

Korean Oral Health Status National Survey Report

Eun-Hee Kim¹, Ah-Hyeon Kim², So-young Park³, Youn-soo Shim⁴, Eun-young Jeon⁵, So-young An^{*6}

¹Dentist, Department of Pediatric Dentistry, 21CENTURY Dental clinic and Research Institute of Wonkwang Bone Regeneration, Daejeon Metropolitan city, 35233, Republic of Korea

²CEO, Red dental research institute, 33-1 Dangsang-dong 5ga Youngdeungpo-gu, Seoul, 07213, Republic of Korea

³Assistant professor, Department of Dental Hygiene, Wonkwang Health Science University, 514, Iksan-daero, Iksan-si, Jeollabuk-do, 54538, Republic of Korea

⁴ Associate professor, Department of Dental Hygiene, Sunmoon University, 70, Sunmoon-ro 221beon-gil, Tangeong-myeon, Asan-si, Chungcheongnam-do, 31460, Republic of Korea

⁵ Assistant professor, Department of Dental Hygiene, Kyungbok University, 425, Kyungbokdae-ro, Namyangju-si, Gyeonggi-do, 12051, Republic of Korea

^{*6} Professor, Department of Pediatric Dentistry, College of Dentistry Wonkwang University, Research Institute of Wonkwang Bone Regeneration, Daejeon Metropolitan city, 35233, Republic of Korea

Eun-Hee Kim and Ah-Hyeon Kim were same contributed.

starocat@naver.com¹, folks81@naver.com², 1101so-young@hanmail.net³, shim-21@hanmail.net⁴, queenym@naver.com⁵, 9543sue@hanmail.net^{*6}

Abstract

Background/Objectives: To assess Korean oral health indices and compares these trends with those found for other OECD countries to determine their characteristics and causes.

Methods/Statistical analysis: This retrospective study examined national data obtained from official epidemiological surveys carried out in Korea during 2000, 2003, 2006, 2010 and 2012. The studied units were Korean municipalities and their average DMFT index and average CPI values for children and adolescents.

Findings: The estimated mean dft index (decayed and filled teeth) values in 5-year-old children were as follows: 5.48 in 2000, 4.12 in 2003, 2.85 in 2006, 2.99 in 2010 and 2.79 in 2012. The estimated mean DMFT index values in 12-year-old children were as follows: 3.3 in 2000, 3.25 in 2003, 2.17 in 2006, 2.08 in 2010 and 1.84 in 2012. The ratio of the CPI code 0 repeatedly increased and decreased from 46.29% in 2000. The number for sealants used in 8-, 12- and 15-year-olds was 0.48, 0.42, and 0.29, respectively, in 2000 and 1.82, 2.36, and 2.12, respectively, in 2012.

Improvements/Applications: *For children aged 12, the CPI rate for code 0 increased, gingival bleeding on probing decreased, and the level of calculus did not change between 2000 and 2012. The average number of sealed teeth increased continuously by approximately 4- to 7-fold over 12 years.*

Keywords: *Dental caries, Korea, national survey, Oral Health, periodontal diseases.*

1. INTRODUCTION

In the late 20th century, oral health improved worldwide; however, a recent WHO review of oral health revealed that internationally, problems remain[1]. In 1981, the WHO and the World Dental Federation (FDI) jointly formulated the following global child oral health goals, to be achieved by the year 2000: ‘50% of 5- to 6-year-olds to be free of dental caries,’ and ‘the global average to be no more than 3 DMFT (decayed, missing, and filled teeth index) at 12 years of age’[2]. After that, FDI, WHO and the International Association for Dental Research (IADR) started preparing the 2020 goals for the new millennium, which were later developed into ‘Vision 2020’. FDI suggested that Vision 2020 should lead to future accomplishments in alignment with the mission of ‘Leading the World to Optimal Health’ [3,4]. Decrease of tooth decay prevalence is well documented. I generally agree that in recent decades, the prevalence of well-being has decreased significantly in most developed children. Various authors believe that the use of various types of fluoride contributed most to this decrease. However, other factors should be considered as discussed extensively in various publications [5,6].

Recent studies have analyzed the results of national surveys on the oral health status of children and adolescents. One study looked at the oral health status and attitude surveys of Thai adolescents. This study found that the DMFT was 8.1 for children aged 6 and was 2.4 for children aged 12; important caries predictors were dental visits, consumption of sweets, Muslim ethnicity and gender (girls)[7]. Another study, which analyzed a national oral health survey of adolescents and adults that was conducted in China in 2002, reported DMFTs of 4.5, 1.0, 1.4, and 1.6 for children and adolescents aged 5, 12, 15, and 18[8]. A 2003 study on changes in the oral health status of 6- and 12-year-old Portuguese children found that caries prevalence was 46.9% and 52.9% for children aged 6 and 12, respectively. The same study found DMFTs of 5.2 and 3.7 for children aged 6 and 12, respectively, and 90% of children aged 12 had a CPI score of 2[9]. A study on the oral health status of children and adults in Burkina Faso conducted in 2004 reported that the caries prevalence of children aged 6 was 38%, DMFT was 0.7 for children aged 12, children aged 6 was 58%, 57% of children aged 12 had a CPI code of 2; dental caries was more serious in urban areas than in rural areas, and periodontal disease was more serious in rural areas than in urban areas[10].

The trend of dental caries has been shown to be generally decreasing in many studies; recently, factors contributing to and the prevalence of dental caries have been studied. In Korea, national oral health surveys have been conducted every 3 years since 2000; however, studies on children and adolescents based on these surveys have only included sealant prevalence in a single year[11] or the relationship between the educational level of the mother and the dental caries of the children in a single year[12]. No studies have analyzed the condition and change of the oral health of children and adolescents in Korea over long periods. Therefore, this study examines changes in the oral health patterns of children and adolescents in Korea, and compares these trends with those found for other OECD countries to determine their characteristics and causes.

2. MATERIALS AND METHODS

2.1. Research subject and method

This is a retrospective study based on the data obtained in national epidemiological surveys conducted by the Ministry of Health and Welfare in Korea in 2000, 2003, 2006, 2010 and 2012 [8-12]. The total sample size including all years was 12,574 preschool children and 63,167 school age children. The national oral health survey was conducted by an interviewer and ancillary personnel who visited households within the survey area and examined adults and preschool children. The same team visited selected childcare centers, kindergartens and schools within the survey area and examined preschool, elementary, middle school, and high school students. In accordance with the oral inspection survey guidelines, the health inspection inspector conducted a preliminary study after educating and training the students in oral care. The oral examinations were carried out under natural daylight using a plane mouth mirror, a standard explorer for the detection of caries, and a WHO/CPI probe to analyze periodontal health status.

The following measurements for caries were used: dft/DFT index, dt/DT index, ft/FT index, dft/DFT rate, dt/DT rate in mixed and permanent dentitions. The index for periodontal disease used was the community periodontal index (CPI).

In this study, data on dental caries and periodontal disease in children aged 5, 8, 12 and 15 were extracted and compared to analyze the oral health condition of youths.

2.2 Ethics statement

The national oral health survey data are freely available on the web. The study was approved by the College of Dentistry, Wonkwang University Hospital Authority Bioethics Committee.

3. RESULTS

The trend of changes in the oral health condition of Korean children and adolescents in the past 12 years, as observed through a national oral health survey, is as follows.

3.1 Dental Caries in Primary Dentition

Changes in dental caries in primary dentition aged 5 between 2000 and 2012 is shown in Fig. 1. The dft, ft, dt index, and dft and dt rates presented an almost continuous decreasing trend, and the dft index for children aged 5 decreased by 2.69 in recent years. The dt index decreased by 1.60. Considering the rate of children without caries, the 1-dft rate of children remained at 17.2% in 2000 but increased to 37.78% in 2012; thus, the number of children without dental caries increased more than two-fold. The number and rate of dental caries decreased for deciduous teeth during the last 12 years, as did the number and rate of teeth that were not treated for dental caries. Overall, the prevalence of dental caries decreased, as did the active treatment for dental caries, indicating that the oral health improved in both deciduous and mixed dentition.

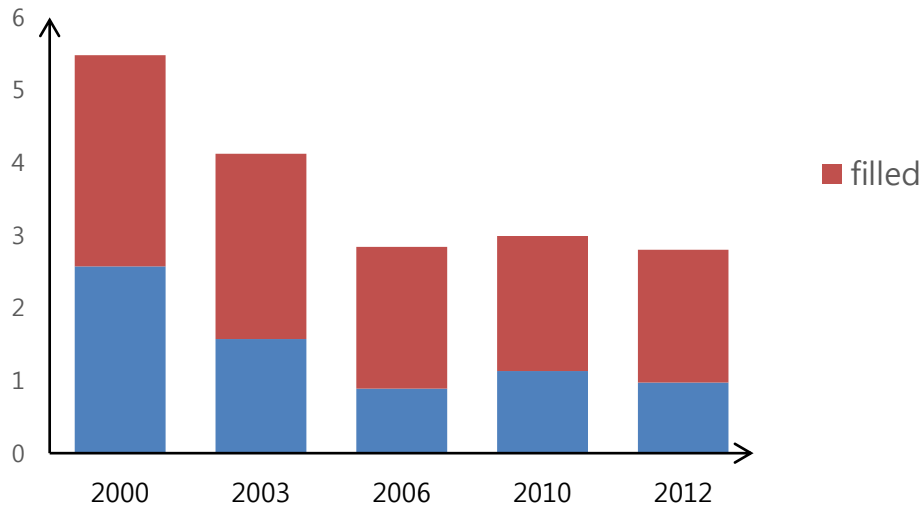


Figure 1. Mean dental caries experience of 5-year-old children by year of study.

3.2. Dental Caries in the Permanent Dentition of School Age Children

The change in dental caries in the permanent dentition aged 12 was analyzed for the period from 2000 to 2012 (Fig. 2). DMFT, DT, MT, FT index, DMFT rate, and DT rate decreased almost continuously, and the DMFT index of children aged 12 decreased by 1.46 during the past 12 years. In permanent dentition with dental caries, the DT index increased slightly in 2003 compared to 2000; thereafter, the DT index decreased continuously. The DT rate was 42.03% for children aged 12 in 2000 but decreased dramatically after 2003, reaching 12.15% in 2012. Thus, the rate of untreated dental caries decreased. When considering the rate of children who did not have dental caries, the rate of dental caries non-experience in children aged 12 increased by 1.9 times over 12 years.

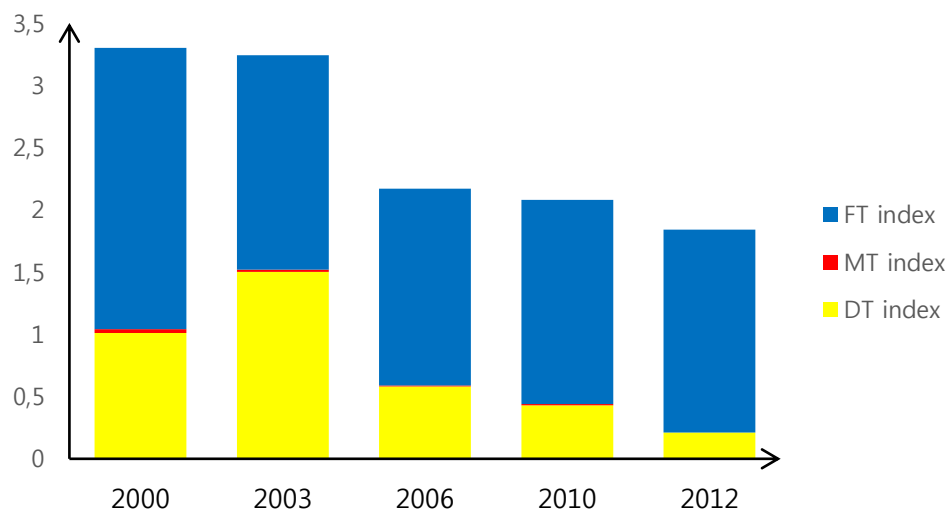


Figure 2. Mean dental caries experience of 12-year-old children by year of study.

3.3. Periodontal Health status of Children

The periodontal health status aged 12 was investigated based on CPI score (Table 1). For the studied 12 years, except for 2006, the periodontal health rate increased overall. In the same period, among children aged 12, the CPI score 0 (healthy) increased from 46.29% in 2000 to 63.77% in 2012, and gingival bleeding decreased from 26.85% to 11.34%. However, calculus did not continuously increase or decrease, but fluctuated.

Table 1: periodontal health status of 12-year-old children by year of study

Years		N	Code 0	Code 1	Code 2	Code 3
2000	M	481	55.8	20.9	23.1	0.22
	C	482	37.9	32	34	
	R	240	35.6	34	30.4	
2003	M	270	44.4	30.4	24.8	
	C	237	41.8	35.9	22.4	
	R	90	24.4	33.3	41.1	1.11
2006	M	801	63.6	12.3	24	
	C	795	80.1	7.3	12.6	
	R	159	71.3	12.6	16.1	
2010	M	5582	43.1	20.4	36.5	
	C	5059	20.4	17.1	21.5	
	R	1690	36.5	36.1	39.9	
2012	M	4666	73.4	4.48	22.1	0.06
	C	4549	49	13.5	37.5	0.1
	R	1288	53.2	9.48	37.2	0.13

3.4. The Number of sealed Teeth

The number of sealed teeth for children aged 8, 12 and 15 was 1.82, 2.36 and 2.12, respectively, in 2012; these numbers increased by 1.34, 1.83 and 1.88, respectively, for the 12 years since 2000.

3.5. Dental Caries by Region

In this study, the regions were classified as metropolitan areas, cities, and rural areas. Seoul and the metropolitan cities of Busan, Daegu, Gwangju, Incheon, Daejeon, and Ulsan were considered metropolitan areas, and other cities and counties were considered urban and rural areas.

3.5.1 Dental Caries in Deciduous Dentition by Region

The dft index in children aged 5 was higher in rural areas than in metropolitan areas and cities, presumably because income level, the education level of parents and accessibility to dental treatment is low in rural areas. The dft rate of children aged 5 was the highest in rural areas, followed by cities and metropolitan areas, in all years. The dt rate, which refers the ratio of untreated caries to total caries, was also higher in rural areas than in the other area types.

3.5.2 Trend of Dental Caries in School Age Children by Region

After 2006, the DMFT index for children aged 12 was highest in rural areas. The DT index was the highest in rural areas, except during 2003, and followed a decreasing pattern in the nation as a whole. The DFT rate varied among the regions, decreasing from 70-80% to 50%, and (except for 2003) the DT rate was highest in rural areas.

3.6 Trend of Periodontal Health status in School Age Children by Region

When the CPI for children aged 12 is analyzed by area type (metropolitan, city, and rural areas), periodontal health was highest in metropolitan areas. The rate of CPI code 0 (healthy) fluctuated over the studied 12-year period but increased overall by 10-20%.

An analysis of the changes in dental health in Korea during the last 12 years showed that various oral health programs for the management of dental caries in school-age children were effective. According to National Oral Health Survey data, DMFT decreased in Korea during the past 12 years, as in other OECD countries. In Korea, the DMFT index of children aged 12 continually decreased (3.3, 3.25, 2.2, 2.08 and 1.84 in 2000, 2003, 2006, 2010 and 2012, respectively). Regarding the periodontal health status of children aged 12, the proportion of children presenting periodontal health has increased over the last 12 years, except for 2006. In Korea, pit- and fissure-sealed teeth were initially covered by national health insurance for the 1st permanent molar (in 2009); this was later expanded to the 2nd permanent molar in 2013 to decrease financial burden on the individual. The result described above might be due to increased consciousness regarding preventive treatment. The amount of dental caries decreased; thus, the number of teeth suitable for sealant application increased, and individual financial burden was decreased.

According to the Korean Health Insurance Review & Assessment Service (HIRA) database, gingivitis and periodontal diseases were ranked 2nd among frequent diseases in 2013, immediately after acute bronchitis, indicating that 10,276,654 people (21% of the population) received treatment for these diseases. Dental caries was in 7th place, showing that 5,263,863 people (11% of the population) attended a hospital due to this disease. Ranked according to medical insurance expense, gingivitis and periodontal diseases were in 2nd place at 435 million, and dental caries was in 9th place at 175 million. In 2013, the cost for medical care expenses for dental clinics and hospitals was \$1.8 billion, representing 5.3% of the total recuperation cost[13]. Burdens on the individual and on society are increasing. Because lifetime oral health is established during childhood and adolescence, it is important to promote oral health and education for the long term. A national oral health management program and oral health policies might decrease the burdens associated with poor oral health.

Korea has set goals to decrease the dental caries rate by 46% for children aged 5 and by 45% for children aged 12; to decrease the dft index by 2.3 for children aged 5 and by 1.6 for children aged 12; to decrease the prevalence of dental caries by 28% for children aged 5 and by 15% for children aged 12, all by 2020.

However, no specific strategy has been developed to realize this goal. To achieve this goal, the following programs will be required: a correct tooth brushing practice program for children and adolescents, a water fluoridation program, an oral disease control program centered on prevention for vulnerable social groups, dental health education promotion programs, and national oral health survey programs.

4. CONCLUSION

The dental health administrative organization in Korea initiated a national oral health program through the establishment of a dental health department in 1997 and the enactment of the Oral Health Act in 2000; however, this program was unsuccessful and was abolished in 2007. It is difficult for the oral health administration system of the Korean central government to promote oral health programs efficiently and systematically due to the lack of a department for oral health. Therefore, to realize lifetime dental health management for the Korean people, it is necessary to establish a department for oral health administration at the Ministry of Health and Welfare as well as in cities and provinces, a policy that would secure personnel that are specialized in dental health and increase expertise and efficiency.

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