

Severe early childhood caries in a group of preschool children over a two year period

Rodica Luca¹, Aneta Munteanu², Catalina Farcasiu²

Bucharest, Romania

Summary

Our previous studies published between 2001-2004 showed a prevalence index of severe early childhood caries (IpS-ECC) of about 30% among children attending the Paediatric Dentistry Department of Carol Davila University.

Objectives. To assess the prevalence of S-ECC between 01.01.2005-31.12.2006 and to compare the results to our previous data.

Methods. A retrospective study was conducted upon a group of 673 children (369 boys) aged < 71 months ($v=37.55\pm 14.52$) examined in the Paediatric Dentistry Department of Carol Davila University. IpS-ECC was calculated for the entire study group and separately for boys and girls. Age at presentation was recorded. Data was compared to those obtained during 2001-2004.

Results. 1) IpS-ECC = 24.81% (2005-2006) versus 31.66% (2001), 36.06% (2002), 33.53% (2003), 26.31% (2004); 2) IpS-ECC for girls = 26,30% (2005-2006) versus 32.95% (2001), 26.41% (2002), 36.48% (2003), 26.04% (2004); IpS-ECC for boys = 23,57% (2005-2006) versus 32.95% (2001), 43.47% (2002), 31.11% (2003), 26.51% (2004); differences between sexes were SS only for 2002 ($t = 2.0066$, $P < 0.5$). 3) proportion of patients aged 3 years or under at the time of their first visit: 73% (2005-2006), compared to 56.14% (2001); 61.63% (2002); 54.55% (2003) and 61.67% (2004).

Conclusions. 1) Although the prevalence of S-ECC in children attending the Paediatric Dentistry Department showed a slight decrease trend, it remains high; 2) The increase in the percentage of children seeking treatment at the age of 3 years or under indicate parents' awareness of the subject due to larger specialists' interventions through mass media.

Key words: preschool children , caries, prevalence index.

Introduction

Severe early childhood caries, also known as baby bottle tooth decay or rampant caries [1; 2; Quartey and Williamson, 1999 and Ismail and Sohn, 1999 – cited by [3]], is a severe form of dental decay affecting infants and toddlers. The condition has long-term growth and development implications [4].

Severe early childhood caries (S-ECC) is currently defined by American Association of Pediatric Dentistry (AAPD) as “any sign of decay on smooth tooth surfaces in children younger than 3 years of age, or, in children aged 3 to 5 years, carious involvement of one or more smooth surfaces of the upper front teeth. The AAPD recommends the use of the same term for dmfs > 4 at the age of 3, >5 at the age of 4 and > 6 at the age of 5 [5,6].

The term “severe early childhood caries” refers to children with “atypical”, “progressive”, “acute” or “rampant” pattern of dental caries [5]. Ismail (2003) states that “all children below the age of 3 years with any noncavitated or cavitated caries lesion are classified as S-ECC children” [7].

First signs of decay appear at very early ages, shortly after tooth emergence [8;9]. Lesions first occur on temporary upper incisors, but, as pathogenic factors persist, they can extend to all erupted teeth [8]. Teeth become affected according to the eruption sequence, usually except the lower front teeth [8;9].

Lesions' evolution is usually asymptomatic but rapid both in surface and in depth. Maintaining inadequate childcare routine will soon lead to complete crown loss.

¹ Professor, DMD, PhD, Department of Paediatric Dentistry, Faculty of Dental Medicine U.M.F. „Carol Davila” Bucharest

² Assistant Professor, Department of Paediatric Dentistry, Faculty of Dental Medicine U.M.F. „Carol Davila” Bucharest

Symptoms become obvious when severe complications occur. Sometimes, osteitis can lead to the erosion the buccal part of the alveolar bone revealing part of the tooth root through the mucosa [8].

Severe early childhood caries occurrence is due to the same factors commonly involved in producing tooth decay: pathogenic oral bacteria (mainly *Streptococcus mutans*, transmitted specially by the mother), carbohydrates (from sweet snacks and drinks) and poor quality of dental tissues. The interaction of these 3 pathogenic factors, together with inappropriate childcare and feeding habits (bottle feeding at night, prolonged use of the bottle after 1 year of age etc) lead, in the absence of oral hygiene, to the early onset and rapid evolution of this caries pattern, compared to other patterns that may occur in the temporary dentition [2; 8-13].

Prevalence of the condition varies widely with several factors (socio-economic, ethnic etc). Studies conducted on children seeking treatment in specialized clinics show higher values than for the general population.

In Romania, reported prevalence index values (IpS-ECC) for the general population were 7.23% for Bucharest [14] and 11.4% for Iasi [15].

Our previous studies published between 2001-2004 showed an IpS-ECC of about 30% among children attending the Paediatric Dentistry Department of Carol Davila University [1;16].

The aim of this study is to gather epidemiological data on S-ECC in children under 6 years of age attending our clinic between 01.01.2005-31.12.2006 and to compare the results to those reported during 2001-2004.

Material and method

The study was conducted upon a group of 673 children (369 boys, 304 girls) aged between 12 and 71 months (mean age = 37.55 ± 14.52 months) examined and treated in the Pedodontics Department of the Faculty of Dental Medicine, Carol Davila University, Bucharest between 01.01.2005 and 31.12.2006. Age and sex distribution of the group are given in Fig. 1.

A retrospective study was conducted using the dental records of the patients. IpS-ECC was calculated for the entire group and separately for boys and girls. Age at presentation was recorded. Data were compared to those obtained during 2001-2004.

Data were centralised and processed using Microsoft Office Access Database 2007. Mean val-

ues were calculated for the studied variables and the statistical significance of differences between mean values was assessed using the t-Student test ($p=0,05$).

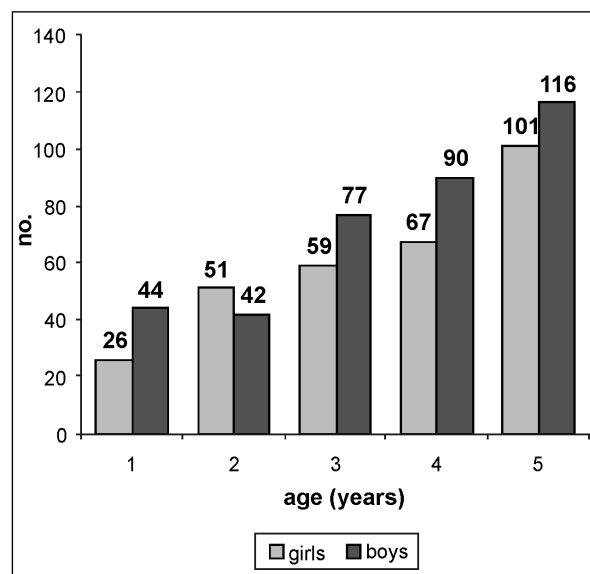


Fig. 1 - Age and sex distribution of the sample (n = 673 children)

Results

a) S-ECC prevalence

Of the 673 children examined, only 76 (11.29%) were caries free and 597 (88.71%) had caries in primary teeth: 430 (63.89%) had a common caries pattern and 167 (24.81%) had severe early childhood caries (S-ECC). The prevalence index for severe early childhood caries for the entire study group was 24.81% (Fig. 2).

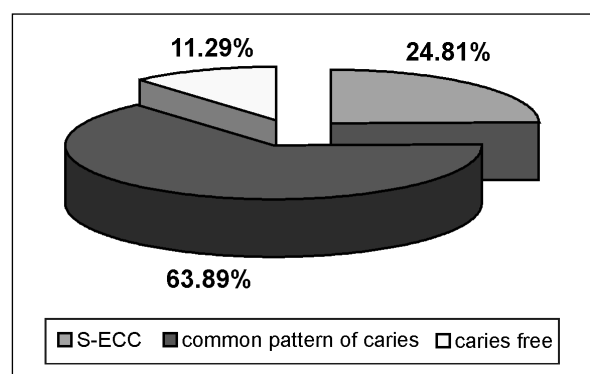


Fig. 2 - Caries prevalence (n= 673 children)

b) Sex distribution of IpS-ECC

In the study group, 87 of the 369 boys had severe early childhood caries, and 80 of the 304 girls exhibited this pattern of dental decay. This

gives a slightly higher IpS-ECC for girls (26.30%) than for boys (23.57%), but differences are not statistically significant ($p = 0.05$) (Fig.3).

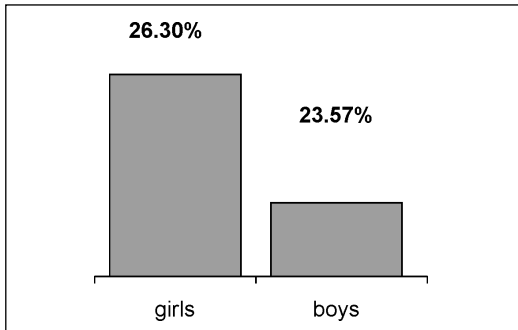


Fig. 3 - Sex distribution of Ip S-ECC

c) Age of children with S-ECC at the first dental visit

Age and sex distribution of the children with S-ECC is given in figure 4. The graph shows that most of the S-ECC children of both sexes sought treatment at the age of 2 and 3 years.

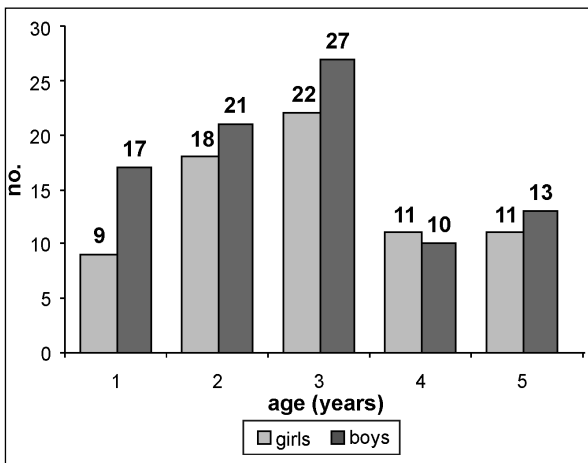


Fig. 4 - Age and sex distribution of children with S-ECC (n=167 children)

Discutions

In the present study, the prevalence index of severe early childhood caries in a group of 673 children attending our clinic during 2005-2006 was 24.81%.

Comparing this result to our previously reported ones (2001-2004) [1;16], a decreasing trend of the prevalence of severe early childhood caries in children seeking treatment in clinic is noticed (Fig. 5).

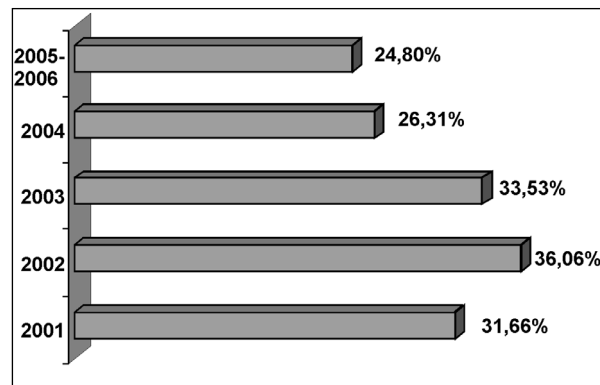


Fig. 5 - Ip S-ECC in children examined in the clinic during 2001-2006

Recent data from literature show that in general population, the prevalence of severe early childhood caries ranges between 9 and 36% [2; 3; 17-20] (Table 1). In exchange, in paediatric clinics or hospitals, prevalence is higher [4; 21-25]. Hallet and O'Rourke (2006) reported a S-ECC prevalence index of 94% for a group of 125 children seeking dental treatment in a paediatric hospital [4] (Table 2).

Regarding sex distribution of this caries pattern, even though girls in the study group had a higher prevalence index than boys (26.30% versus

Table 1. An overview of prevalence data on S-ECC in general population

Authors	Country/City/Year	Sample	Age	Ip S-ECC (%)	Comments
Ferro R et al. [3]	Italy (2002-03)	954	1-6 yr.	9,85%	Preschool children attending both private and public nursery schools
Iida et al. [17]	U.S.A. (1999-2002)	1503	2-5 yr.	10%	National Health and Nutrition Examination Survey
De Grauwe A et al. [20]	Belgium/Ghent (2004)	385	24-35 mo.	12,2%	Inner city children
Finlayson TL et al [18]	SUA/Detroit (2007)	719	1-5 yr.	20%	Low-income African-American children
Postma TC et al [19]	South Africa (1999-2002)	5822	36-71 mo.	32%	South African National Children's Oral Health Survey
Azevedo TDPL et al [2]	Brazil (2005)	369	36-71 mo.	36%	Preschool children selected at public health centers in Brazil

Table 2. Prevalence index of S-ECC in children attending paediatric clinics or hospitals

Authors	Country/City/Year	Sample	Age	Ip S-ECC (%)	Comments
Ferro R et al. [3]	Italy (2002-03)	954	1-6 yr.	9,85%	Preschool children attending both private and public nursery schools
Iida et al. [17]	U.S.A. (1999-2002)	1503	2-5 yr.	10%	National Health and Nutrition
Eronat N, Eden E [21]	Turkey / Izmir (1989-90)	706	2-6 yr.	9.94%	
Baccetti T et al. [22]	Italy / Florence (1999)	434	2-6 yr.	11.5%	Department of Paediatric Dentistry, University of Florence
Casaretto H et al. [23]	Argentina / Buenos Aires (1993-94)	Not stated	< 3 yr.	17.23%	
Present study	Romania / Bucharest (2005-06)	67	31-6 yr.	24.80%	Department of Pediatric Dentistry, University of Bucharest
Al-Shalan TA et al. [24]	Minnesota (USA) (1985-88)	115	1.5-4 yr.	50.40%	Department of Preventive Dental Science, University of Minnesota
Tsai AI et al. [25]	Taiwan / Taipei (2001)	92	1-4 yr.	53.26%	A hospital in Taipei Hallet KB,
O'Rourke PK [4]	Australia / Brisbane (2006)	125	< 4 yr.	94%	A paediatric hospital in Brisbane

23.57%), differences were not statistically significant ($p=0.05$).

Moreover, for previous years, except 2002, S-ECC prevalence index values were approximately the same for boys and girls, with no statistically significant differences (Table 3).

Similar results were reported by Wyne and co-workers for Saudi Arabia (2001) [26] and by Iida et al for USA (2007) [17]. However, studies conducted in Turkey found a higher prevalence of S-ECC in boys, motivated by the tendency of overindulging boys in Asian cultures [21; 27].

Regarding the age of the S-ECC children at the time of their first visit in clinic, almost 2/3 of the 167 children in the study group were three years old or under.

Comparing this result to those of previous years, the proportion of S-ECC children aged 3 years or under is higher (fig. 6). This shows a higher parental concern regarding their children's dental health, due to a higher involvement of specialists in preventing this disease through various media means (radio and tv shows, high impact journals etc.).

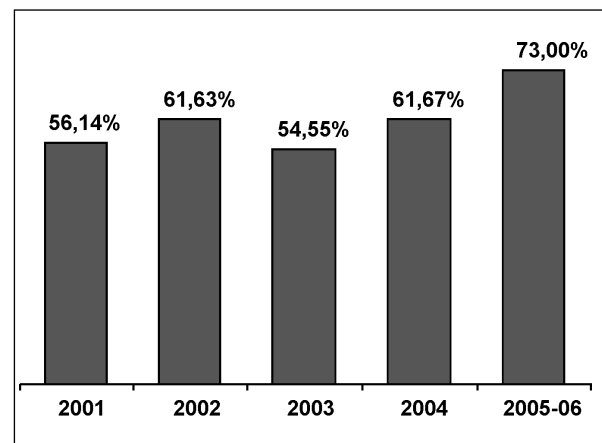


Fig. 6. Percentage of children with S-ECC aged 3 or under during 2001- 2006

In order to reduce S-ECC prevalence it is essential to raise parents' awareness on the necessity and importance of a first dental check-up during the first 6 months after the emergence of the first tooth [5; 28; 29]. During this first visit, the dentist assesses the risk of developing S-ECC, making early prevention possible [28].

Table 3. Sex distribution of Ip S-ECC during 2001-2006

	2001	2002	2003	2004	2005-2006
Ip S-ECC girls (%)	30.43	26.41	36.48	26.04	26.30
Ip S-ECC boys (%)	32.95	43.47	31.11	26.51	23.57
P value	NS	0.05	NS	NS	NS

Conclusions

1) Prevalence index of S-ECC in preschool children attending the Paediatric Dentistry Department during 2005 and 2006 was 24.81%.

2) Although the prevalence of S-ECC in children attending the Paediatric Dentistry Department showed a slight decrease trend, it still remains high.

3) The increase in the percentage of children

seeking treatment at the age of 3 years or under indicates improved parents' awareness on the subject due to larger specialists' interventions through mass media.

4) Sustained efforts are still needed in order to find more appropriate methods to educate parents regarding the prevention of this carries pattern.

References

1. Luca R, Ivan A, Stanciu I, Vinereanu A. Severe early childhood caries in a sample of preschool children attending a Pediatric Dentistry Clinic from Bucharest. *Oral Health and Dental Management in the Black Sea Countries* 2002, **1**: 29-35.
2. Azevedo TDPL, Bezzera ACB, de Toledo OA. Feeding habits and Severe Early Childhood Caries in Brazilian Preschool Children. *Pediatric Dentistry* 2005, **27** (1): 28-33.
3. Ferro R, Besostri A, Meneghetti B, Beghetto M. Comparison of data on Early Childhood Caries (ECC) with previous data for Baby Bottle Tooth Decay (BBTD) in an Italian kindergarten population. *European Journal of Paediatric Dentistry* 2004, **2** (5): 71-75.
4. Hallet KB, O'Rourke PK. Caries experience in preschool children referred for specialist dental care in hospital. *Australian Dental Journal* 2006, **51** (2): 124-129.
5. de Grauwe A, Aps JKM, Martens LC. Early Childhood caries (ECC): what's in a name? *European Journal of Paediatric Dentistry* 2004, **2** (5): 62-70.
6. American Academy of Pediatric Dentistry. Early Childhood Caries (ECC): Classifications, Consequences, and Preventive Strategies.. *Pediatric Dentistry* 2005, **27** (7) (Reference Manual 2005-2006): 31-33.
7. Ismail AI. Determinants of Health in Children and the Problem of Early Childhood Caries. *Pediatric Dentistry* 2003, **25** (4): 328-332.
8. Luca R: Pedodonție vol. 2, Ed. Cerma, București, 2003, pg. 46-69.
9. Attari N, Roberts JF. Restoration of primary teeth affected by Early Childhood Caries. *European Journal of Paediatric Dentistry* 2004, **2**(5): 92-97.
10. Hallet KB, O'Rourke PK. Predictors of severe early childhood caries in hospital referred children. 19th Congress of IAPD, Paris, September 12-15, 2001, Abstract TO1-3, 34.
11. Hallet KB, O'Rourke PK. Early childhood caries and Infant Feeding Practice. *International Journal of Paediatric Dentistry* 1999, **9** (1): 20.
12. Saito SK, Deccico HMU, Nobre dos Santos M. Dental caries and infant practices in Brazilian children. 16th Congress of IAPD, Buenos Aires, Argentina, September 17-20, 1997. Abstract 293.
13. Berkowitz RJ. Causes, Treatment and Prevention of Early Childhood Caries: A Microbiologic Perspective. *Journal of Canadian Dental Association* 2003, **69** (5): 304-307.
14. Luca R, Stanciu I, Ivan A. Considerații asupra patologiei odontale la dinții temporari la un lot de copii preșcolari din mediul urban. Probleme actuale de stomatologie. Materialele Congresului XI Național al Medicilor Stomatologi din Republica Moldova, 9-10 octombrie 2001: 101-104.
15. Balan A, Pasareanu M, Saila V. Baby bottle caries syndrome – risk factors. *Jurnal de Medicina Preventiva* 2000, **8**(3): 44-47.
16. Luca R, Ivan A, Stanciu I, Vinereanu A. Trends of Index of Prevalence of S-ECC between 2001-2004 in Bucharest, Romania. *International Journal of Paediatric Dentistry* 2005, **15** (2): 50.
17. Iida H, Auinger P, Billings RJ, Weitzman M. Association Between Infant Breastfeeding and Early Childhood Caries in the United States. *Pediatrics* 2007, **120** (4): 944-952.
18. Finlayson TL, Siefert K, Ismail AI, Sohn W. Psychosocial factors and early childhood caries among low-income African-American children in Detroit. *Community Dentistry and Oral Epidemiology* 2007, **35** (6): 439-448.
19. Postma TC, Ayo-Yusuf OA, van Wyk PJ. Socio-demographic correlates of early childhood caries prevalence and severity in a developing country – South Africa. *International Dental Journal* 2008, **58** (2): 91-97.
20. de Grauwe A, Aps JKM, Martens LC, Vanobbergen J. Determinants of severe early childhood caries (S-ECC) in a group of inner city children. 7th Congress of the EAPD, Barcelona, 10-13 June 2004. Abstract book.
21. Eronat N, Eden E. A comparative study of some influencing factors of rampant caries or nursing caries in preschool children. *Journal of Clinical Pediatric Dentistry* 1992, **16** (4): 275-279.
22. Baccetti T, Minasi V, D'Avenia R, Antonini A. Baby Bottle Caries (BBC): a clinical investigation. *Italian Journal of Paediatric Dentistry* 1999, **3**: 103-106.
23. Casaretto H, Schoj G, Recalde C. The baby bottle tooth decay in the pediatric clinic. 15th Congress of IAPD, Göteborg, June 8-11, 1995. Abstract 107.
24. Al-Shalan TA, Erikson PR, Hardie NA. Primary incisor decay before age 4 as a risk factor for future dental caries. *Pediatric Dentistry* 1997, **19** (1): 37-41.
25. Tsai AI, Johnsen DC, Lin YH, Hsu KH: A study of risk factors associated with nursing caries in Taiwanese children aged 24-48 months. *International Journal of Paediatric Dentistry* 2001, **11**: 147-149.
26. Wyne A, Darwish S, Adenubi J, Battata S, Khan N. The prevalence and pattern of nursing caries in Saudi preschool children. *International Journal of Paediatric Dentistry* 2001, **11** (5): 361-364.
27. Ayhan H. Influencing factors of nursing caries. *The Journal of Clinical Pediatric Dentistry* 1996, **20** (4): 313-316.
28. American Academy of Pediatric Dentistry. Infant Oral Health Care. *Pediatric Dentistry* 2005, **27** (7) (Reference Manual 2005-2006): 68-71.
29. Cuculescu M. Ingrijirea profilactica stomatologica a femeii gravide si a nou-nascutului in primul an de viata. *Revista Nationala de Stomatologie, Chirurgie Maxilo-faciala si Chirurgie Orala* 2003, **1** (1): 12-15.

Corresponding author: Prof. Dr. Rodica Luca, Pedodontics Department Faculty of Dental Medicine, Carol Davila University, 12 Ionel Perlea Street, Bucharest 1, Romania, tel/fax: 0040213104502; e-mail: lucarodica@yahoo.com