Stomatologija, Baltic Dental and Maxillofacial Journal, 5:62-64, 2003

Dental Health in 11 and 13 Year Old Children in Latvia

Sandra Berzina, Ruta Care

SUMMARY

The aim of the present survey was to describe the caries prevalence, periodontal conditions and oral hygiene among 11 and 13 year old children. Dental and periodontal conditions were assessed in a representative national sample consisting of 705 schoolchildren aged 11 and 13 years in 1993. Clinically detectable caries was found in 91.2% of the children, restorations in 73.8% and recurrent caries in 36.7%. The mean DMFT (decayed, missing, filled teeth) and DMFS (decayed, missing, filled surfaces) were 3.9 /6.8 in the 11-year-old group, and 6.1/11.8 in the 13-year-old group, respectively. Visible dental plaque was observed in 99.7% of the 11-year-olds and in 99.1% of the 13-year-olds. The periodontal conditions were recorded using CPITN (Community Periodontal Index of Treatment Needs). In both age groups an average of 2.5 sextants had healthy periodontal tissue. Gingival bleeding was detected in 3.0 sextants in the 11-year-old group and in 2.9 sextants in the 13-year-old group. Calculus was found in 0.3 and 0.5 sextants per person, respectively. Results of this survey suggest high caries prevalence and insufficient oral hygiene in Latvian schoolchildren.

Key words: dental caries; oral hygiene; CPITN.

INTRODUCTION

Previous epidemiological studies showed high prevalence of caries in Latvian children (1). According to the results from International Collaborative Study of Oral Health Outcomes (ICS - 2) in 1992, the mean DMFT score for children aged 12 was 5.8 (2). Similarly, high caries levels were observed in pre-school children (3).

In Latvia fluoride content in drinking water varies between 0.2 - 1.1 mg/l. Until 1989 the availability of fluoride containing preventive agents was low and the level of their utilisation was not assessed. With no national production and scarce import, fluoride dentifrices were virtually unavailable to general population. Short-term attempts to distribute fluoride tablets in several day-care centres and schools could scarcely compensate for the otherwise absent caries prevention. Results of these efforts were not evaluated.

Political and economic changes in recent years have considerably influenced dental service. Privatisation and transition to paid treatment has started. Organized dental care for children at schools, day-care centres and specialized out-patient clinics functioning until beginning of 1990s no longer exist and prevailing economical restraints limit the implementation of the free dental care for children and adolescents warranted by the state up to 18 years of age. Lately, a variety of imported fluoride-containing toothpastes and other dental care products have become available, but the use of these has not been assessed. The results of ICS-2, showing that only 15% of the children aged 12 had healthy periodontal tissue and more than 58% had gingival bleeding, suggest inadequate oral hygiene (2).

Recognising the severity of the situation, the National Caries Prevention Program is being planned. Dependable epidemiological data regarding present dental health in Latvian population are mandatory to assure its relevance and successful implementation.

The aim of this study was to describe oral health in 11 and 13 years old Latvian children.

MATERIAL AND METHODS

Caries experience, periodontal conditions and dental hygiene were assessed in a representative sample of Latvian schoolchildren aged 11 and 13 years in 1993. This study was a part of National Oral Health survey among Latvian children and adolescents. After stratification, the 1% sample was calculated for each of the 5 regions (Riga, Vidzeme, Kurzeme, Zemgale, Latgale). The list containing 926 schools with 65400 children aged 11 and 13 years, supplied by the Latvian Ministry of Education, was used as the sampling frame. Schools and subsequently one class in each school were randomly included in the study. From the chosen class every third child present on the day of examination was selected. Examinations were conducted in the medical or dental facilities of the schools by a team of five preliminary trained and mutually calibrated dentists. Fibre-optic light source (ROR Int ApS), dental mirrors, blunt explorers and WHO periodontal probes (CPITN type E) were used. The acquired data were recorded in specially designed case report forms. The data were assessed and analysed using SPSS – PC 9.05 (Statistical Package for the Social Sciences) and Visual FoxPro 6.0 programmes. For selective analy-

Sandra Berzina *- D.D.S., assistant at Department of Conservative Dentistry, Faculty of Stomatology, Riga Stradins University, Latvia*

Ruta Care *– D.D.S., PhD., associate professor, Head of Department of Conservative Dentistry, Riga Stradins University, Latvia*

Address correspondence to Dr. Sandra Berzina: Department of Conservative Dentistry, Faculty of Stomatology, Riga Stradins University, 20 Dzirciema Str., Riga LV 1007, Latvia.

ses descriptive statistical methods were used. Mean values were compared by t-test. The critical level of significance was 0.05.

Radiographs were not taken.

Caries

DMFT (decayed, missing, filled teeth) and DMFS (decayed, missing, filled surfaces) were recorded by the following criteria: decayed (D) - carious lesion of dental hard tissue, with a lost integrity of dental surface; recurrent decay (Dsec) - carious lesion on previously restored tooth surface; restoration (F) - restoration due to caries; extraction (M) - loss of the tooth due to caries. Extracted premolars/molars and incisors/cuspids contributed to the DMFS score 5 and 4 surfaces, accordingly.

Periodontal conditions

The periodontal conditions were described by partial Community Periodontal Index of Treatment Needs (CPITN) in accordance with WHO methodology (4). The highest measurement detected in each sextant was recorded as follows: healthy (0); gingival bleeding (1); supragingival calculus (2).

Oral hygiene

For estimation of oral hygiene Silness & Loe plaque index (5) was used. Plaque, assessed by means of disclosing dyes at 8 buccal surfaces (first molars and first incisors of maxilla and mandible), was recorded as follows: no plaque (0); thin film of plaque at the gingival margin, visible only when scraped with an explorer (1); moderate amount of plaque along the gingival margin (2); heavy plaque accumulation at the gingival margin and buccal surface of the tooth (3). The plaque index represented percentage of the surfaces having visible plaque deposits (score 2 and 3).

RESULTS

Of 705 children examined, 315 (45%) were boys and 390 (55%) were girls. The 11-year-old group consisted of 366 children from 54 schools. Their average age was 11.6 years (SD 0.29). In the 13-year-old group, 389 children from 56 schools with average age of 13.6 years (SD 0.3) were examined. Thirty percent of the sample lived in the capital Riga and 70% were inhabitants of smaller towns or the rural area.

The reliability exercise showed that combined inter-examiner (9.8) and intra-examiner variance (1.1) accounted for 10.9 of the total variance in DMFS (93.5).

Sixty-two children (8.8%) did not have clinically detectable caries. Restored teeth were found in 520 (73.8%), unrestored caries and recurrent caries in 508 (72%) and 259 (36.7%) of the children, respectively. Caries related extractions were recorded in 12% of the children. Eleven percent had one or more teeth with open pulp lesions.

The means of DMFT and DMFS scores together with the separate components of the latter for both ages, as well as separately for boys and girls are shown in Table 1. In 11-year-old age group D component accounted for 41% and in 13-year-old-group for 45% of DMFS score, including recurrent caries (9% in both age groups). The average number of extracted teeth was 0.1 and 0.2, respectively.

Table 1. *Caries experience in 11 and 13 year old children in Latvia.*

	DMFT		DMFS		DS		FS		Dsrec		MS	
	X	SD	X	SD	X	SD	X	SD	X	SD	X	SD
11-yr-olds												
boys	3.8	2.9	6.7	5.8	2.1	3.2	3.3	4.1	0.7	1.4	0.5	1.9
girls	4.1	3.1	6.8	6.5	2.3	3.6	3.5	3.7	0.5	1.0	0.4	1.9
all	3.9	3.0	6.7	6.1	2.2	3.4	3.4	3.9	0.6	1.2	0.5	1.9
13-yr-olds												
boys	5.8	3.8	11.4	9.9	4.1	5.8	4.9	5.0	1.0	1.8	1.3	3.2
girls	6.4	4.3	12.1	9.8	4.2	5.2	5.7	5.4	1.1	1.8	1.1	2.5
all	6.1	4.0	11.8	9.9	4.2	5.4	5.4	5.3	1.1	1.8	1.1	2.8

Table 2. *The mean DMFT and DMFS in 5 locations.*

	11 years olds					13 years olds				
	Number of Subjects	DMFT		DMFS		Number of Subjects	DMFT		DMFS	
		X	SD	X	SD		X	SD	X	SD
Riga	120	3.1	2.3	5.4	5.7	92	5.6	4.1	10.1	8.3
Vidzeme	89	4.4	3.3	8.0	6.8	83	6.3	3.7	13.6	11.2
Latgale	71	4.2	3.0	6.5	5.4	65	6.3	4.0	11.8	9.3
Kurzeme	47	4.1	3.3	7.7	6.4	55	6.3	4.4	12.6	11.6
Zemgale	39	4.5	2.4	7.3	6.0	44	6.0	4.0	10.9	7.8

In Riga, the mean values for DMFT and DMFS were significantly lower than in the rest of Latvia (Table 2). The mean DMFS score in the 11-year group in Riga was 5.4 and in the rest of the regions 7.4 ($p<0.001$). In the 13-year-old group it was 10.1 and 12.2, respectively ($p<0.05$). Decay (D) in the 11-year-old group in Riga was 26% of DMFS score, and in other regions 47% ($p<0.001$). In the 13-year-old group, it was 32% and 44% of DMFS index ($p<0.05$). Number of filled surfaces in the 11-year-old group in Riga was 64% of DMFS score, while in the rest of the regions 46% ($p<0.001$), and in the 13-year-old age group it was 59% and 43%, respectively ($p<0.01$).

The level of oral hygiene is shown in the Table 3. Only one 11-year-old and three 13-year-olds did not have visible plaque on the examined teeth. Among 11-year-olds 94% were found to have abundant plaque deposits (score 3) on 5.4 (68%) of the 8 teeth exam-

Table 3. *The mean number of teeth with different plaque scores.*

	Number of teeth			
	0 - 1		2 - 3	
	X	SD	X	SD
11-yr-olds	0.7	0.9	7.3	2.2
13-yr-olds	1.0	1.2	7.0	2.3

Table 4. *The mean number of sextants with healthy periodontal conditions, gingival bleeding on probing, calculus.*

	11-yr-olds		13-yr-olds	
	X	SD	X	SD
healthy	2.5	1.9	2.5	1.9
gingival bleeding	3.0	1.9	2.9	1.9
calculus	0.3	0.8	0.5	0.9

ined. Similarly, 92% of 13- year-olds averaged 5.0 (63%) sites with score 3. No differences regarding oral hygiene between boys and girls were observed.

Thirty-four children (9.3%) among 11-year-olds and 39 (11.5%) among 13-year-olds had healthy periodontal conditions. Inflammatory changes in periodontal tissues in all sextants were detected in 57 (15.5%) of the children aged 11 and in 66 (19.5%) of the children aged 13. The most common finding was gingival bleeding. Gingival bleeding in all sextants was observed in 37 children (10%) aged 11 and in 27 (8%) aged 13. Average number of sextants in children with healthy periodontal tissue, gingival bleeding and calculus is shown in Table 4.

DISCUSSION

Epidemiological studies have shown a significant decrease of caries prevalence during last decades in the majority of Western countries as well as in the USA, particularly in children and adolescents (6-8). Widespread use of fluoride containing dental care products, improvement in oral hygiene and healthier dietary habits are considered to be the main reasons for reduction of caries levels (9-11). This survey shows that in comparison with similar age groups in other countries (12-14), the prevalence of caries is high in Latvian children. However, it is noteworthy that present caries levels in Latvia resemble those observed in the majority of developed countries only a few decades earlier.

This study was carried out in the period of significant economical and political changes, affecting dental service in general. Previously existing system of financed health care was abolished, while the new one was in process of being established. This study thus partly reflects the dental care policy, which emphasized reparative treatment and neglected preventive measures. Filled teeth, which comprised 50% of DMFT index in both age groups, showed that most children had received reparative treatment. Nevertheless, comparatively high D component indicated both insufficient operative treatment and insufficient prevention for caries reduction.

The considerable difference in caries prevalence between the successive age cohorts examined suggests high caries activity among Latvian children (15).

Significant differences between Riga and other regions were observed in both the mean values of DMF scores and in their separate components. DMFT and DMFS scores in metropolitan area were 28% and 10% lower as compared with rural area in 11 and 13 year old children, respectively. The majority of children in capital had restored teeth, while in rural regions carious teeth prevailed. It is conceivable that the differences in dental health between metropolitan and rural children are due to disparity in lifestyle, and attitudes towards both oral health, its protection and health in general. The poor economical conditions (16) further restrict availability and utilisation of dental care in rural areas. In future these factors should be studied more properly.

The results of this study showed that oral hygiene was poor in both age groups, without any noticeable difference between Riga and the other regions. In earlier epidemiological data, based on questionnaire 83% of 11-year-old children and 80% of 13-year-old children claimed that they brushed teeth regularly (17). The present clinical examination suggested insufficient and/or improper oral hygiene, shown to be the main cause of gingival bleeding in children (18,19).

CONCLUSIONS

This survey indicates:

- Poor oral hygiene coupled with low fluoride exposure may be a major factor explaining high level of caries and periodontal pathologies in Latvian children.
- Dental restorations as the only means of improving oral health are not sufficient in decreasing the prevalence of caries.
- Versatile caries prevention program, which would include the use of fluoride and changes in diet, is necessary for the improvement of dental health in the future.

Acknowledgments

This study was performed in collaboration between Gothenburg University (Sibilla Bjarnason) and Riga Stradins University. Thanks are due to I. Ranka (RSU) and I. Kalnina (Toronto University).

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Received: 22 04 2003
Accepted for publishing: 27 06 2003