

Oral Health in 8-9 year-old children in Saxony-Anhalt (Germany) and in two Hungarian cities (Budapest and Debrecen)

A. Borutta¹, K. Brauner¹, S. Hufnagl³, S. Márton⁴, K. Mavrodisz² and I. Tarján²

¹ Department of Preventive Dentistry, Friedrich-Schiller-University of Jena, Germany; ² Department of Orthodontic and Children Dentistry, Semmelweis-University of Budapest, Hungary; ³ Institute of Economic and Social Statistics, Friedrich-Schiller-University of Jena, Germany; ⁴ Department of Sociology, University of Debrecen, Hungary

Objective This paper reports the results of standardised oral examination (dmft/DMFT, CPI) of 1,090 8-9 year-old children from Saxony-Anhalt (Germany) and 906 8-9 year-old children from Budapest and Debrecen (Hungary) to assess the oral health condition after the political changes and the transformation of the dental care systems in Eastern Germany and in Hungary respectively. **Method** Children were randomly selected from urban and suburban areas in one of the new Federal States of Germany. Hungarian children were selected from Budapest and Debrecen. The clinical examinations were based on WHO criteria. **Results** The mean dmft of the German children was 3.5 (95%CI: 3.33-3.68); the corresponding mean in the Hungarian sample was 2.3 (95%CI: 2.19-2.55). In both samples the decayed (d) component was the highest within the dmft. The mean DMFT in the German sample was 0.7 (DT = 0.4, FT = 0.3, MT = 0); in Hungary the corresponding means were 0.4 (DT = 0.3, FT = 0.1, MT = 0). Initial inflammation was the most common gingival condition found. **Conclusion** In general the oral health status of both groups was poor. The major problem was the high percentage of children with caries that needed treatment.

Key words: Caries prevalence, CPI, oral epidemiology, oral health

Introduction

The fall of the "iron curtain" in 1989, saw not only tremendous political change in Eastern Germany and Hungary, but also significant changes in the health care system in both countries, including the arrangements for the delivery of dental care.

In Germany, the Reunification Treaties essentially resulted in the transfer of the political structure of the Federal Republic of Germany (FRG) to the former German Democratic Republic (GDR). In a similar fashion, the healthcare system of the FRG was applied to the GDR. In the FRG, the "Allgemeine Ortskrankenkasse" (AOK), the Government's insurance carrier, provides cover. Immediately following the 1989 changes, the AOK assumed responsibility for the citizens of Eastern Germany, who then later had the option of transferring to other substitute carriers or to one of the private carriers (Beske *et al.*, 1993). These changes occurred relatively quickly.

In Hungary, the process of change has occurred much more slowly. Although economic factors constitute the major barrier to change in Hungary, there has nevertheless been a marked increase in the proportion of private dentists, even in the field of paediatric dentistry. This contrasts with the situation in the former GDR, where the majority of paediatric dentists have opted to work as generalists, only a small number opting for employment in the Public Dental Service.

These changes, political, economic and in the oral healthcare system have obvious potential implications

for oral health. At present, there are only limited studies on the impact of the changes of the last two decades in Eastern and Central European countries (Petersen *et al.*, 1995; Künzel, 1997; Szöke and Petersen, 1998; Pieper, 2001; Borutta and Mönnich, 2001; Petersen and Rusu, 2002; Wierzbicka *et al.*, 2002).

In light of these changes the aim of this survey was therefore to compare the oral health status of 8-9 year-old children from Saxony-Anhalt (Germany), and from Budapest and Debrecen (Hungary).

Subjects and methods

In 2001, an oral health survey, of children born in 1992/1993 was conducted in Germany and Hungary. The WHO standard protocol for oral health surveys as used in The International Collaborative Study of Oral Health Outcomes (ISC-II) was employed as well as the Oral Examination Form of the ICS-II (WHO, 1997a). In Saxony-Anhalt, permission to examine the study participants had to be obtained from the local authority (school head offices) and parents, but no such requirement existed in Hungary. It was estimated that a sample of at least 1,000 children in both Germany and Hungary was required in order to estimate the mean dmft scores and calculate a 95% confidence levels.

The total population of 8-9 year-olds in the Federal State of Saxony-Anhalt, was 2,679 of whom, 1,892 (70.62%) were from urban, and 787 (29.38%) from rural areas. A proportionate sample of 814 children from urban and 339 from rural areas were randomly selected as the

study population, resulting in a total survey sample of 1,153 children with an average age of 8.36. A multistage random sampling method was adopted. The first stage comprised random selection of elementary schools in all urban and rural areas of the State according to the percentage share of registered 8- to 9- year olds. Children were then selected from lists of names provided by the school administrators, every fifth name being chosen.

In Hungary, a similar method was used to select 906 children with an average age 8.45 years. Of these, 199 were resident in Budapest and 707 from Debrecen, a town situated in the Eastern part of Hungary. These numbers reflect 0.42% and 16% of 8-9 year olds in Budapest and Debrecen respectively. The Hungarian arm of the study was limited to these two cities. Sampling frames and the response rates of the study population are shown in Table 1.

The oral examinations were carried out with the children seated in an office chair, using artificial light of equivalent intensity in both countries. Prior to the surveys, a bilateral meeting was organised to train and calibrate the examiners from both countries (one examiner from Germany and two from Hungary). This was carried out in order to obtain examiner agreement of at least 85% in recording dental caries and periodontal conditions (WHO, 1993). Dental examinations focussed on the assessment of dental caries and periodontal status according to WHO criteria (WHO, 1997b).

Dental caries (dmft/DMFT) was diagnosed visually (without radiography, fibre-optic transillumination, or compressed air). A dental mirror and a metal CPI probe were used to record dental caries at (d_3/D_3) into dentine level. Periodontal status was assessed using the Community Periodontal Index (CPI). However scores were restricted to: score 0 = healthy, score 1 = bleeding and score 2 = bleeding and calculus.

Data were processed by means of the Statistical Package for Social Sciences (SPSS) version 10.0.

Results

Dentition and caries status

In Saxony Anhalt 23% were caries free in the primary dentition (dmft = 0) and 25% were caries free in Budapest and in Debrecen. The mean dmft score was 3.5 [95% CI: 3.33; 3.68] (dt = 1.7, mt = 0.4, ft = 1.4) in Saxony-Anhalt, compared to 2.3 dmft [95% CI: 2.19; 2.55] (dt = 2.0, mt = 0, ft = 0.3) in Budapest and Debrecen (Figure 1). A more detailed analysis of dmft scores showed interesting variations. In Saxony-Anhalt, 20% of children with past caries experience, did not have a treatment need at the time of the survey, (dmft > 0, dt = 0), while in 57% a definite need for treatment was recorded (dmft > 0, dt > 0) (Figure 2). In the third of children with the highest levels of decay, (Significant Caries Index, SIC) (Bratthal, 2000), the average dmft score was 6.9. In contrast, in

Table 1: Sampling frames and response rate of the 8-9 year-old German and Hungarian subjects

Country	Sampling frames	Subjects	Male	Female	Response rate (%)
Germany	1153	1090	540	550	94.5
Hungary	1085	906	457	449	83.5

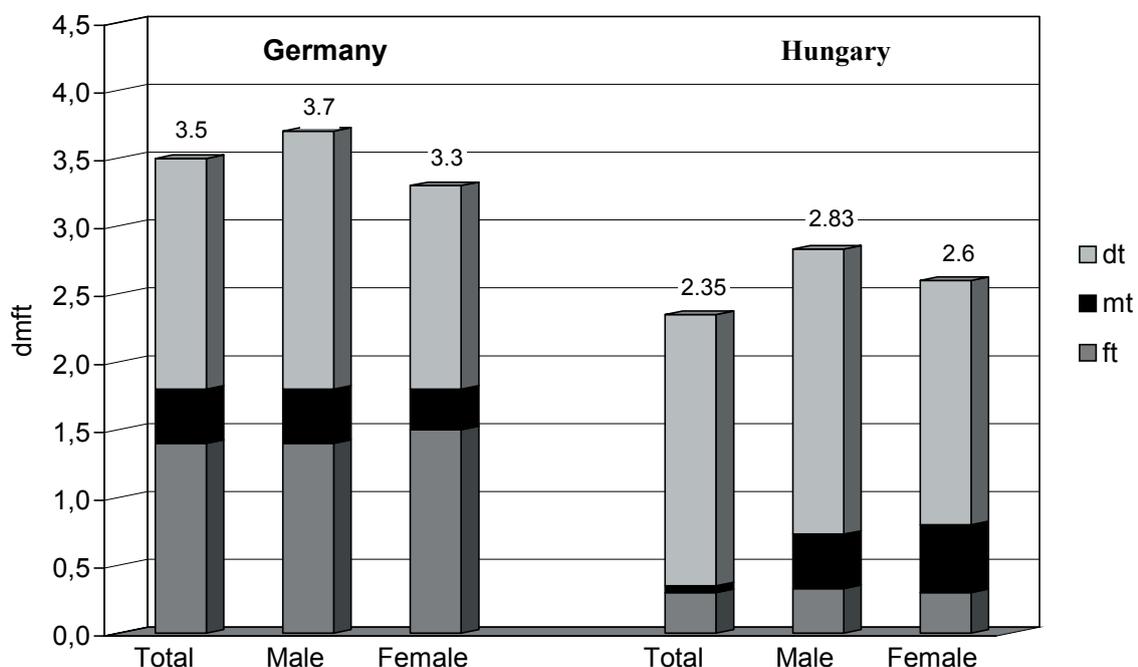


Figure 1: Caries experience among 8-9 year-olds from Germany and Hungary – Primary dentition

the Hungarian sample, the SIC-Index was 5.0 dmft. Fifty eight percent of the children had a current treatment need (dmft > 0, dt > 0) and 16.9% had already been treated (dmft > 0, dt = 0) (Figure 2).

Considering the permanent dentition, in Germany 66.1% of children were caries-free in comparison with 74.2% of Hungarian children (DMFT = 0). In Saxony-Anhalt the caries experience in the permanent dentition was 0.7 DMFT (DT = 0.4, FT = 0.3, MT = 0) and in Budapest and Debrecen 0.4 DMFT (DT = 0.3, FT = 0.1, MT = 0). The DT value was again the highest component of the DMFT Index in both study samples (Figure 3). The SIC-Index in the German sample was 2.0 DMFT, while in the Hungarian sample it was 1.6 DMFT. As for treatment need, 10.6% of the German children were treated (DMFT > 0, DT = 0) and 23.2% had caries related treatment need (DMFT > 0, DT > 0). In Hungary 5.6% of the subjects were treated and 20.2% showed a need for treatment in the permanent dentition.

Periodontal status

A CPI of 0 in all sextants was found in 6.1% of children in Saxony-Anhalt. For the vast majority of the German children (88%), gingivitis (CPI = 1), was evident in at least one sextant. Only 5.9% of these children were diagnosed as having dental calculus (CPI = 2). The figures for the Hungarian sample was 20.1% (CPI = 0), 79.9% (gingivitis in one sextant) and 0% (calculus) respectively (Figure 4).

Discussion

Children enrolled in this study were born after the political changes in Eastern Europe. Therefore the oral status of these children might be expected to reflect the influence of the transformed dental care system on oral health. In general, the results showed deficiencies in the oral health of children of both study samples, especially in the primary dentition.

Data on caries prevalence in 8-9 year-olds living in East Germany dating back to 1981 are available and can

be used for comparative purposes. In recent years, reports of increased caries prevalence in the primary dentition have been well documented, especially in the new Federal States of Germany (Borutta and Mönnich, 2001; Hetzer *et al.*, 1995; Künzel, 1997), but also in other Western European countries (Birkeland and Haugejorden, 2002; Pitts *et al.*, 2003).

In Eastern Germany the caries experience among 8-9 year olds decreased from 4.3 dmft (dt= 2.7, ft= 1.3, mt= 0.3) in 1981 (Borutta and Waurick, 1984) to 3.1 dmft (dt = 1.3, ft = 1.8) in 1991 (Borutta *et al.*, 1995a). The care given in 1991 and 1995 could be deemed unsatisfactory, as most of the primary teeth with decay experience were left untreated.

Comparable epidemiological data for Hungarian 8-9 year-olds is unfortunately not available. In Hungary the first national investigation of 7 year-old children was undertaken in 1985 and was followed by similar surveys in 1991 (Czukur, 1994) and 1996 (Szöke and Petersen, 2000). In 1991 30% of children were caries free at age 7 (Czukur, 1994). In the present study of 8-9 year olds the number of caries free children was 25%. This reduction may of course be partly explained by the sample being a different age group (8-9 year olds) from the previous sample of 7-year-old children.

Reports of caries in the primary dentition existed, showing caries experience in Hungarian 7 year-old children being 3.7 dmft in 1991 (Czukur, 1994).

Comparing the German and Hungarian 1991 values, just after the political and economic changes, the caries experience in primary dentition was similar: 3.1 dmft in Germany, 3.7 dmft in Hungary. However, direct comparisons are a little difficult as there were differences in the ages of the children examined. As far as Hungary is concerned, the current study suggests a decline since then, albeit the current value of 2.3 dmft is still high. While the present study suggests dmft values are lower in Hungary than in Germany, some care needs to be exercised in making comparisons as, while the German sample contained children from both rural and urban communities, the Hungarian children were all resident

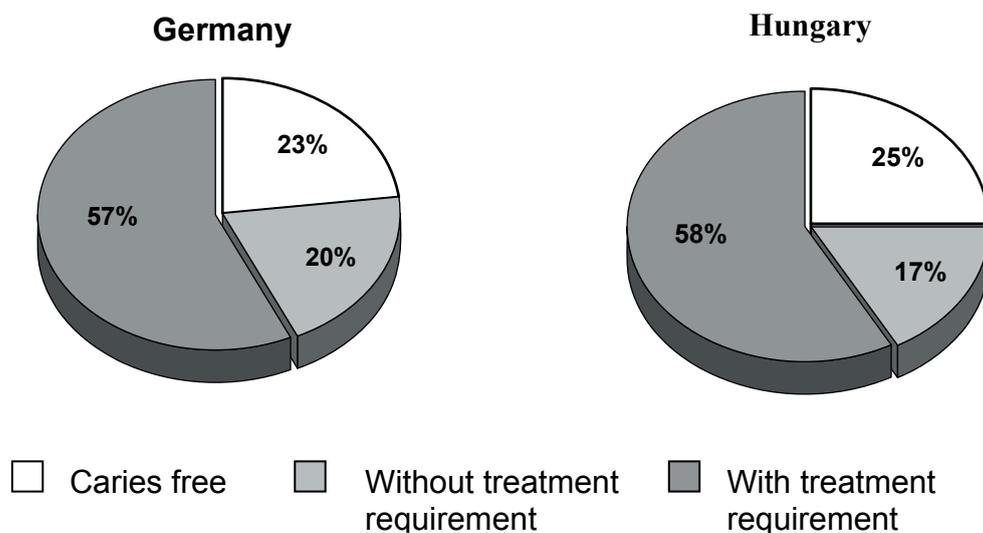


Figure 2: Dental treatment needs among 8-9 year-olds from Germany and Hungary (% of subjects)

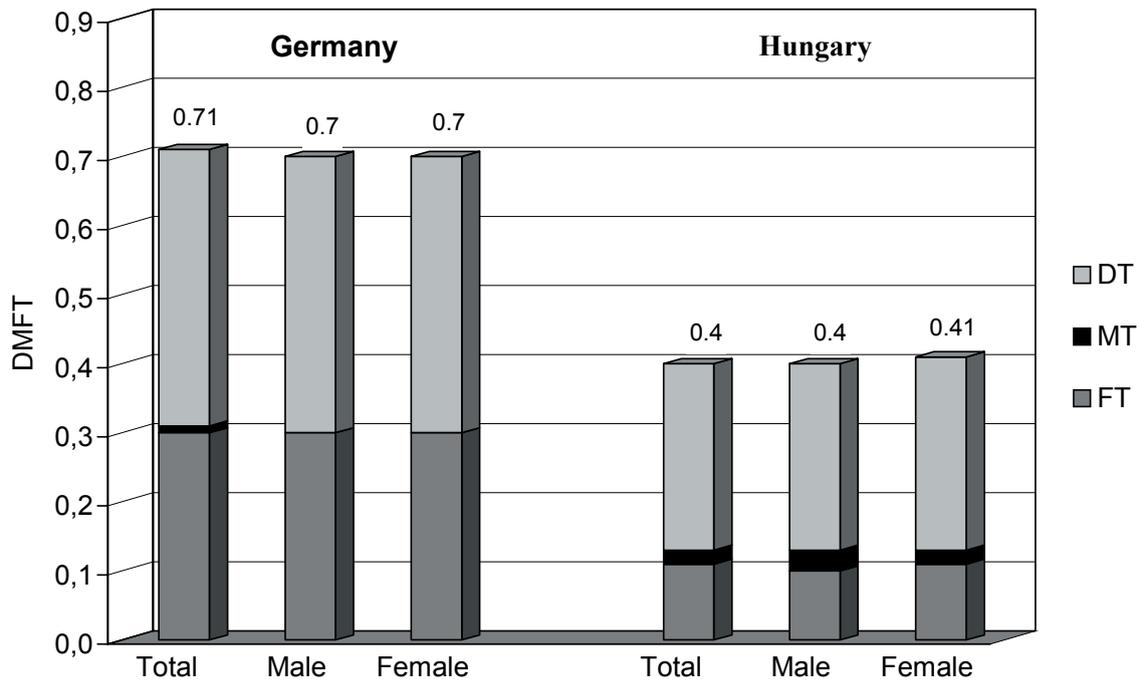


Figure 3: Caries experience among 8-9 year-olds from Germany and Hungary – Permanent dentition

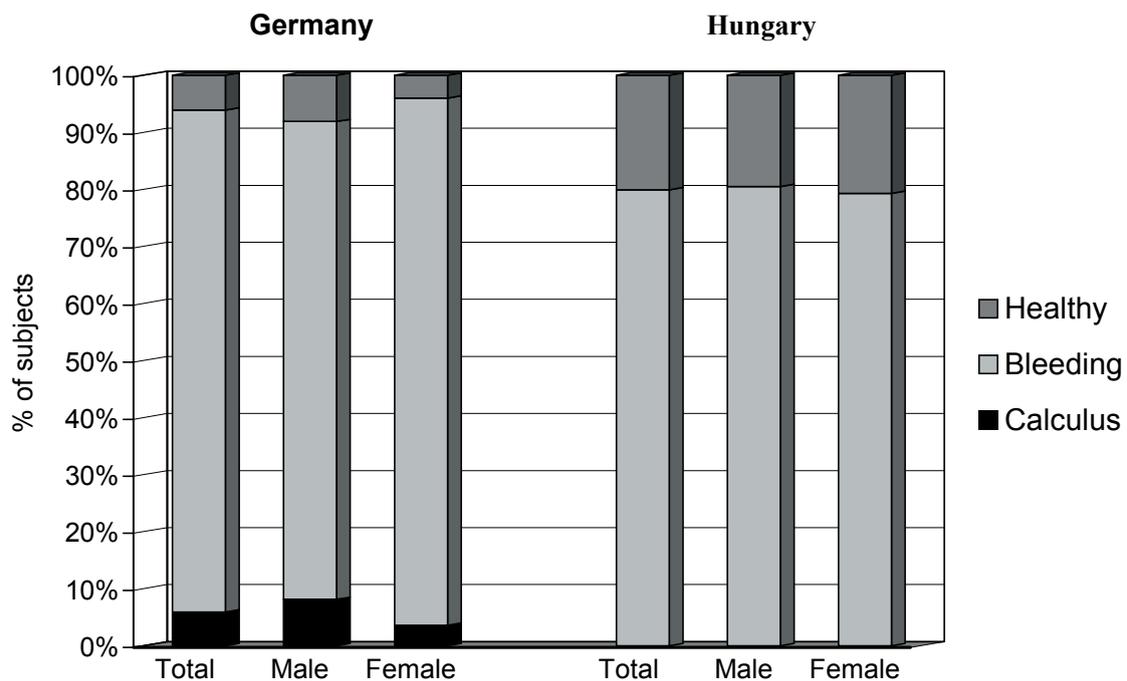


Figure 4: Periodontal status among 8-9 year-olds from Germany and Hungary

in urban environments.

Turning to the permanent dentition, a relatively high number of caries free children and low DMFT-values were observed in both countries. While a significant difference in DMFT values was recorded in the German and Hungarian children, this again may well be explained by the differences in rural / urban make-up of the study samples.

The percentage of children observed as caries free in this study was very similar to the 68.8% of 9-year

old German children recently reported caries-free in the permanent dentition (Pieper, 2001). Furthermore, Pieper's study recorded the caries prevalence of the permanent dentition of children in Saxony-Anhalt as 0.65 DMFT (DT = 0.2, FT = 0.45) and was on a par with the values recorded in the present study.

Borutta et al. (1995a), reported DMFT values in East German children in 1991 and 1995 as 1.0 DMFT, while a 1994 Hungarian survey by Czukur recorded a DMFT of 1.1 in 7 year-olds (Czukur, 1994). The current study

suggests improvements in caries levels in the permanent dentition in both Eastern Germany and Hungary since the mid-1990s. It should be noted however, that DT contributed the largest fraction to DMFT in both countries, the component attributable to FT being lower in the present study.

The periodontal status of German children also showed an unfavourable development in comparison to prior studies. In 1991 more than half of the children were free of marginal inflammation (56.8 %), over a third (39.7 %) had initial stages of inflammation, and in 3.5 % of children calculus was observed (Borutta *et al.*, 1995b).

Taken together the data on both dental caries and periodontal disease suggest an urgent and continuing need for more effective primary and secondary preventive care.

Federal law in Germany dictates that children aged from 2–12 years participate in public dental programmes. In Hungary, a National General Health Programme was introduced in 1986 and preventive oral care was included for schoolchildren aged 6-12, pre-schoolchildren and pregnant women. However, in the mid-1990s most preventive care activities ceased and currently there is no public health programme for children in Hungary.

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