

# Sever early childhood caries in a sample of preschool Children attending a Pediatric Dentistry Clinic from Bucharest

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## Summary

**Aim.** To evaluate the prevalence (Ip) of severe early childhood caries (S-ECC) in a group of preschool children at their first visit in clinic (during 2001), the severity of the lesions and the influences of some social and behavioral factors upon the onset and evolution of the condition. **Material and methods.** I) Data drawn from dental records of 180 children (age  $4.43 \pm 0.22$  yr.) analyzed using Microsoft Excel 2000 and Student Test. II) Questionnaires on social (SF) and behavioral (BF) topics answers by mothers of the children with S-ECC. **Results.** I) Ip=31.66%; 89.46% of the S-ECC children had complicated caries; 56.15% had affected molars (besides upper incisors). II) (SF) 52.94% of the mothers were under 25 at the time of childbirth and 82.35% were junior high/high school graduates. (BF) 61.76% of the S-ECC children were bottle-fed after the age of 3, contents of the bottle usually sweetened; 67% of the mothers gave the bottle to their children before he/she fell asleep and most of them did not remove it afterwards; 97.05% of the mothers used feeding as a pacifying method at night; 1/3 of the S-ECC children commenced toothbrushing after the age of 3. **Conclusion.** The relatively high prevalence of S-ECC points out the need of parents education programs on infant and toddler care and about the appropriate moment for the child's first dental visit.

## Introduction

Severe early childhood caries (S-ECC) represent a part of primary teeth pathology that affects small children, alarm their parents and make the treatment more difficult. First signs of decay appear at very early ages, shortly after tooth emergence. "Low risk" surfaces are generally affected, usually buccal and palatal surfaces of the upper incisors. If pathogenic factors persist, caries extends to all present teeth and tends to progress rapidly both in surface and depth. The process leads to early pulp involvement and rapid crown destruction [13, 18, 20, 21, 25, 27, 31, 32]. Lower incisors can remain sound, but there are cases where they can also be involved. For those clinical cases where lower front teeth are not affected some authors use the term of "baby bottle tooth decay" (BBTD) (Ripa quoted by [5], [14], [18]), whilst the term "rampant caries" is used to describe the cases where lower incisors are also involved (Davies quoted by [18, 19]). Other authors regard baby bottle caries either as a form of rampant caries with a specific cause [27] or as a form of rampant caries with sound lower incisors [30].

The many different terms used in literature where the reason why the American Association of Pediatric Dentistry (AAPD)

proposed, on the last revise of the Clinical Guideline on Baby Bottle Tooth Decay/ Early Childhood Caries/ Breastfeeding/ Early Childhood Caries in may 2001, the term "severe early childhood caries" (S-ECC). By S-ECC the AAPD defines 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. At the same time, although it considers BBTD or synonyms such as "bottle mouth" or "nursing decay" to be misleading terms, the AAPD recognizes BBTD as a distinct caries pattern, the severe type of ECC, associated with frequent or prolonged consumption of liquids containing fermentable carbohydrates [24].

Concerning the prevalence of the S-ECC, figures vary from one population to another, feeding habits as an important etiologic factor of this condition being influenced by the culture and habits of the different ethnic groups. Since there is no standard data collecting protocol available at the moment, reported values for S-ECC prevalence range widely. In developed countries prevalence varies between 1 and

12%, whilst in developing countries and disadvantaged populations S-ECC may affect as many as 70% of the schoolchildren [22].

S-ECC appears as a result of the interaction of three main factors: pathogenic bacteria in the oral cavity, fermentable carbohydrates and dental tissues. Among these, fermentable carbohydrates from food play an important part. The interaction of the three pathogenic factors, together with inappropriate infant and toddler feeding habits lead, in the absence of oral hygiene measures, to the early onset and rapid evolution of this caries pattern compared to other caries patterns seen in the temporary dentition.

Literature associates the onset of S-ECC with certain socio-economic and behavioral factors. The age of the mother [10], parents' education level [13, 28], ethnic origin [11], and geographic area (rural/urban) [15] are quoted as socio-economic factors. Behavioral factors comprise certain inappropriate infant and toddler care and feeding habits. In this respect, it was demonstrated that prolonged breastfeeding (over the age of 1), the use of a bottle with sweetened contents at night either for feeding or for soothing purposes and the use of sweetened pacifiers significantly influence caries experience of the child (Koronyi and Ditley [2, 2, 3, 9, 12, 19, 23]).

Certain authors regard both the moment when toothbrushing is introduced and the frequency of toothbrushing as factors that can influence the early onset of dental caries. Parents' knowledge on child dental care is important from this point of view. Hallet and O'Rourke (1999) point out the influence of introducing toothbrushing after the age of 2 upon early onset of decay [9], whilst Ollila and col. (1999) stress the importance of regular toothbrushing [23].

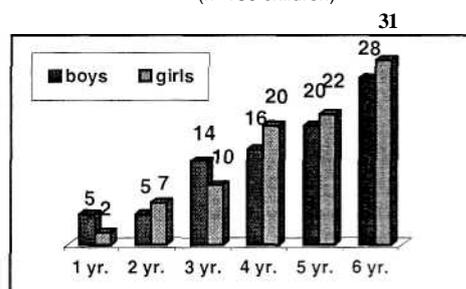
There are few epidemiological studies conducted in Romania on S-ECC. Given this and the fact that in our clinic we currently deal with a relatively large number of patients with this condition, we considered necessary to conduct a study on S-ECC prevalence, the localization and severity of the lesions and the influences of some socio-economic and behavioral factors upon the onset and evolution of the S-ECC.

## Material and method

The study was conducted upon a group of 180 children (88 boys, 92 girls), aged 1 to 6 years (mean age =  $4.43 \pm 0.22$  yr.) ( $t=1.98$ ) examined

in the Pedodontics Department of the Faculty of Dentistry, "Carol Davila" University of Medicine and Pharmacy, Bucharest, during the year 2001. Age and sex distribution of the group are given in Fig. 1. A retrospective study was conducted using dental records. Prevalence index (Ip) was calculated for S-ECC. Localization and severity of the lesions at the time of the first visit to the clinic were recorded. Data was processed using Microsoft Excel 2000 and Student test ( $p=0.05$ ).

Fig. 1 Age and sex distribution of the sample (n=180 children)



The mothers of the children with S-ECC were given questionnaires containing questions on their own age at the moment of childbirth, their education (social factors) and closed questions on child feeding and pacifying habits at night and oral hygiene practice (behavioral factors).

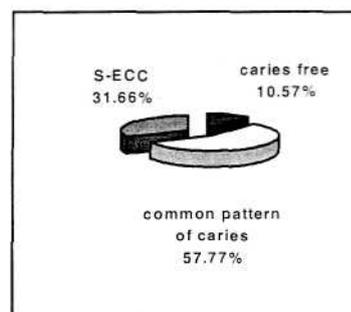
## Results

### I. Data resulting from dental records analysis

#### a) ECC prevalence (Ip)

Of the 180 children examined, 10.57% were caries free, 57.79% had a usual caries pattern and 31.66% had S-ECC (Fig. 2).

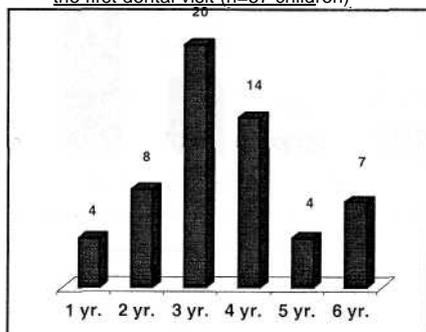
Fig. 2 Caries prevalence (n = 180 children)



Ip was slightly higher in boys (32.95%) than in girls (30.43%), but differences were not statistically significant ( $p=0.05$ ). Age

distribution of the children with S-ECC is given in Fig. 3. 78.95% of these children lived in Bucharest, the other 21.05% came from the neighboring districts.

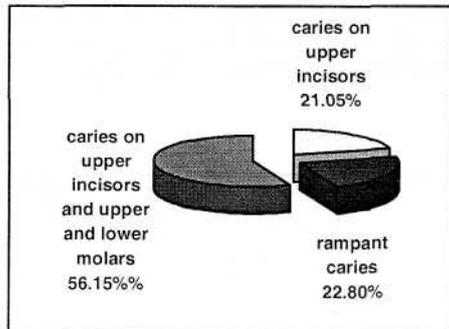
Fig. 3 Age of children with S-ECC at the first dental visit (n=57 children)



*b) Caries topography*

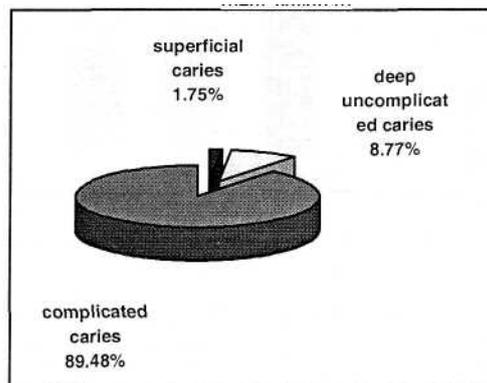
Of the 57 children with SECC, 21.05% only had caries on the upper incisors, 56.15% also had affected upper and lower molars, and 22.80% had caries on the lower incisors besides the first two localizations (rampant caries) (Fig. 4).

Fig. 4 S-ECC lesions localization (n=57 children)



*c) Severity of the lesions* 10.52% of the S-ECC children had uncomplicated caries, 1.75% of which were superficial. The remaining 89.74% had complicated caries, most of which (90.20%) with gross or even complete crown destruction (Fig. 5).

Fig. 5 S-ECC lesions severity (n=57 children)



**II. Data resulting from questionnaire analysis**

Of the 57 questionnaires, 34 (59.65%) were filled and returned.

*a) Age and education of the mothers*

At the time when their children were born 52.94% of the mothers of S-ECC children were aged 18 to 25 yr. (Table 1).

Table 1. Mothers' age at childbirth (n = 34 answers)

18 - 25 yr.		26 - 44 yr.		No answer	
n	%	n	%	n	%
18	52.94%	14	41.18%	2	5.88%

More than half of the mothers were high school graduates, approximately one third

(32.35%) had less than 10 classes and very few (11.76%) had a university degree (Table 2).

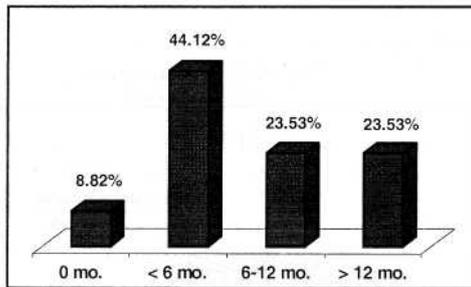
Table 2. Mothers' education (n = 34 answers)

< 10 classes		High school		University		No answer	
n	%	n	%	n	%	n	%
9	26.47%	19	55.88%	4	11.76%	2	5.88%

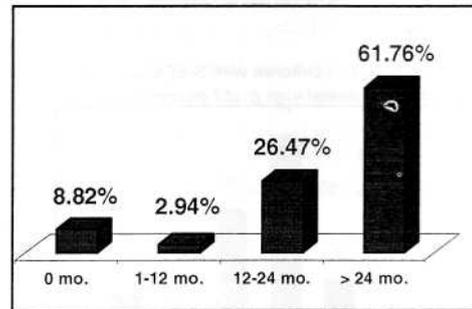
*b) Feeding habits*

23.53% of the S-ECC children were breastfed over 12 months of age and for 61.76% the nursing bottle was used as a feeding means over the age of 2 (Figures 6 and 7).

**Fig. 6 Breast feeding period (n=34 answers)**



**Fig. 7 Bottle feeding period (n=34 answers)**



Most of the bottle-fed children (96.77%) got sweetened contents in their bottles: milk with sugar, honey or semolina, sweetened tea, natural fruit juices, carbonated juices.

About two thirds of the mothers (67.74%) gave the bottle to the child before he/she fell asleep and 64.52% did not remove the bottle after that.

Less than half (44.12%) of the mothers admitted to have given their children a pacifier.

Most of them (86.67%) did not sweeten the pacifier with sugar or honey.

*c) Pacifying methods*

Of the 34 mothers who answered the questionnaires, 33 stated that their children used to wake up and cry at night, so they used feeding as a means of pacifying, associating it or not with non-alimentary methods. A bottle with sweetened contents was most commonly used as alimentary soothing means (Table 3).

**Table 3. Pacifying methods (n = 33 answers)**

Method	Never		Sometimes		Often	
	n	%	n	%	n	%
Breastfeeding	12	36.36	8	24.24	13	39.39
Bottle with sweetened contents	5	15.15	5	15.15	18	54.54
Bottle with non-sweetened contents			0	0	5	15.15
Pacifier	21	63.64	4	12.12	5	15.15
Sweetened pacifier			3	9.09	0	0
Rocking	9	27.27	12	36.36	12	36.36
Taking the child to the parents' bed	8	24.24	9	27.27	16	48.48
Ignoring the child	25	75.75	7	21.21	1	3.03
Favorite toy	15	45.45	8	24.24	10	30.30
Music	20	60.60	5	15.15	8	24.24

*d) Oral hygiene practices* Most of the studied S-ECC children (35.29%) commenced toothbrushing after the age of 3. (Table 4) Daily frequency of toothbrushing was twice a day for half of the children with S-ECC, whilst 38.24% brushed their teeth once a day (Table 5).

Concerning the amount of time children spent brushing their teeth, almost half

of the mothers (46.67%) estimated it to be between 1 and 2 minutes at a time, whilst 30% admitted it to be less than one minute (Table 6) About the person who performed toothbrushing half of the mothers stated that the child did that him/herself, without adult supervision (Table 7).

**Table 4.** The moment toothbrushing commenced (n = 34 answers)

< 1 year		1-2 years		2-3 years		> 3 years		No answer	
n	%	n	%	n	%	n	%	n	%
0	0	9	26.47%	9	26.47%	12	35.29%	4	11.76%

**Table 5.** Daily frequency of toothbrushing (n = 34 answers)

One time a day		2 times a day		No answer	
n	%	n	%	n	%
13	38.24%	17	50.00%	4	11.76%

**Table 6.** Duration of toothbrushing (n = 30 answers)

< 1 minute		1-2 minutes		> 2 minutes	
n	%	n	%	n	%
9	30.00%	14	46.67%	7	23.33%

**Table 7.** The person who brushed the child's teeth (n = 30 answers)

Parent		Child helped by parent		Child without adult supervision	
n	%	n	%	n	%
4	13.33%	11	36.67%	15	50.00%

Table 8 resumes the mothers' answers about the source of their information on child dental health. Most of them (58.82%) stated that they got information from medical staff (dentist, pediatrician, GP, when leaving the

hospital with the newborn, school doctor), some (23.23%) got it from mass-media (radio/TV broadcasts, magazines, books) and 26.47% had no information on the subject.

**Table 8.** Parents' sources of information on child dental care

Medical staff		Mass-media		No information	
n	%	n	%	n	%
20	58.82%	8	23.53%	9	26.47%

## Discussion

The Ip index we calculated for S-ECC in children of 1 to 6 years of age attending our clinic is rather high (31.66%), much higher than the one reported for children in kindergartens (7.23%) [16]. The value is also higher

than the ones reported by similar studies conducted in Turkey, Bulgaria, Italy and Argentina, but lower than the ones reported for Minnesota (USA) and Taiwan (Table 9).

**Table 9.** Ip S-ECC values

Authors	Country / city / year	Number of subjects	Age	Ip ECC
Eronat N., Eden E. [8]	Turkey / Izmir (1989-1990)	706	2 - 6 yr.	9.94%
Baccetti T. <i>et al.</i> [4]	Italy / Florence (1999)	434	<3 - 9 yr.	11.50%
Markova N., Vassileva R. [17]	Bulgaria / Sofia (1999)	100	1 - 4 yr.	15.00%
Casaretto H. <i>et al.</i> [6]	Argentina / Buenos Aires (1993 - 1994)	Not stated	< 3 yr.	17.23%
Present study	Romania / Bucharest (2001)	180	1 - 6 yr.	32.66%
Al-Shalan T.A. <i>et al.</i> [1]	Minnesota (USA) (1985 - 1988)	115	1.5 - 4 yr.	50.40%
Tsai A.I. <i>et al.</i> [28]	Taiwan / Taipei (2001)	92	1 - 4 yr.	53.26%

The Ip differences we found between the two sexes were not statistically significant. This finding is consistent with that of Wyne *et al.* (2001) [30]. However, similar studies conducted in Turkey showed a much higher percentage of S-ECC in boys, motivated by the

tendency to overindulge sons in Asian countries [2, 8].

Concerning the severity of the lesions, approximately 90% of the subjects bearing S-ECC presented complicated caries. This finding is consistent with the fact that most children

show up for the acute pain or brought by the concern of the parents about possible consequences on permanent teeth. Baccetti et al. (1999) reported a high percentage of complicated caries, their study showing pulp involvement in 75% of the children [4]. Our higher percentage (89.74%) is due to the fact that most of the children are brought to the clinic for treatment at 3 or 4 years of age, when complications are already installed.

The results of the present study concerning social and behavioral factors associated to S-ECC must be regarded with reservation due to the inherent disadvantages of the questionnaire method: distortions due to the memory of the questioned people [7], as well as the high percentage of people not returning the filled questionnaires [33]. These disadvantages were present in our study. Only approximately 60% of the questionnaires were filled and returned. Part of the answers can be considered doubtful due both to the time that had passed since the events and to the fact that subsequent information could have influenced the subjects.

However, our findings are partly consistent with those in literature, at least regarding incorrect feeding and pacifying habits in children with S-ECC. The present study revealed in these children prolonged use of the bottle with sweet contents long after the emergence of the first teeth and mainly at night and more than one third of the S-ECC children began toothbrushing after the age of 3. Moreover, the study reveals parents' rather superficial approach for their children oral hygiene, half of the parents admitting not to get involved in either actual brushing or in supervising the process.

Ollila et al., as well as Hallet and O' Rourke advocated the night use of the bottle with sweetened contents both for feeding and for pacifying reasons as risk factors for the onset of S-ECC [9, 23]. The use of alimentary methods for soothing children who wake up at night is proved to significantly increase *dmf* index. Kroll and Stone found a correlation between the presence of bottle caries on one hand and the moment and amount of time the child sleeps with the bottle in his/her mouth on the other side [2]. Shantinath et al. (1996) showed that patients with baby bottle caries wake up more often at night and their parents prefer to

feed them in order to calm them down. Authors reached the conclusion that parents use feeding to help children fall asleep because this is a simple handy method and results show very quickly [26].

Concerning oral hygiene practice, literature points out the need of introducing them as soon after the emergence of the first teeth as possible [29]. Moreover, some authors demonstrated that introducing toothbrushing after 24 months of age [9], as well as discontinuous practicing of toothbrushing [23] or skipping toothbrushing before going to bed [28] are as many risk factors for the onset of S-ECC. In addition to that, Azrak and Willerhausen (2000) stated that introducing of toothbrushing as soon as the first tooth emerges and adult-assisted toothbrushing in older children significantly reduce the apparition of decay [3].

Regarding the mother's age and education our study shows that most of the mothers of the S-ECC children were under 25 at the time of childbirth and had a medium or under-medium education level. Hallet and O' Rourke (2001) demonstrated that mother's age under 25 represents a significant social anticipation factor for S-ECC prevalence [10]. In a case-control study Tsai et al. showed that children whose mothers were only junior high school graduates had a higher risk of developing S-ECC (*odds ratio* = 1.60), although differences were not statistically significant [28].

The fact that almost 60% of the mothers declared to have got their information on child dental care from medical staff and yet their children developed S-ECC questions the ways information was transmitted and/or received and stresses the importance of this topic for future preventive programs.

## Conclusions

1. The present study reveals a relatively high prevalence of S-ECC in children seeking dental treatment in the Pedodontics Clinic.
2. The first visit to dental office is generally late, after the age of three, when complications are already installed.
3. S-ECC prevention programs are needed, parents education on infant and toddler care being an important issue in this respect.

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