## Short Communication

# Risk indicators of dental caries in 5-year-old Brazilian children

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***Objective*** To report the prevalence and severity of dental caries and to identify caries risk indicators among gender, clinical and socioeconomic variables in 5-year-old children attending preschools in Piracicaba, Brazil, in 2005. ***Method*** The random sample consisted of 728 subjects attending public and private preschools that were examined by a calibrated dentist. Dental caries was measured using WHO criteria. The socioeconomic variables (type of school, monthly family income, number of people living in the household, parents' educational level and home ownership) were collected by means of a parental semi structured questionnaire. ***Results*** The mean dmft was 1.30 (SD=2.47); 62.2% were caries-free. The multiple logistic regression analyses showed that the risk indicators of caries were father's incomplete college education and presence of initial lesion. ***Conclusions*** The prevalence of dental caries in 5-year-old preschool attenders in Piracicaba was moderate, and father's educational status below undergraduate level, as well as presence of initial lesions, were risk indicators of the disease.

*Keywords: Dental caries, preschool, risk indicator*

### Introduction

Most developed countries have experienced a significant reduction in dental caries prevalence since the 1970s (Pitts *et al*., 2002). Caries decline has been also observed in Brazil. However the disease is still considered a public health problem (Brazil Health Ministry, 2004). For preschool children, an apparent increase in caries prevalence (Pitts *et al*., 2003) as well as a skewed distribution of the disease has been observed in 5-year-olds (Mattila *et al*., 2000). Moreover those with the highest level of caries are in the lower socioeconomic bracket, and probably do not have adequate access to preventive measures (Jones and Worthington, 2000).

However, there are few studies of the prevalence of dental caries in preschool children in Brazil. In this context, it is very important to carry out epidemiological studies periodically in order to know and to follow dental caries trends over time in this age group. Therefore, the present study aimed at reporting the prevalence and severity of dental caries and identifying caries risk indicators according to gender and clinical and socioeconomic variables in 5-year-old preschool attenders in Piracicaba, Brazil, in 2005.

### Methods

The study was approved by the Research Ethics Committee of the Dental School of Piracicaba, State University of Campinas (UNICAMP).

The sample size was calculated based on caries experience reported in previous studies (Cypriano et al., 2003). A cluster sampling method was used admitting a sampling error of 0.36 decayed, missing and filled teeth, mean dmft of 2.64 with standard deviation of 3.4, a confidence level of 95% and an expected loss of 20% due to non return of consent forms or absence from school on day of clinical examination. Twenty-two public and eighteen private preschools were randomly selected. In each preschool all 5-year-old children were invited to participate in the study, totalling 814 subjects (481 from public preschools and 333 from private preschools). Among them, children who did not return the informed consent form and questionnaires (n=31; 3.81%), those absent on the examination day (n=55; 6.76%) or those with severe dental hypoplasia, serious systemic disease, or fixed orthodontic appliance (n=0) were excluded from the study. The final sample was composed of 728 five-year-old children attending preschool, out of which, 428 were from public preschools and 300 from private preschools.

A previously calibrated dentist (Kappa>0.88) performed the clinical examinations in an outdoor setting, under natural light, using CPI probes, mirrors #5 (WHO, 1997) and air-drying. Before examination each child brushed their teeth under the supervison of a dental hygienist.. Dental caries was registered using the dmft index, according to the World Health Organization diagnostic criteria (WHO, 1997). The initial lesions (IL) were also recorded in surfaces/teeth following an adaptation of the

**Table 1.** Sample distribution according to type of school and gender. Piracicaba, Brazil, 2005.

| Type of school | Gender | | Total (n) |
|---|---|---|---|
| | Male (%) | Female (%) | |
| Private preschool | 45.3 | 54.6 | 300 |
| Public preschool | 53.7 | 46.2 | 428 |
| Total | 50.2 | 49.7 | 728 |

**Table 2.** Univariate analysis of the association between dmft (dichotomization by the median) and gender, socio-economic and clinical variables. Piracicaba, Brazil, 2005.

| Variable | n | dmft > 0 (%) | $\chi^2$ | p-value |
|---|---|---|---|---|
| *Monthly family income* | | | | |
| Up to 4 Minimum Wages * | 423 | 45.1 | 22.72 | < 0.0001 |
| Over 4 up to 6 Minimum Wages | 186 | 27.9 | 20.81 ** | < 0.0001 ** |
| > 6 Minimum Wages | 67 | 23.8 | | |
| *Number of people living in the household* | | | | |
| ≤ 4 people | 451 | 36.3 | 2.04 | 0.1778 |
| > 4 people | 241 | 41.9 | | |
| *Father's education* | | | | |
| Incomplete elementary school | 51 | 52.9 | 32.34 | |
| Incomplete middle school | 117 | 44.4 | 25.73 ** | < 0.0001 |
| Incomplete high school | 111 | 45.9 | | < 0.0001 ** |
| Incomplete undergraduate studies | 179 | 32.9 | | |
| Complete undergraduate studies | 69 | 11.5 | | |
| *Mother's education* | | | | |
| Incomplete elementary school | 57 | 49.1 | 20.97 | 0.0003 |
| Incomplete middle school | 132 | 47.7 | 17.63 ** | < 0.0001 ** |
| Incomplete high school | 180 | 38.8 | | |
| Incomplete undergraduate studies | 235 | 35.7 | | |
| Complete undergraduate studies | 72 | 18.0 | | |
| *Home ownership* | | | | |
| Yes | 348 | 37.0 | 0.42 | 0.5677 |
| No | 342 | 39.4 | | |
| *Type of school* | | | | |
| Public preschool | 428 | 43.4 | 14.27 | 0.0002 |
| Private preschool | 300 | 29.6 | | |
| *Initial lesion* | | | | |
| 0 (no) | 516 | 15.8 | 360.99 | < 0.0001 |
| > 0 (yes) | 212 | 91.0 | | |
| *Gingivitis* | | | | |
| 0 (no bleeding) | 607 | 35.0 | 11.19 | 0.0012 |
| 1 (bleeding) | 121 | 51.2 | | |
| *Gender* | | | | |
| Female | 362 | 36.1 | 0.77 | 0.4226 |
| Male | 366 | 39.3 | | |

* Minimum wage at the time of the data collection ≅ US$ 101.02
** Linear trend for ordinal non-dichotomous variables

**Table 3.** Stepwise logistic regression with dmft as dependent variable. Piracicaba, Brazil, 2005.

| Variable | dmft > 0 | | Odds ratio | 95% confidence interval | p-value |
|---|---|---|---|---|---|
| | n | % | | | |
| *Father's education* | | | | | |
| Incomplete elementary school | 27 | 52.9 | 5.02 | 1.45-17.24 | 0.0106 |
| Incomplete middle school | 52 | 44.4 | 5.02 | 1.71-14.70 | 0.0033 |
| Incomplete high school | 51 | 45.9 | 5.91 | 2.00-14.03 | 0.0013 |
| Incomplete undergraduate studies | 59 | 32.9 | 3.12 | 1.09-8.84 | 0.0327 |
| Complete undergraduate studies | 8 | 11.5 | ref | | |
| *Initial lesion* | | | | | |
| 0 (no) | 82 | 15.8 | ref | | |
| >0 (yes) | 193 | 91.0 | 49.58 | 26.42-93.05 | < 0.0001 |

criteria of Nyvad *et al.,* (1999) and Fyffe *et al.,* (2000). Gingivitis was evaluated using the gingival alteration index for 5-year-olds according to SB Brasil criteria (Brazil, 2004).

The children's parents received a semi-structured questionnaire for collecting information on socioeconomic status (monthly family income, number of people living in the household, parents' educational level, home ownership).

The dependent variable dmft was dichotomized according to the median (med=0). Univariate analyses using the Chi-square test ($\chi^2$) at 5% significance level were performed to test the influence of independent variables on dependent variable and the Yates's continuity correction on 2×2 contingency tables was used. For ordinal non-dichotomous variables, the linear component was assessed by the Mantel-Haenszel Chi-Square test. Then multiple logistic regression analyses using the stepwise procedure were performed in order to identify the caries risk indicators. Only the independent variables with significant association at p<0.15 were selected for the regression analysis. The logistic regression models were adjusted estimating the Odds Ratios (OR), their 95% confidence intervals (CI), and significance levels. The variables that remained in the regression models at p<0.05 were considered caries risk indicators. All statistical tests were performed using the SAS software (SAS Institute Inc., 2001, version 8.2) at 5% significance level.

## Results

The response rate in this study was 89.5%. Table 1 shows the distribution of 5-year-olds children according to the type of school and gender.

The examined children had a mean dmft of 1.30 (SD = 2.47) and among them 62.2% were caries-free. The decayed component contributed the most (61.3%), followed by the filled (36.0%) and the missing (2.7%) components.

Table 2 shows the association of independent variables with dmft using the Chi-square test. Table 3 shows the stepwise logistic regression with dmft as dependent variable. Father's educational status below undergraduate level and the presence of initial lesions were risk indicators of caries in primary teeth.

## Discussion

A decline in the prevalence of dental caries has been observed worldwide (Pitts *et al*., 2002). In Piracicaba, data from oral health surveys in 5-year-old children indicate a reduction in caries experience from 1999 (dmft=2.64; Cypriano *et al*., 2003) to 2005, as reported in this study (dmft=1.30). In comparison to national data, 5-year-old preschool attenders from Piracicaba presented lower caries experience (Brazil, 2004). However, the decayed component showed the highest prevalence (61.3%), indicating a great number of the children with treatment needs.

In determining the socioeconomic status, the educational level is considered an important instrument. The father's educational level remained in the regression model and the results indicated that the educational level below complete undergraduate as a risk indicator of caries (Table 3). In fact the high educational level of parents is very important for passing on oral health education to their children such as correct toothbrushing habits, healthy diet with special attention to sugar consumption.

Among the clinical variables, the presence of one or more initial lesions (IL) was associated with caries and could be considered a risk indicator (Tables 2 and 3). Other studies have also found strong influence of IL on caries primary and permanent dentitions. These data indicate that further surveys on dental health should include the detection of the IL. Moreover, caries experience in primary teeth has been considered a predictor of the disease in the future, which makes the detection of IL in epidemiological studies very important to demonstrate the preventive needs for the population studied (Assaf *et al*., 2004).

In conclusion, caries prevalence in 5-year-old preschool attenders from Piracicaba was moderate; father's educational status below undergraduate level and the presence of initial lesions were risk indicators of the disease.

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