

# Changes in Toothbrushing Behavior and Knowledge through Dental Health Care Education and Experience for Elementary School Students

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## ABSTRACT

**Background/Objectives:** To form habits through the dental health education for assisting with mid to long-term oral health maintenance of elementary school students, surveys were conducted from March to December of 2018.

**Method/Statistical Analysis:** The data was encoded then statistically analyzed using SPSS ver. 23.0, and the level of significance was set as 0.05. Cross-tabulation was conducted for the grade distribution depending on the gender, and the frequency analysis was conducted for the existence of oral health recognition, school's oral health education behaviors and changes in toothbrushing behaviors after the oral health education.

**Findings:** As for dental health education, 74.8% students responded that it is 'helpful' for dental health care, and 71.7% students responded that it is 'helpful' for dental health education usage and method. As for dental health recognition, 'healthy' was the most frequent response, and 49.2% students responded they have experienced 'bleeding from the gum' when toothbrushing. As for the toothbrushing related questions, 35.5% respondents were using rotational method, and 54.1% responded that they brush after lunch. "between 2 to 3 minutes" was the most popular with 33.1%. As for the distribution of correct answers for dental health knowledge before and after education, the correct answers which asked 'if the cause of gum disease is dental plaque' increased after education(89.9%) compared to before (76.1%). The question which asked 'if one should brush teeth before going to sleep', the correct answer was higher after education(98.4%) compared to before (89.6%). The question which asked 'if fruits, milk and vegetables assist with tooth cleanliness', the correct answer was higher after education(88.2%) compared to before(79.4%).

**Improvements/Applications:** Consequentially, forming proper habits through repeated education and experience opportunity is the main method for changing the behaviors of elementary school students.

**Keywords:** Dental hygiene care, Oral hygiene state, Dental health education

## Introduction

In South Korea, systematic dental health programs have been implemented based on a legal basis of Dental Health Act enacted in 2000, and such programs are

assisting the public rationally manage dental health, and changing their dental health knowledge, attitude and behaviors in order to develop abilities to appropriately manage dental health. In particular, since dental health knowledge obtained during the elementary school days forms the foundation of life-long dental health management, dental health programs for elementary school students are significant for public health science<sup>1</sup>.

Elementary school period is a mixed dentition period where baby and permanent teeth are exchanged, and due to such exposures, dental caries can easily occur. Also, issues arising from baby teeth can affect permanent

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teeth, which can possibly lead to tooth eruption disorders and malocclusion. Therefore, oral health education is extremely crucial during this period in order to maintain oral health from elementary school days to adulthood<sup>2</sup>. Ever since the period of preschool, oral health education is mostly conducted by kindergarten teachers, extracurricular related officials and guardians at home. Among characteristics of children, their attitude, belief and behavior towards oral health are very much affected by their parents' socioeconomic factors and oral health behaviors. Currently in South Korea, the mother spends the most amount of time with her children and forms intimate relationships. Therefore, the mother plays a leading role in choosing the timing of visiting the dentist or dental treatments. In such ways, the mother plays the most important role in regard to maintaining and promoting the family's oral health.

Also, according to precedent researches (2012:46-190), proper dental health care behaviors provided by mothers to infants promote the dental health of infants and furthermore allow the children in their childhood form proper dental health management attitudes and habits. Children either do not have dental health education related experiences or do not remember much contents even after receiving education, and continuous implementation of dental health education in the elementary school curriculum is believed to be necessary<sup>3</sup>. By targeting the students in the upper grade of an elementary school located in Dong-borough of Busan Metropolitan City, the effect of education was grasped by comparing the effect before and after the oral health and toothbrushing education. Based on this, this study aims to serve as the baseline data for the tools and programs of continuous oral health education for elementary school students.

**Materials and Method**

**Study Subjects:** By targeting the entire students of a elementary school located in D-borough of B-city from March 20th to December 30th of 2018, their parents consent and students participation were obtained with the help from D-borough's Education Office, and the investigation took place after distributing questionnaires. The survey was conducted two times in total, and they were distributed and collected before and one month after the education. As for the content of education, oral care education and toothbrushing lessons for elementary school students were conducted to confirm the effect before and after the education.

With the educational contents of dental health care education, and toothbrushing education and experiences for elementary school students, the effectiveness of education was verified by comparing the results before and after education.

**Study Method:** The data was encoded then statistically analyzed using SPSS ver. 23.0, and the level of significance for determining statistical significance was set as 0.05. Cross-tabulation was conducted for the grade distribution depending on the gender, and the frequency analysis was conducted for the existence of oral health recognition, school's oral health education behaviors and changes in toothbrushing behaviors after the oral health education. As for the changes in the oral health knowledge, correct answer percentages were marked before and after the education.

**Work Engagement Gender and Grade Distribution of Elementary School Students:** The level of satisfaction and behavioral changes in the elementary school students after the oral health care education is shown in Table 1. As for toothbrushing method, 408(35.5%) of the respondents were using the rotational method, and for toothbrushing after lunch, 531(54.1%) responded that they brush after lunch. As for the toothbrushing duration, "between 2 to 3 minutes" was the most popular response with 380(33.1%) respondents, followed by "between 1 ~ 2 minutes" with 356(31.0%) respondents.

**Table 1: Dental Health Education Experience of Elementary School Students**

Grade	Man	Women
3rd year	47 (8.1)	61(10.4)
4rd year	180(31.1)	154(26.3)
5rd year	164(28.4)	175(29.9)
6rd year	186(32.4)	195(33.4)
Total	577(100.0)	585(100.0)

**Dental Health Education Experience of Elementary School Students:** General characteristics of elementary school students are shown in Table 2. 990(83.0%) students responded that they have experienced such education programs, and 203(17.0%) students responded that they haven't. In regard to the education program helping with dental health care, 868(74.8%) students responded "helpful", 269(23.2%) students responded "somewhat", and 24(2.1%) students responded that "not helpful". In regard to dental health education usage and method,

833(71.7%) students responded “helpful”, 307(26.4%) students responded “somewhat”, and 21(1.8%) students responded that “not helpful”

**Table 2: Dental Health Education Experience of Elementary School Students**

Division		N(%)
Awareness of oral health education	Yes	990(83.0)
	No	203(17.0)
Do you think it helps with oral health care?	Be helpful	868(74.8)
	Normal	269(23.2)
	It does not help.	24 (2.1)
Do you think oral health education method is helpful?	Be helpful	833(71.7)
	Normal	307(26.4)
	It does not help.	21 (1.8)

**Dental Health Recognition and School’s Dental Health Behavior for Elementary School Students:**

Dental health recognition and school’s dental health behavior are shown in Table 3. In regard to dental health recognition, 606(50.0%) students responded “healthy”, followed by 518(42.7%) students who responded “somewhat”. In regard to having experiences of bleeding while brushing teeth, 598(49.2%) students responded “yes”, while 493(40.6%) students responded “no”. In regard to having experiences of bad breath, 545(45.1%) students responded “yes”, 263(21.8%) students responded “no” and 400(33.1%) students responded “don’t know”. In regard to brushing teeth after lunch at school, 681(56.6%) students responded “yes”, while 523(43.4%) students responded “no”. In regard to alternative behaviors to replace toothbrushing, the most frequent answer was “rinsing mouth with water” with 664(61.5%) students.

**Table 3: Dental Health Recognition and School’s Dental Health Behavior for Elementary School Students**

Division		N (%)
Oral Health Status	Oral Health Status	606(50.0)
	Normal	518(42.7)
	Not healthy	89(7.3)
Bleeding on gums when tooth brushing	I do not know	124(10.2)
	There was bleeding.	598(49.2)
	There is no bleeding	493(40.6)

*Conted...*

Is there a bad breath?	I do not know	400(33.1)
	There was bad breath	545(45.1)
	There is no bad breath	263(21.8)
Do you brush your teeth after lunch at school?	Yes	681(56.6)
	No	523(43.4)
It does replaced by any act that does not brushing after lunch at school?	Do nothing	264(24.5)
	Wash your mouth with water.	664(61.5)
	Chew gum	30(2.8)
	Other	121(11.2)

**Changes in Elementary School Student’s ToothbrushingBehavior after Dental Health Care:**

Elementary school students’ level of satisfaction and changes in behaviors are shown in Table 4. As for the method of toothbrushing, 408(35.5%) students answered that they use the rotational method. As for toothbrushing after lunch, 531(54.1%) students answered that they brush their teeth after lunch. In case of the duration of toothbrushing, the most frequent answer was “between 2~3 minutes” with 380(33.1%) students, followed by “between 1~2 minutes” with 356(31.0%) students.

**Table 4: Changes in Elementary School Student’s ToothbrushingBehavior after Dental Health Care**

Division		N (%)
After oral health education do I brushing in some way?	Vertical method	211(18.4)
	Lateral method	81(7.0)
	Fones’ method	179(15.6)
	Rolling method	408(35.5)
	Other	270(23.5)
After oral health education do you brushing after lunch?	Yes	531(54.1)
	No	450(45.9)
After oral health education do a few minutes of brushing after lunch?	Less than 1 minute	97(8.4)
	1 minute to less than 2 minutes	356(31.0)
	2 minutes to less than 3 minutes	380(33.1)
	3 minutes to less than 4 minutes	240(20.9)
	More than 4 minutes	44(6.6)

**Changes in Elementary School Students’ Dental Health Knowledge after Dental Health Care Education:** Elementary school students’ distribution of correct answers before and after dental health knowledge education is shown in Table 5. To the question of “dental plaque” being the cause of gum diseases, 908(76.1%) students got the answer correct before education, and 1033(89.9%) students got the answer correct after education, which showed improvement. To the question

of “toothbrushing must be done before sleeping”, 1095(89.6%) students got the answer correct before education, and 1131(98.4%) students got the answer correct after education, which showed improvement. To the question of “fruits, milk and vegetables helping with maintaining clean teeth”, 966(79.4%) students got the answer correct before education, and 1013(88.2%) students got the answer correct after education, which showed improvement

**Table 5: Changes in Elementary School Students’ Dental Health Knowledge after Dental Health Care Education**

Question	Percent correct answer	
	Before	After
Dental caries is caused by poor brushing.	1091(89.1)	1079(93.9)
The cause of gum disease is the dental plaque.	908(76.1)	1033(89.9)
When brushing, brush your upper teeth from top to bottom and bottom teeth from bottom to top.	1121(91.8)	1075(93.6)
When brushing, the tongue should be cleaned.	1197(97.7)	1135(98.8)
Brushing should be wiped off before sleeping.	1095(89.6)	1131(98.4)
Fruit, milk, and vegetables are foods that help clean the teeth.	966(79.4)	1013(88.2)
Chocolate, sweets, candy is a food that caused great dental caries.	1177(96.1)	1127(98.1)
Tobacco is harmful to oral health.	1192(97.5)	1115(97.0)
Fluoride-containing toothpaste is effective in preventing Dental caries	1088(89.9)	1120(97.5)
Regular dental examinations have the effect of preventing Dental caries	1160(95.6)	1125(97.9)

**Satisfaction and Help after Oral Health Care Education in Elementary School:** The level of satisfaction and assistance after oral health care education for elementary school students is shown in Table 6. The satisfaction level of oral health education was the highest among 968 respondents (85.0%) and 960(84.8%) who answered “helpful” in oral health education, followed by 709(62.7%) who answered “easy” in oral health education, followed by 383(38.8%). About 880 respondents (84.9%) answered, “Helping the actual toothbrush was helpful” rather than just teaching.

Conted...

Difficulty in oral health education?	Easy	709(62.7)
	Normal	382(33.8)
	Difficult	40 (3.5)
Was it helpful to brush your teeth in person rather than just teaching?	Be helpful	880(84.9)
	Normal	140(13.5)
	It does not help	17 (1.6)

**Table 6: Satisfaction and Help after Oral Health Care Education in Elementary School**

Division	N (%)
Satisfaction of Oral Health Education?	Be satisfied 968(85.0)
	Normal 151(13.2)
	Not satisfy 20 (1.8)
Do you think oral health education helps oral health care?	Be helpful 960(84.8)
	Normal 152(13.4)
	It does not help 20 (1.8)

**Conclusion**

This study attempted to grasp the effect of education by conducting the oral care education and toothbrushing lessons, and comparing before and after results by targeting elementary school students located in Dong-borough of Busan Metropolitan City, and attempted to induce positive behavioral changes that can improve the students’ oral health care abilities through repeated education.

1. As for the general characteristics of elementary school students, 83.0% of the students responded that they have experienced education, compared

to 17.0% that haven't. 74.8% of the students responded that education is "helpful" for dental health care, and 71.7% of the students responded that it is "helpful" for dental health education usage and method.

2. Elementary school students' changes in behaviors after dental health care education are as follows. As for the method of toothbrushing, switching to the rotational method was the most frequent. Toothbrushing after lunch was 54.1%, which showed a small decrease. However, as for the duration of brushing teeth, "between 2~3 minutes" was the most frequent response with 33.1%, followed by "between 1~2 minutes" with 31.0%. This implies that more than 60% of the students are brushing teeth for an extended period of time, which shows that the students' dental hygiene behaviors are showing positive tendencies.
3. Elementary school students' distribution of correct answers before and after dental health education was compared, and in regard to dental related healthy eating habits and dental caries prevention methods, the percentage of correct answers for partial dental health knowledge questions increased.
4. The level of satisfaction with oral health education for elementary school students after oral health education and the level of help it gives oral health care were almost the same. The majority of the respondents said that brushing your teeth directly helps rather than just teaching. It is seen as a positive result of direct action.

Since 1999, Korea has set up an oral health center in an elementary school or installed and operated a toothbrushing classroom. However, in elementary schools where it is difficult to provide preventative oral health services, all elementary school students no. It is a continuous project to help improve the oral health of some school-aged children. However, various programs for different grades and oral conditions are needed. It is thought that the difference of awareness of oral health education<sup>4</sup> among the elementary school students, motivation level<sup>5</sup>, parent's interest<sup>6,7</sup>, and oral care interest of the health teacher are considered to be important variables of education effect<sup>8</sup>. Continuous repetition education, experience - oriented brushing education, and various media use should be able to reduce the dental caries that are common in school age

children. According to the comprehensive analysis of the findings of this study, providing continuous dental health education programs to elementary school students helps with maintaining the interests in dental health and increasing the percentage of correct answers for the dental health knowledge, although not significant. According to the study by Ahn<sup>3</sup>, dental health education experience of the parents positively affects the dental health of elementary school students. Also, according to precedent studies, acquisition of dental health<sup>9,10,11</sup> knowledge and changes in dental health behaviors through dental health education in guardians are the factors that affect children's knowledge, attitude and behaviors for dental health. Oral health habits formed by education on oral health in family living together do not change easily<sup>12</sup>. Many studies have reported that caregivers' oral health knowledge and oral health behaviors are factors that affect their children's knowledge, attitudes and behaviors on oral health<sup>13</sup>.

A similar study on dental examination found that parents who are worried about tooth loss often visit dental institutions in case of tooth decay<sup>14</sup>, and parents who are concerned about time lag and beauty are often reported to have high rates of use of dental institutions in cases of irregular marriages<sup>15</sup>. Oral hygiene education and prevention programs show various results according to local characteristics and are reported in many studies on the need for oral health considering locality and socio-economic characteristics<sup>16,17</sup>.

This study was limited to conducting dental health education by targeting elementary school students only, and expanding and developing programs for dental health education by including guardians are believed to be necessary. However, positive changes were observed for elementary school students' behaviors towards dental health care, and political measures that can continuously provide and maintain opportunities of dental health education to elementary school students based on practical experiences, in addition to teaching by rote, are necessary in order to positively affect the aspect of students' dental health behaviors.

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**Conflict of Interest:** The authors declare no conflict of interest.

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