family decisions[12], and reflecting on the health habits practiced by the children and their families[14].

Whereas, the family income declared by the parents did not show a significant correlation with the DMFT/dmf-t index, probably due to its variable and fluctuating nature. As the family income was self-declared, there is a tendency by the subject to emphasize or exaggerate a desirable measurement, generating a bias in this type of measurement[32].

An important fact to point out is that the sample of the present study consisted of children not referred for dental treatment, and they would tend to present lower impact on OHRQoL than referred children. Pain is known to be one of the main reasons for seeking treatment[33], and therefore these individuals would report discomfort or limitation in a more precise and intense manner. In other clinical conditions, such as obesity, individuals who seek treatment, present the worst signs and symptoms[34]. Nevertheless, the scores obtained for the total scale in the group with caries experience were significantly higher than they were in the group without this experience.

The design of the present study (cross-sectional) in some ways limits generalization of the results obtained. In this sense, prospective studies are needed to understand to what extent harmed oral health impacts the OHRQoL in growing individuals, whether it has repercussions in adulthood, and if dental treatment would be able of improving their quality of life.

CONCLUSION

The findings of the present study showed that in schoolchildren aged 12 years from Carapicuíba-SP, caries experience was related to a negative perception of oral health, particularly in the emotional and social aspects, and with the number of persons who lived in the children's home.

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