

Dental caries experience in preschool children in Veneto region (Italy)

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Objectives : The aim of this study was to assess the dental caries experience in deciduous dentition among preschool children attending nursery-schools in the area of Ulss n.15 of Veneto Region (Italy). **Basic research design and participants:** A cross sectional survey in maternal schools in an area of North-East of Italy was carried out between October 2002 to May 2003 enrolling 1,006 2-6 year-old children randomly selected. WHO diagnostic criteria for dental caries were adopted; dmft and SiC indices were used to measure the severity of the disease. In this paper the “umbrella” term ECC to define caries in primary dentition prior to eruption of permanent teeth (Horowitz, 1998) was used as well. **Results :** ECC prevalence and mean dmft by age were: 3 years: 13.28% and 0.53 (SD \pm 1.83); 4 years: 18.95 % and 0.83 (SD \pm 2.24) ; 5 years: 26.9% and 1.34 (SD \pm 2.8). SIC index values were 1.6 at 3 years, 2.4 at 4 years and 4 at 5 years. **Conclusions** The prevalence of dental caries increased with age: the mean dmft increased 2 ½ times (0.53 to 1.34) and the percentage of children affected by caries doubled (13.28% to 26.9%) between ages 3 and 5 years. Comparing the data for 4 year-old children with those of two surveys carried out in the same area in the last two decades, it is concluded that as in the other industrialised countries, dental caries in preschool children of this area of North-East of Italy has declined.

Key words: Dental caries, dental epidemiology, Italy, preschool children, prevalence

Introduction

Over the past three decades many epidemiological studies have reported a dramatic decline in dental caries in children and adolescents in industrialized countries. (Glass, 1982; Marthaler *et al.*, 1996, Petersson and Bratthall, 1996; Petersen, 2003). As regards the primary dentition this decline in some areas seems to have ceased (Steck-sén-Blicks and Holm, 1995) while in others appear to have slightly increased (Rugg Gunn, 2001; Birkeland and Haugejorden, 2002). In England and Wales the declining trend in this dentition is assumed to have ended in 1983 (Downer, 1994). Likewise, in Swiss children of the Canton of Zurich an end of the decline in caries levels in primary teeth became evident in 1988. In the first survey in 1964, the average dmft was 7.6; in 1988, 1992, 1996 and 2000 Swiss children had dmft averages between 1.5 and 1.8 ; the so called “stable period” (Marthaler, 2004).

On the occasion of the 1995 ORCA Symposium, Italy was defined “*the only large populous Western continental country for which a decline remains to be demonstrated*” (Marthaler *et al.*, 1996): this statement is still valid.

Since 1996 only four papers have been published in the international literature on the occurrence of dental caries in preschool and school children in Italy and none dealing with trends over time (Angelillo *et al.*, 1999; Faggiano *et al.*, 1999; Petti *et al.*, 2000; Campus *et al.*, 2001).

In a national pathfinder survey of a random sample of 12 year-olds in 10 of the 20 regions in Italy (Falcolini *et al.*, 1998) found a mean DMFT of 2.12 (\pm 2.36).

The current study was performed as part of an oral health promotion activity in the area of Ulss n 15 in

Veneto region entitled “*From mother to child*”. The aim of our study was to evaluate the prevalence and severity of dental caries in a kindergarten population of the area of the Ulss n. 15 (Veneto region) in the North-East of Italy.

Methods

Data on the prevalence and severity of dental caries were obtained from a sample of 1,006 children aged 2-6 (mean age 4.5 \pm 10.1) of both genders (519 males and 487 females) in the area of Ulss n.15 “Alta Padovana” in Veneto region, in the North-East of Italy. Ulss is an acronym term for Unit Local Socio-Sanitary and the Italian Public Health Service comprises more than 700 Ulss (22 in Veneto region).

The sample was randomly selected from children attending both private and public kindergartens of the same area (the overall number of resident children in this area aged 3-5 was 7,354: 2,502 aged 3, 2,456 aged 4, 2396 aged 5). The concentration of fluoride in drinkable water of this area is low (0.07 ppm / l) (Miotti *et al.*, 1985).

The children received a clinical examination between October 2002 to May 2003 by one trained dental examiner, using standardised and widely accepted criteria as recommended by WHO (WHO, 1997); decay was recorded at the level of cavitation, no radiographs were taken. The clinical examinations took place in the school buildings by using plain mouth mirrors and dental probes under artificial light with the child sitting in an ordinary upright chair. A sub-sample of children were re-examined at a later date to assess the intraexaminer’s

reliability. School authorities were responsible for obtaining permission from the parents for the visits.

Only primary teeth were included in the scoring and the ECC term was used to report caries on this dentition. Early Childhood Caries is the name used to describe the occurrence of caries in primary dentition prior to the eruption of permanent teeth. This terminology was proposed as an “umbrella term” for caries in primary teeth in 1994 (Horowitz, 1998) and adopted by the American Academy of Pediatric Dentistry (Drury *et al.*, 1999) The diagnostic criteria were as follows:

- ECC : is the presence of one or more decayed , missing (due to caries) or filled tooth surfaces in any primary tooth in a child of 71 months of age or younger
- in children less than 3 years of age, any sign of smooth-surface caries is indicative of severe Early Childhood Caries (S-ECC);
- from 3 to 5 years of age, one or more cavitated, missing(due to caries) or filled smooth surfaces in primary maxillary anterior teeth or decayed, missing or filled score of ≥ 4 (age 3), ≥ 5 (age 4), ≥ 6 (age5) surfaces constitutes S (severe)-ECC

This term substitutes and integrates many previous definitions such as Baby Bottle Tooth decay syndrome, bottle caries, rampant caries of primary dentition, rampant early childhood decay and so on. Based on this definition of ECC 52 children aged more than 71 months were excluded. Moreover as the sample of 29 children aged < 36 months was not representative of all children of that

age it was also excluded from the results. Therefore the overall studied sample was 925 children.

In order to focus attention on the children with highest scores of dmft, the Significant Caries Index (SiC Index) was calculated as follows :

- Individuals are sorted according to their dmft values
- One third of the sample with the highest caries scores is selected
- The mean dmft for this subgroup is calculated. This value is the SiC Index. (Bratthall, 2000).

Chi square test was used to compare data on the prevalence between different surveys with different size of the sample.

Results

The reliability of the examiner was found to be good. Analysis of the repeated examinations gave a Cohen’s Kappa score of 0.96.

19.71% of the overall sample presented ECC, while 80.29% were caries free. Table 1 reports data on mean dft and the single components of dmft index, caries free percentage and Sic index by age. The dt score was the major component in dft scores at any age. From 3 to 5 years the percentage of children affected by dental caries doubled from 13.28% to 26.9% (Fig 1).

The prevalence of caries was significantly lower ($p \leq 0.01$) than that found in Rome in 1997/98 (Petti *et al.*, 2000) (Table 2).

Table 1. Data on mean dft and the single components of dft index, caries free percentage and Sic index by age.

Age (months)	n	Caries free %	Mean dft (\pm SD)	d	f	Sic index	CI 95%	Max value
36-47	271	86.72	0.53 (\pm 1.83)	0.53	0	1.62	\pm 0.22	12
48-59	364	81.05	0.83 (\pm 2.24)	0.77	0.06	2.43	\pm 0.23	14
60-71	290	73.10	1.34 (\pm 2.8)	1.23	0.11	4.02	\pm 0.32	14

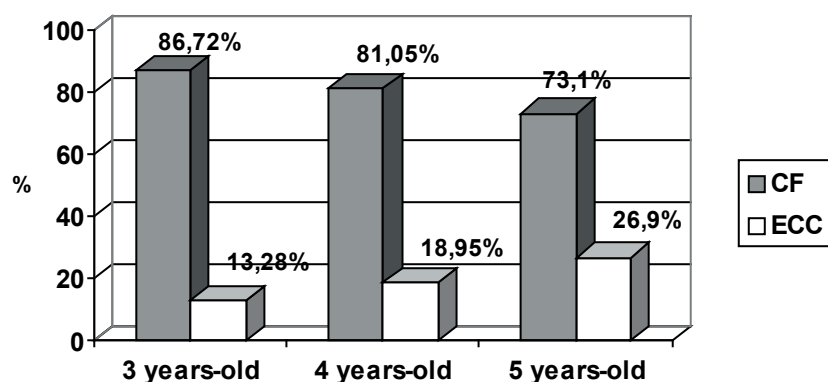


Fig 1. Occurrence of caries free vs ECC affected children by age.

Discussion

Two epidemiological surveys were carried out in the same area in 1985 and in 1994 to evaluate the prevalence and the severity of dental caries in preschool children at different ages. In 1985 a sample of 245 children aged 3 years and 243 aged 4 years were included (Miotti and Ferro 1985) and in 1994 the sample included 401 children aged 4 (Ferro *et al.*, 1995). (Table 3).

In 1985 the survey was carried out by three calibrated dentists and data recorded using WHO criteria for caries diagnosis. No data are available on the interexaminers reliability; the 1995 investigation was performed by a trained dental examiner and the Cohen's Kappa value was 0.86. In Table 3 we report data on these cross sectional surveys carried out in our area on preschool children over the last two decades. Although there are some methodological problems with these data they indicate a strong decline of dental decay levels in preschool children in our area.

Comparing our data for 4-5 year olds with those recorded in the same age group in the Swedish city of Umeå (Stecksèn Blicks *et al.*, 2004) it is seen that caries levels are considerably lower than in the Swedish group (Table 4). However it is important to note some differences in the methods used in the two studies making comparisons unreliable. For example bitewing radiographs were used in the Swedish study and decayed, missing and filled surfaces were recorded.

A pan-European oral health study of 5-year-olds was conducted by Bolin *et al.*, (1997) with one of the participating groups coming from Sassari (Italy). The percentage caries free (dmft=0) amongst the Sassari 5-year-old group was 48% compared with 73% recorded amongst 5-year-olds in the Veneto Region. There was considerable variation amongst the regions included in the Bolin *et al.*, (1997) study, the percentage caries free amongst 5-year-olds ranged from 38.5% in Berlin, Germany and in Dundee, Scotland to 74.0% in Stockholm, Sweden.

Table 2. The prevalence of caries in preschool children in Ulss 15 and Rome. (Petti *et al.*, 2000)

Locality	Years of investigation	n	Affected by caries %
Rome	97/98	1494	32
Ulss15 (Veneto region)	2002/2003	925	19.71

Table 3. Comparison of the results of surveys conducted in Ulss n. 15 amongst 3-year olds ('85-'02/'03) and 4-year-olds ('85, '94, '02/'03)

Year	n	Dmft (+ SD)	d	m	f	Caries free (%)
3-year-olds						
1985	245	2.2 (N.A.)	2.23	0	0	58.2
2002/2003	271	0.53 (+ 1.83)	0.53	0	0	86.7
4 year olds						
1985	243	3.3 (N.A.)	3.3	0	0	39.9
1994	401	1.3 (+ 2.7)	1.2	0.1	0	69.6
2002/2003	364	0.8 (+ 2.2)	0.8	0	0.06	81.05

Table 4. Comparison of caries experience amongst 4-year-old children in ULSS 15 (Veneto Region-Italy) and Umeå city (Sweden)

	ULSS 15 (Veneto-Italy)	Umeå (Sweden)
Year of survey	2002/2003	2002
n. subjects	364	182
dmft	0.83 ± 2.24	1.7 ± 2.7
% caries free	81.05	54

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