

Scientific Thought and
Clinical Practice



10 years of BaSS

**EPIDEMIOLOGY
AND
PREDICTORS OF EARLY
CHILDHOOD
CARIES / ECC /**

N.Markova,
E.Ilieva

Early childhood caries (ECC) is of epidemic proportions in some European and US minority populations and in many developing countries all over the world.

There are relatively few studies of caries prevalence in preschool children and the data that are available often are grouped into broad age categories. The international trend in industrialized countries shows declining dmft scores since 1967, although the absolute level of dmft is high in some countries. For example, in 1992 Japanese 4-year-olds had a mean dmft score of 5.7, while Finnish 4-olds had a mean dmft score of 0.6 (8). Furthermore, the rate of decline may be leveling off (3).

Mayanagi et al. (8) also report a relatively high prevalence of caries in the primary dentition (percentage of children affected) among 5-year-olds in both developed and developing countries, ranging from 92% in China to 75% in Scotland and 42% in England and Wales. Milnes (9) comprehensive review of the epidemiology of maxillary anterior caries examines numerous studies from Europe (primarily England), Africa, Asia, Middle East, and North America. The highest prevalence of maxillary anterior caries is found in Africa and Southeast Asia/48%/, although this caries pattern remains widespread in developed countries of Western Europe/12%/. The English studies are of particular interest because relatively large, community-based samples are used along with a common definition of maxillary anterior caries/4-18%/.

Caries scores in US children range from approximately 1 to 12 but the many different caries measures (dmft, dmfs, dfs, dft) make comparison difficult (2,7,12,13). In contrast to these high caries levels, a US national survey of children aged 2 to 4 years reports a mean dmfs of 1.2, with 17% having caries (6). Reports limited to the prevalence of maxillary anterior caries in the United States also illustrate a wide range affecting from less than 5% to more than 70% in some Native American populations (2).

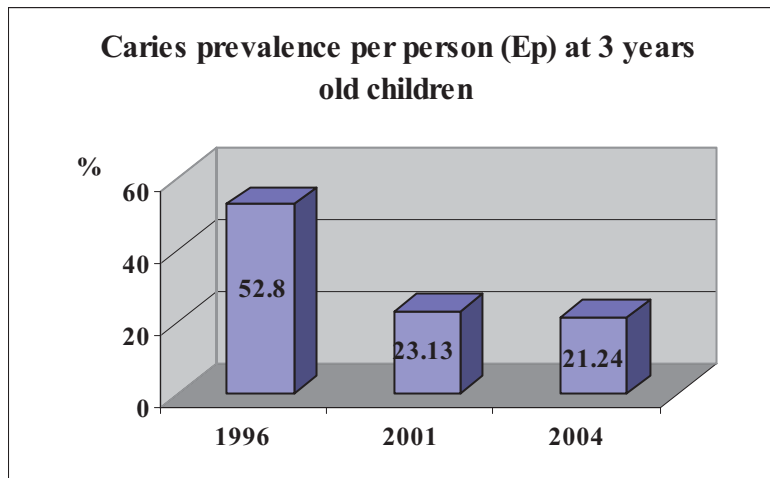
Data are sparse or inaccurate because: preschool-age children are not readily accessible for examination; examined samples may be non-representative; infant feeding practices vary in different cultural and ethnic groups, making extrapolation of finding inappropriate; infants and toddlers often are difficult to examine thoroughly; and criteria for ECC have varied among existing studies with respect to location of dental decay and number of teeth affected, e.g., any labiolingual lesion in a maxillary incisors or a dmft score of 5 or greater (13)

Although prevalence of ECC have varied in individual surveys from about 1% to as high as nearly 70%, the national prevalence of the condition in Bulgaria concerning 3 year-olds has been estimated to be no greater than 60.84% (14).

An investigation, an object of our comment was held in 2004 at 372 three years old children. The observation's objects are: individuals, teeth and tooth surfaces

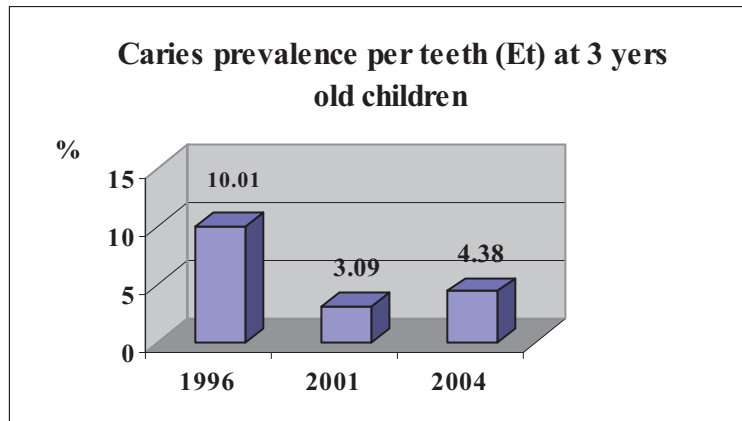
with caries and free of caries. The comparison with epidemiological studies with children of the same are held in 1996 and 2001 have been made.

Fig. 1.



The comparison of the results of Ep shows statistically significant differences of 2001 and 2004 compared with 1996. The reduction of Ep for the last 3 years is obvious, but without significant difference. Nevertheless we can speak about decreasing of Ep during last years, that is compatible with the data of scientific literature. (Fig.1).

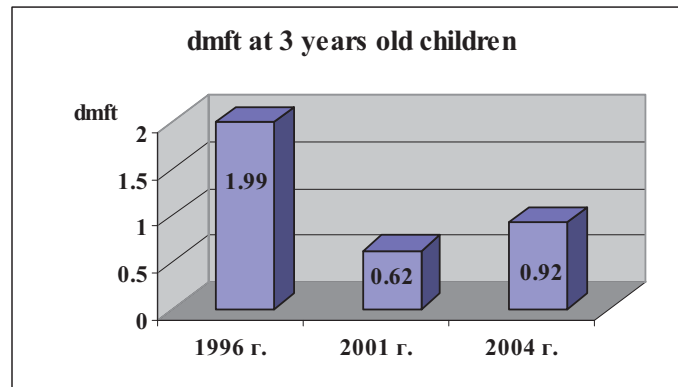
Fig. 2.



The Et index shows another way of development. Comparison of the results in 2001 and 2004 to these in 1996 decrease of Et with statistically

significant differences. The result from the last 3 years shows controversial tendency - statistically significant increase of the Et. Compared with the reduced group of children with caries, the increase of the percent of the affected teeth means that the number of affected teeth in the mouth of one sick child is increasing. (Fig.2)

Fig. 3.



This conclusion has been confirmed at same rate from the from the in investigation of dmft. There is increase of the average level in 2004 compared with 2001. The difference is not yet statistically significant ($u=1,87$), but the results are compatible to data for Et-index. (Fig. 3)

Fig. 4

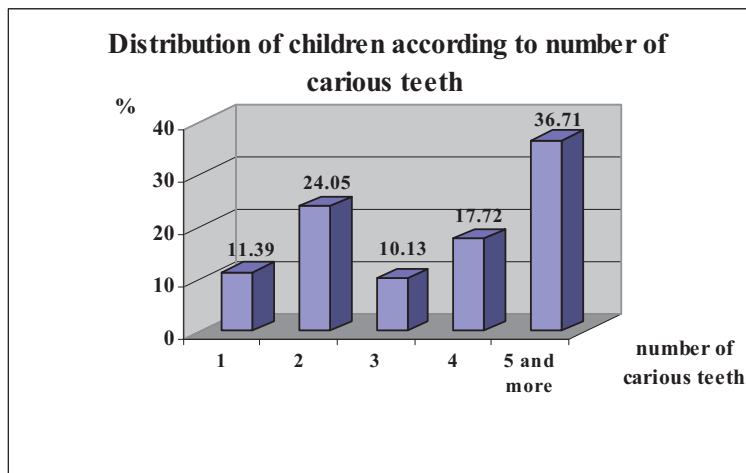
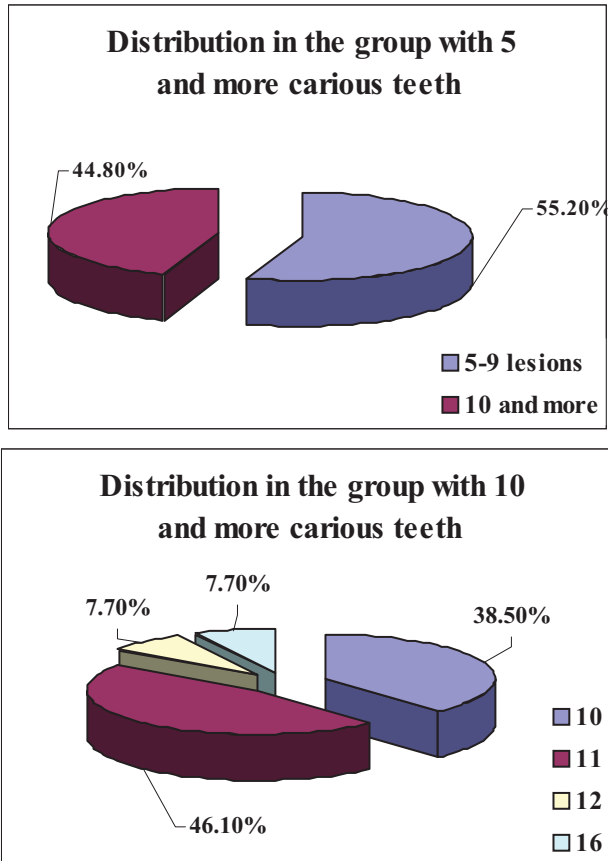
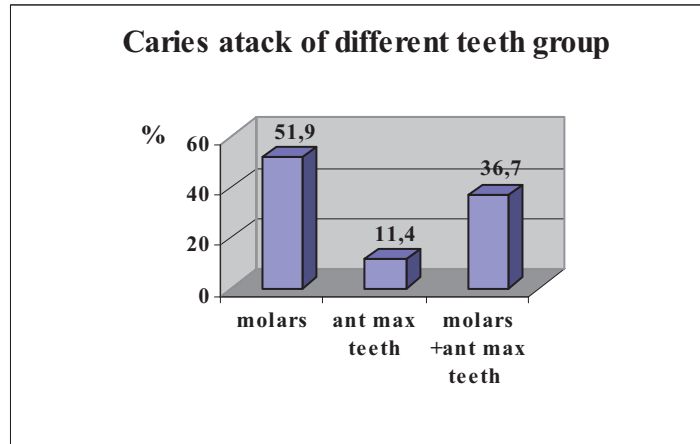


Fig. 5a, 5b.



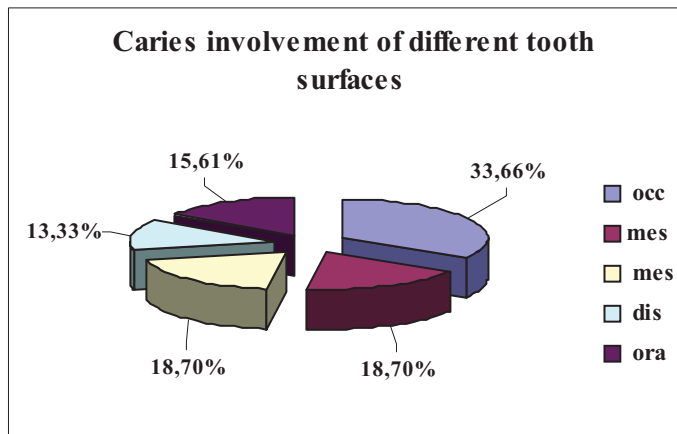
To be understanding the meaning of caries prevalence in the group of sick children is necessary to follow-up the percentage of children with different number of carious teeth. The results show that children with 5 and more lesions are statistically more than all the other groups excluding the group with 2 carious teeth. (Fig. 4) In the group with 5 and more lesions there also are differences. Their analysis show that nearly equal are the group of children with 5-9 carious teeth and that of children with 10 or more carious teeth. In the last subgroup statistically more are the children with 10 and 11 lesions. A clear tendency of prevalence of children with more carious teeth is seen. (Fig. 5a, 5b)

Fig. 6.



With teeth are most often attack at 3 years old children? The biggest is the percentage of children with involved molars – more than half of sick children. On the second place is the group of children with the worse clinical symptoms – involved molars and anterior maxillary teeth. The least percentage is for the group with involved only anterior maxillary teeth. (Fig. 6)

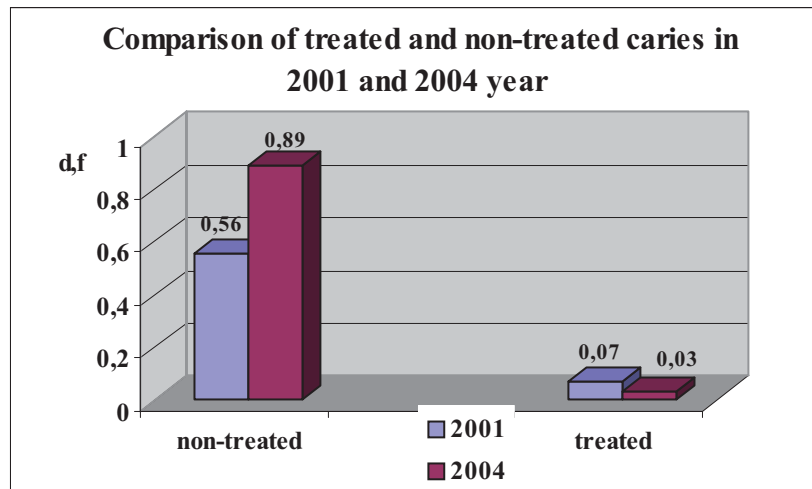
Fig. 7.



The results for the most often involved tooth surfaces are similar to the teeth. Oclusal surfaces are statistically significant more affected than all the others – mesial, bucal, distal, oral. Next are mesial and bucal surfaces with significant differences to distal ones. There is no such difference compared to oral surfaces. These data show that in spite of the proven specifications of the

caries of the 3 year old children, in early age prevails fissure caries, determined by the retentive surfaces and incomplete mineralisation.

Fig. 8.



For further view of the already described tendency the development of Dental Caries Treatment Index in 2001 and 2004 has been followed up. The comparison of average rates of active caries in both years shows statistically significant increase in 2004 year. Decrease, but not statistically significant, is seen at the treated caries. The number of filled teeth at 3 years old children is extremely small compared with the need of treatment.

Predictors of ECC

Swedish investigators in a prospective, longitudinal study showed that predictors of caries development before 2.5 years of age were MS concentration, immigrant background and the consumption of candy (4). Predictors for developing caries during the next year were the same as those before age 2.5 years, plus mother's education and consumption of sugar-containing beverages. The probability of caries development was 87% when all the variables associated with caries were present at 1 year of age (5).

A study of 677 children aged 1-6 years who attended one of 20 day-care centers in Finland showed that MS were increased by consumption of sucrose snacks and reduced by regular use of fluoride tablets (10). Cessation of toothbrushing at the centers did not affect MS levels. Those with positive tests for MS had significantly greater dmf scores than did those with negative tests. Findings of another Finnish study showed that visible plaque on the labial surfaces of maxillary incisors of children who averaged 19 months of age at baseline was the best predictor of caries risk during the following 1.5 years (1). Visible plaque had a positive prognostic (predictive) value of 63% and a negative prognostic value of 97% during the interval. More children with

visible dental plaque at 1 and 2 years of age has developed caries by the age of 3 than those without visible plaque at those ages. Those who were caries free at age 3 had received more help with toothbrushing and had used more frequently fluoride toothpaste than those who developed caries by age 3. Wendt also shows that oral hygiene and dietary habits established by 1 year of age are maintained throughout early childhood. He also reported that immigrant status was correlated with the development of caries by age 3. Slavkin (11) has indicated that genetics may confer susceptibility or resistance factors with respect to tooth decay, which might affect the development of ECC. A study of oral health behavioral, cognitive and socioeconomic factors associated with increments of dental caries in children aged 3-5 years showed that higher MS and initial dmfs scores and parental reports of more frequent toothbrushing of their children's teeth were associated with greater increments of dental caries (4,13).

Although research should continue on determining the prevalence of ECC in various racial, ethnic and socioeconomic groupings, we are reaching the point where high risk of the disease in communities can be predicted on the basis of socioeconomic factors, immigrant status and ethnic/racial background. Research, thus, should focus on developing profiles or indexes to predict the prevalence of ECC in communities based on these factors. Research also is needed to develop an index to identify individual children at high risk of ECC. Some factors for consideration for this index are: low socioeconomic status, low birthweight, siblings with the condition, low exposure to fluoride, high consumption of refined carbohydrates and poor oral hygiene practices.

Key words : Early childhood caries, predictors, risk factors, prevention.

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