

## The social status associated with dental experience among Brazilian children

O status social associado à experiência odontológica entre crianças brasileiras

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**Abstract** Dentists should be alert not only to clinical variables, but also to socioeconomic, psychological and cultural factors, which have all been associated with the experience of dental caries. The aim of this study of was to assess social status and dental experience among Brazilian children. A cross-sectional study was conducted involving 1367 male and female children aged six and seven years enrolled at public and private schools in the city of Recife (Brazil) in 2013. The children at tending public schools were socioeconomically less privileged than those attending private schools. Data were collected through interviews and intraoral examinations. Caries experience was high (53.3%) in the overall sample, but less privileged children had larger percentages of decayed teeth and teeth that required extraction ( $p < 0.001$ ). Children from less privileged social class had a greater chance of having a low (OR = 1.77 [95%CI 1.33 - 2.35]), moderate (OR = 4.41 [95%CI: 3.18 - 6,14]) and high (OR = 9.55 [95%CI 6.01 - 15.16]) caries experience. They also had a greater chance of never visiting a dentist (OR= 2.90 [95% CI 2.25 - 3.74]) and had dental anxiety (OR = 1.70 [95%CI 1.34-2, 16]). Socioeconomic status influences the dental caries experience, the visits to the dentist and the dental anxiety of the children analyzed.

**Key words** Oral health, Social class, Epidemiology

**Resumo** Os dentistas devem estar atentos não apenas às variáveis clínicas, mas também aos fatores socioeconômicos, psicológicos e culturais, que têm sido associados à experiência de cárie dentária. O objetivo deste estudo foi avaliar o status social e a experiência odontológica em crianças brasileiras. Foi realizado um estudo transversal envolvendo 1367 crianças de 6 e 7 anos de idade, de ambos os sexos, matriculadas em escolas públicas e privadas da cidade do Recife (2013). As crianças de escolas públicas eram socioeconomicamente menos privilegiadas. Os dados foram coletados por meio de entrevistas e exames intraorais. A experiência de cárie foi alta (53,3%), mas as crianças menos privilegiadas tiveram maiores porcentagens de dentes cariados e com extração indicada ( $p < 0,001$ ). Crianças de classe social menos privilegiada tiveram maior chance de ter experiência de cárie baixa (OR = 1,77 [IC95% 1,33 - 2,35]), moderada (OR = 4,41 [IC95% 3,18 - 6,14]) e alta (OR = 9,55 [IC95% 6,01- 15,16]). E, também tiveram maior chance de nunca visitar um dentista (OR = 2,90 [IC95% 2,25 - 3,74]) e ter ansiedade ao tratamento odontológico (OR = 1,70 [IC95% 1,34 - 2,16]). O status socioeconômico exerce influência na experiência de cárie dentária, nas visitas ao dentista e na ansiedade ao tratamento odontológico das crianças analisadas.

**Palavras-chave** Saúde bucal, Classe social, Epidemiologia

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## Introduction

Dental caries continues to be a highly prevalent public health problem, especially in socially and educationally disadvantaged communities<sup>1,2</sup>. The pain and suffering stemming from this adverse oral condition can exert an impact on different vital functions, such as eating, drinking and sleeping, with a consequent reduction in quality of life<sup>3-5</sup>.

The prevalence of oral conditions, such as tooth decay, is influenced by aspects beyond mere etiological factors and the identification of individuals at high risk for caries is the first step toward the determination of treatment needs. Clinical variables as well as socioeconomic, demographic, psychological, ethnic and cultural factors have all been associated with the incidence of dental caries and toothache, as have patterns of access to dental services and the use of such services<sup>1,3,6</sup>.

The phenomenon known as caries disease polarization is characterized by the social vulnerability of certain social groups, which continues to have an effect on preventing the decline in the frequency of this condition. Indeed, studies report that a greater burden of caries affects less economically privileged populations<sup>7,8</sup>, leading to a greater concentration of the disease and treatment needs in a small part of the population (20 to 40%)<sup>9</sup>. A Brazilian national report on oral health<sup>10</sup> showed that children under five years of age had an average of 2.43 teeth with caries, with a higher mean (dmft = 2.89) in the northeastern region of the country, which is where the present study was conducted.

Brazil appears to be an ideal country for conducting epidemiological studies for the evaluation of inequalities in health when one considers the recent economic changes along with the continuation of social inequalities<sup>3</sup>. Evidence from such studies could contribute to the improvement of social policies and the establishment of equitable health care. Thus, the purpose of the present study was to assess social status and dental experience among Brazilian children.

## Material and Methods

A cross-sectional study was conducted in the city of Recife, Brazil, involving 1367 male and female children aged six and seven years in 2013.

The sample size was determined considering the following criteria: (a) estimated population;

(b) estimated 50% prevalence of the variables of interest in the population; (c) 95% confidence interval; (d) maximum tolerable error of 5%; and (e) a design effect of 1.5. For a statistical power greater than 80%, the minimum sample was determined to be 1,221 children.

Data were collected at public and private elementary schools selected proportionally by size (number of children) and location in the six political administrative regions of the city. Single-stage cluster sampling was used for the selection of the subjects. Schools were selected randomly and all groups in first and second grade classes participated in the study. The children attending public schools were socioeconomically less privileged than those attending private schools. Type of school has been used as an indicator of socioeconomic status<sup>11,12</sup>.

Two researchers underwent a training process for the administration of the interviews and clinical examinations. A pilot study was conducted to test the methods. The Kappa statistic was employed. Intra-examiner and inter-examiner agreement was 0.80 and 0.75, respectively, for the interviews and 0.75 and 0.70, respectively, for the clinical examinations.

A private interview was conducted with each child. To determine experiences with a dentist, the children were asked: "Have you ever been to the dentist?" Data on a history of dental pain were collected based on the answer to the following question: "Have you ever had a toothache in your life?" Both answers were close-ended (yes or no)<sup>13</sup>.

Dental caries experience was evaluated using the decayed, missing and filled teeth indices for the primary (dmft) and permanent (DMFT) dentitions<sup>14</sup>. Oral examinations were conducted at the schools using artificial light and disposable tongue depressors. Prior to the examination, the children were asked to clean their teeth with gauze. Biosafety procedures were strictly followed. The children were classified as caries free (dmft + DMFT = 0) or having low (dmft + DMFT from 1 to 2), moderate (dmft + DMFT from 3 to 4) or high (dmft + DMFT > 4) caries experience. Decayed teeth were categorized as 0, 1, 2 and  $\geq 3$ . Missing and filled teeth were categorized as 0, 1 and  $\geq 2$ <sup>15</sup>.

Dental anxiety was evaluated using the Dental Anxiety Questionnaire (DAQ)<sup>16-18</sup>. The children were asked the following question: "Are you afraid of going to the dentist?" The responses were "no," "a little," "yes, quite" and "yes, very" and were dichotomized as the presence or ab-

sence of anxiety<sup>6</sup>. The DAQ is considered a suitable means for testing dental anxiety, since it is short, easy to use, has been validated for use with Brazilian children and has demonstrated good reproducibility and reliability in population-based studies<sup>17,18</sup>.

The data were tabulated using the EpiData software program and analyzed with the aid of the SPSS program (version 20). The chi-square test was used for the determination of associations among the qualitative variables. Means were compared using the t-test and simple analysis of variance. The level of significance in the decision of the statistical tests was 5% ( $p \leq 0.05$ ). Multivariate binary logistic regression was performed in this study. The model was accepted (significance of model:  $p < 0.001$ ), had an adequate goodness-of-fit on the Hosmer-Lemeshow test ( $p = 0.417$ ) and correctly classified 67.1% of the data.

This study received approval from the Human Research Ethics Committee of the University of Pernambuco, Brazil. The legal guardians signed a statement of informed consent on behalf of the children.

## Results

The sample was composed of 1,367 children. Distribution with regard to gender and age was similar. Males accounted for 52.2% of the sample; 50.8% were six years of age and 49.2% were seven years of age.

Most children (66%) had been to a dentist and 51.1% reported having experienced toothache sometime in their lives. A total of 54.4% reported having some degree of anxiety: 40.3% reported mild to moderate anxiety and 14.1% reported severe anxiety. Concerning caries experience, 53.3% of children had  $dmft + DMFT \geq 1$ . A total of 46.6% of these children had cavities ( $d + D$ ), 17.1% had teeth that required extraction ( $m$ ) and 15.7% had filled teeth ( $f + F$ ). The mean  $dmft + DMFT$  was 1.91 (range: 0 to 15). Moreover, 28.3% of the children had moderate to high caries experience ( $dmft + DMFT \geq 4$ ).

The sample consisted of 726 (53%) students from public schools and 641 (47%) from private schools (more privileged). Considering socioeconomic status based on type of school, significant differences between more and less privileged children were found with regard to having visited a dentist and dental anxiety ( $p < 0.001$ ). Moreover, significant associations were found between

social class and both caries experience and the number of decayed teeth or teeth that required extraction ( $p < 0.001$ ) (Table 1).

Considering the significant variables based on the ORs and respective confidence intervals in the adjusted model, a less privileged child had a greater chance of never having visited a dentist and having dental anxiety. This same population also had a greater chance having low (OR = 1.77 [95%CI 1.33 - 2.35]), moderate (OR = 4.41 [95%CI: 3.18 - 6,14]) and high (OR = 9.55 [95%CI 6.01 - 15.16]) caries experience. Children from less privileged social class had a greater chance of never visited a dentist (OR = 2.90 [95%CI 2.25 - 3.74]) and having dental anxiety (OR = 1.70 [95% CI 1.34 - 2.16]) (Table 2).

## Discussion

Private schools in Brazil typically offer a more complete structure than public schools, with better facilities and a more advanced curriculum. However, these are private institutions funded by parents and guardians. For most of the less privileged population, spending money on education is not possible. In a study conducted with children in Mexico City, Irigoyen et al.<sup>11</sup> report that type of school is a reliable indicator of socioeconomic status in urban environments, as children from more privileged families generally attend private schools. Likewise, Kumar et al.<sup>12</sup> report that children in India from families with a low socioeconomic status primarily attend the public school system. Comparing caries index data based on a socioeconomic variable (type of school), studies conducted in the cities of in Rio Claro (SP)<sup>19</sup> and Blumenau (SC)<sup>20</sup> found a lower occurrence of the disease in children who attended private schools, which is in agreement with the present findings.

A significant association was found between social class and visits to the dentist, with the percentage of children who reported a visiting a dentist significantly higher among more privileged children ( $p < 0.001$ ). Among the children who had never been to the dentist, six out of 10 were from less privileged families. Moreover, the percentage of children who reported having no dental anxiety was significantly higher among those considered more privileged ( $p < 0.001$ ). It is likely that lower classes visit the dentist less often due to their limited purchasing power<sup>21</sup> and use health services less often due to cultural issues or simply having less access to such services

**Table 1.** Distribution of children according to variables analyzed and social class.

Variables	Social Class				p-value	Mean ± SD	
	Less privileged		Privileged				
	N	%	N	%			
Gender	Male	336	52.4	337	51.9	0.899 <sup>a</sup>	-----
	Female	305	47.6	349	48.1		
Visit to dentist	Yes	359	56.1	543	74.8	<0.001 <sup>a*</sup>	-----
	No	281	43.9	183	25.2		
Dental pain	Yes	340	53.5	355	48.9	0.098 <sup>a</sup>	-----
	No	295	46.5	371	51.1		
Dental anxiety	Yes	405	63.2	338	46.6	<0.001 <sup>a*</sup>	-----
	No	236	36.8	388	53.4		
Caries experience	Caries free	216	33.7	422	58.1	< 0.001 <sup>a*</sup>	1.91 ± 2.66
	Low	153	23.9	189	26.0		
	Moderate	158	24.6	87	12.0		
Decayed teeth	High	114	17.8	28	3.9	< 0.001 <sup>a*</sup>	1.27 ± 2.00
	0	258	40.2	476	65.6		
	1	89	13.9	135	18.6		
	2	97	15.1	68	9.4		
Missing Teeth	≥ 3	197	30.7	47	6.5	< 0.001 <sup>a*</sup>	0.32 ± 0.86
	0	475	74.1	658	90.6		
	1	78	12.2	48	6.6		
Filled teeth	≥ 2	88	13.7	20	2.8	0.318 <sup>a</sup>	0.32 ± 0.92
	0	538	83.9	615	84.7		
	1	52	8.1	45	6.2		
	≥ 2	51	8.0	66	9.1		

<sup>a</sup> Pearson's chi-square test; \* Significant at p < 0.05.

**Table 2.** Results of univariate and multivariate logistic regressions for children from less privileged schools.

Variables	Univariate		Multivariate		
	OR and IC 95%	p-value	OR and IC 95%	p-value	
Visit to dentist	Yes	1.00	< 0.001 <sup>*</sup>	1.00	< 0.001 <sup>*</sup>
	No	2.32 (1.85 to 2.92)		2.90 (2.25 to 3.74)	
Dental anxiety	Yes	1.97 (1.59 to 2.45)	< 0.001 <sup>*</sup>	1.70 (1.34 to 2.16)	< 0.001 <sup>*</sup>
	No	1.00		1.00	
Caries experience	Caries free	1.00	< 0.001 <sup>*</sup>	1.00	< 0.001 <sup>*</sup>
	Low	1.58 (1.21 to 2.07)	0.001 <sup>*</sup>	1.77 (1.33 to 2.35)	
	Moderate	3.55 (2.61 to 4.83)	< 0.001 <sup>*</sup>	4.41 (3.18 to 6.14)	
	High	7.95 (5.10 to 12.41)	0.189	9.55 (6.01 to 15.16)	

\* Significant at p < 0.05.

for the purposes of prevention<sup>22</sup>, which can help maintain or even increase the level of fear, thereby causing greater dental anxiety<sup>23,24</sup>. Indeed, dental anxiety is reported to be more common among individuals who have never been to the dentist<sup>6</sup>.

In the present study, most children reported having toothache experience. However, reports of pain may have been associated with the tran-

sition phase of the mixed dentition and physiological primary tooth exfoliation, which is independent of socioeconomic status. Children with tooth mobility could report discomfort or pain that is difficult to distinguish from pain related to tooth decay or originating from the pulp. Another study found that a previous history of dental pain was an indicator of risk for untreated dental

caries. However, the results should be interpreted with caution, since dental pain is not a cause of caries, but rather is caused by its progression to the dentin and pulp<sup>25</sup>.

Dental caries experience was significantly associated with socioeconomic status ( $p < 0.001$ ). Most privileged children were free of cavities, whereas four out of 10 less privileged children had moderate to high caries experience. This result is in agreement with findings described by Peres et al.<sup>9</sup>, who report a change from a situation of high disease prevalence to one in which a large percentage of individuals were free of caries. However, greater frequencies of the disease and treatment needs were found in a portion of the population, which characterizes a phenomenon known as polarization.

The high caries experience among less privileged children may be related to the low rate of visiting the dentist in this social group. Poor oral health status among Brazilians, especially children, ends up being a reflection of socioeconomic inequality and less access to dental care resulting from the limited offer of public services and the high cost of private practice for most of the underprivileged population<sup>26,27</sup>. In less privileged classes, the high caries index is more serious and the identification of these groups can enable the adoption of adequate prevention measures<sup>7</sup>.

The more privileged children had fewer decayed teeth ( $d + D$ ) ( $p < 0.001$ ) and teeth that required extraction ( $m$ ) ( $p < 0.001$ ). Disadvantaged children had a greater number of decayed teeth ( $d + D$ ) and primary teeth that required extraction ( $m$ ) but had a similar number of filled teeth ( $f + F$ ). The number of filled teeth in the more socioeconomically privileged children may be due to less need for curative treatment, in contrast to the situation of the disadvantaged children, which suggests greater needs for restorative treatment or extraction associated with a low frequency of visits to the dentist. The prevalence of dental caries is associated with socio-demographic and behavioral aspects, such as the frequency of dental appointments<sup>28</sup>.

The age range of children selected for the present study was six to seven years, which several authors describe as a transitional period and important for establishing new data in the literature<sup>29-31</sup>. To assess oral health status in the mixed

dentition, some authors have performed separate evaluations of the primary and permanent dentitions (dmft and DMFT indices, respectively)<sup>32,33</sup>. However, when assessing caries experience, there is no difference whether tooth decay occurs in primary or permanent teeth.

Regarding the socioeconomic profile, the monthly fee of the private schools in this study ranged from US\$ 100 to 380. As the selection of the sample was determined using a cluster design, no differentiation was made in terms of private schools with different standards, which can be considered a limitation of the study. However, the random selection process led to a representative sample of the entire city of Recife, which can be replicated and externalized to other cities or countries.

Despite the limitations of using “type of school” as a socioeconomic indicator, the decision was made to focus on this variable, following the example of previous studies<sup>11,12,19,20</sup>. The non-inclusion of other socioeconomic indicators, such as income and mother’s schooling, was due to the fact that the present study involved interviews with children aged six and seven years, who were likely unaware of their family’s actual economic status. As a large number of children participated in this study, it was not possible to seek out their parents to clarify this issue. A previous study points out the limitations of collecting socioeconomic data, especially when the study population is formed by schoolchildren, since it is necessary to involve family members for more precise evaluations, making it difficult to perform this type of study<sup>19</sup>.

## Conclusion

Socioeconomic status exerted an influence on dental caries experience in the children analyzed. Overall caries experience was high, but more privileged children had lower percentages of decayed teeth and teeth that required extraction. Socioeconomic status was also associated with visits to the dentist and dental anxiety. Dentists should be alert not only to clinical variables, but also to socioeconomic, psychological and cultural factors, which have all been associated with the incidence of dental caries.

## Collaborations

All authors listed have contributed sufficiently to the project to be included as authors.

## Acknowledgements

This study financed in part by the Coordenação de Aperfeiçoamento de Pessoal de Nível Superior – Brasil (CAPES).

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Article submitted 15/08/2018  
 Approved 12/04/2019  
 Final version submitted 14/04/2019

