



STUDY OF MIDDLE SCHOOL STUDENTS' ORAL HEALTH KNOWLEDGE AND BRUSHING BEHAVIOR CHANGE

Hye Jin Kim*

Dept. of Dental Hygiene, Dong-Eui University, Busan, 47340, Korea.

*Corresponding Author: Dr. Hye Jin Kim

Dept. of Dental Hygiene, Dong-Eui University, Busan, 47340, Korea.

Article Received on 01/08/2019

Article Revised on 21/08/2019

Article Accepted on 11/09/2019

ABSTRACT

This study is a part of the project supervised by the Education Office of D. District, B City. It conducted an oral health education activity with all the middle school students in the District, utilizing the experts in oral health education from March through June 30, 2018 and obtained the following conclusions as a result of analysis of questionnaires before and after the education. As a result of a comparison of the percentage of correct answers to the questionnaires of oral health knowledge before and after the education, overall, the subjects showed a high percentage of correct answers concerning the toothbrushing method, the problems of smoking, and the effect of fluorine on the prevention of dental caries before the education, but in the questionnaires asking the causes of oral diseases or foods that help clean teeth, they showed a relatively lower level of correct answers. However, they showed an improved rate of changes in all questions. To examine the rate of change in brushing behavior before and after oral health education for middle school students, the responses to the questionnaire asking "toothbrushing after lunch" increased by 15% after the education. Since the middle school years are a period with the high contraction of oral diseases, adding on to the elementary school years, oral health education is very necessary. Judging from the results of this study, it is necessary for students, parents, and schools to take more active home care with an interest in the oral management area, one of the areas of the students' health management, and it is suggested that in in-school activities, it is very necessary to conduct repetitive education that can promote lunchtime toothbrushing activity and individual attention.

KEYWORDS: Middle School Students, oral health knowledge, oral health behavior, toothbrushing.

1. INTRODUCTION

Today, dental caries continues to decrease in most developed countries; however, the occurrence of dental caries and periodontal diseases hardly decreases in South Korea despite it has been developed socially and economically.^[1] It is judged that this is because the country or individual does not recognize the importance of oral health and prevention. Especially, adolescence is the time when growth and change rapidly occur, the permanent dentition is completed in the oral cavity and puberty begins. In addition, it is an emotionally fairly disquiet time, every part of the mind and body shows a transitional phenomenon.^[2-3] This period, people take plenty of snacks indiscriminately due to stress about school grades, so multiple dental caries occurs, and gum diseases and periodontal diseases appear. Dental caries is a chronic disease most commonly occurring among adolescents, which may affect oral health and general health.^[4] In addition, dental caries is a pandemic disease, the main cause of tooth loss with a very high prevalence rate.^[5]

In adolescence, even if adolescents have accurate knowledge about tooth management, they may be

negligent to oral hygiene management due to the collective characteristics of school life. Also, hormone-related gum diseases, foul breath and the progress of periodontal diseases caused by reckless smoking^[6-7] or difficulty in having a regular dental examination, etc. tell the necessity of middle school oral health education.^[8] Especially, correct and continuous oral care during adolescence determines oral health in adulthood and old stage in the future, and unlike childhood when people have a high dependency on parents, it is the stage when they begin to be responsible for their oral health condition themselves, educational support is essential.^[9] The long-term oral health behaviors are likely to be habituated, and once oral health habits are formed, it is very difficult to change them; however, since oral health behaviors during adolescence, when oral health habits are not firmly formed, are very likely to be corrected, it is necessary to take a continuous interest in oral health behavior.^[10] Moreover, since it is the period when the 2nd molar erupts and sets of permanent teeth are completed to complete the lifelong sets of teeth, it is a time when their oral health behavior is very important.^[11] It is judged that preventive education through securing oral health education for middle and high students has an

effect on the prevention of periodontal diseases during adulthood.^[12]

Judging from these, since in the middle school time, permanent dentition is completed, and pubertal gum diseases and periodontal diseases begin, oral health management and oral health education are very important. Especially, since adolescents spend most of their time in school, conducting oral health education at the school can form desirable behavior and knowledge.^[13] Thus, this study would provide the basic data in presenting the directions of oral health education through a survey of students' awareness about oral health before and after oral health education in middle schools located in Busan Metropolitan City.

2. RESEARCH SUBJECT AND RESEARCH METHOD

2.1 Research subject

This study is an oral health education project affiliated with college supervised by the Education Office of D. District, Busan and conducted an oral health education activity with 500 middle school students for oral health management from March through June 30, 2018. This study explained the purpose and intention of the study to the students and got consent to conduct a survey before the education and conducted a survey with the questionnaires about oral health knowledge and brushing behavior after the education. This study was conducted only with the students who responded to both surveys before and after the education and finally chose 401 students as the subjects of analysis, excluding the questionnaires with errors. The contents of individual and collective oral health education with middle school students are as follows.

Table 1: General characteristics of study subject.

Major Category	Education topics
Individual oral health education	1. Causes and prevention of dental caries 2. Early treatment of dental caries 3. Causes and prevention of periodontal diseases 4. Proper brushing 5. Selection of auxiliary oral hygiene products
Collective oral health education	1. Oral tissue 2. Dental caries 3. Prevention of dental caries 4. Gum disease (pubertal sex) 5. Gum disease prevention 6. Malocclusion 7. Proper brushing 8. Continued oral health care (regular oral examination)

2.3 Analysis method

The results were analyzed, using the collected data, using SPSS Statistics Ver. 23. Cross-tabulations were conducted on the sex and grade of the middle school students, and frequency analysis was conducted on the education experience, the number of times, and effect. The statistical values of oral health knowledge and brushing behavior before and after oral health education were presented as frequency and rate of change. The significance level of all statistics was $p < 0.05$.

3. RESEARCH RESULTS

3.1. Grade classification according to the sex of middle school students

The grade classification according to the sex of middle school students is like Table 2. By sex, girls were 20.2% (81 persons), and boys, 79.8% (320 persons). Of the first graders, girls were 6.5% (26 persons), and boys, 16.5% (66 persons). Of the second graders, girls were 6.2% (25 persons), and boys, 29.9% (120 persons). Of the third graders, girls were 7.5% (30 persons), and boys, 33.4% (134 persons).

Table 2: Grade classification according to the sex of middle school students.

Grade	Sex		Total
	Boy	Girl	
1	66 (16.5)	26 (6.5)	92 (22.9)
2	120 (29.9)	25 (6.2)	145 (36.2)
3	134 (33.4)	30 (7.5)	164 (40.9)
Total	320 (79.8)	81 (20.2)	401 (100.0)

3.2. Experience of oral health education in middle school students

The experience of oral health education in middle school students is like Table 3. The subjects who responded that they had oral health education experience were 54.6% (219 persons), and those who responded that they did not were 45.4% (182 persons). Of the 219 persons who responded that they had oral health education experience, those who responded that they had oral health education experience once were 27.5% (60 persons); those who responded that they had the experience twice were 35.1% (77 persons); and those who responded that they had the experience three times and more were 37.4% (82 persons). The subjects who responded that the oral health education experience had an effect were 27.2% (109

persons), and those who responded that it did not were 30.2% (121 persons).

Table 3: Experience of Oral Health Education in Middle School Students.

Characteristic		N (%)
Education experience	Yes	219 (54.6)
	No	182 (45.4)
The number of times of education experience ¹⁾	Once	60 (27.5)
	Twice	77 (35.1)
	Three times	82 (37.4)
Effect of education experience	Yes	109 (27.2)
	No	121 (30.2)
	I do not know	171 (42.6)

3.3. Percentage of correct answers and the rate of change of oral health knowledge after oral health education for middle school students

The percentage of correct answers and the rate of change of oral health knowledge before and after oral health

education for middle school students are like Table 4. Of the oral health knowledge related questions, for the questionnaire, "Fruits, milk, and vegetables are foods that help clean teeth," showed a high rate of change, 17%, the percentage of correct answers before the education was 74.8% (300 persons), but it increased to 91.8% (368 persons) after that. For the questionnaire, "The cause of the gum disease is plaque," the percentage of correct answers before the education was 84.5% (339 persons), but it increased to 98.3% (394 persons) after that, and the rate of change was 13.8%. For the questionnaire, "Brushing should be done before sleeping," the percentage of correct answers before the education was 89.0% (357 persons), but it was 99.3% (398 persons), and the rate of change was 10.3%. For the questionnaire, "When brushing, the tongue must be cleaned," the percentage of correct answers before the education was 98.3% (394 persons), and it was 99.8% (400 persons), which increased by 1.5%.

Table 4: Influence to temporomandibular disorders.

Question	Percentage of correct answers		Rate of change (%)
	Before	After	
Tooth decay is caused when not a good brushing.	360 (89.8)	388 (96.8)	7
The cause of the gum disease is plaque.	339 (84.5)	394 (98.3)	13.8
When brushing, brush your upper teeth from top to bottom and bottom teeth from bottom to top.	377 (94.0)	397 (99.0)	5.0
When brushing, the tongue must be cleaned.	394 (98.3)	400 (99.8)	1.5
Brushing should be done before sleeping.	357 (89.0)	398 (99.3)	10.3
Fruits, milk, and vegetables are foods that help clean teeth.	300 (74.8)	368 (91.8)	17.0
Chocolate, sweets, and candy are foods that cause tooth decay.	385 (96.0)	397 (99.0)	3.0
Smoking is harmful to your oral health.	391 (97.5)	399 (99.5)	2.0
A fluoride-containing toothpaste is effective in preventing tooth decay.	368 (91.8)	396 (98.8)	7.0
Regular dental examinations have the effect of preventing tooth decay.	392 (97.8)	396 (98.8)	1.0

3.4. Changes in brushing behavior after oral health education for middle school students

The rate of change in brushing behavior before and after oral health education for middle school students is like Table 5. For the questionnaire, "Whether brushing after lunch," only 40.6% (163 persons) responded that they brushed teeth before the education, but 55.6% (223 persons) responded that they did after that, which

increased by 15%. For the brushing method, "vertical motion or rotation" increased by 14.8% after the education, and "bass method and other recommended usage" increased by 14.5%. For the time of brushing, "2-3 minutes" increased by 7.3% after the education, and for the frequency of brushing, "two or more times a day" increased by 6%, and "no brushing" decreased by 1.2% after that.

Table 5: Influence to temporomandibular disorders.

Oral Health Behavior		Before	After	Rate of change (%)
Whether brushing after lunch	Brushing	163 (40.6)	223 (55.6)	15.0
	No brushing	238 (59.4)	178 (44.4)	-15.0
Frequency of brushing	Two or more times a day	360 (89.8)	384 (95.8)	6.0
	Once a day	36 (9.0)	17 (4.2)	-4.8
	No brushing	5 (1.2)	-	-1.2
Frequency of time	More than 3 minutes	113 (28.2)	73 (18.2)	-10
	2-3 minutes	262 (65.3)	291 (72.6)	7.3
	Less than 1 minute	26 (6.5)	37 (9.2)	2.7
Frequency of method	Vertical motion or rotation	173 (43.1)	232 (57.9)	14.8
	Horizontal motion or blending method	179 (44.6)	62 (15.5)	-29.1
	Bath method Other recommended usage	49 (12.2)	107 (26.7)	14.5

4. CONCLUSIONS

The present school oral health service is concentrated in elementary school and insufficient for middle school, but the importance of school oral health education for oral health management during adolescence is emphasized through the preceding studies. This study would provide the baseline data for the presentation of the directions of oral health education for adolescents through a survey of middle school students' awareness about oral health before and after oral health education.

In this study, the students who had oral health education experience were 54.6%. In Kim & Nam^[14], 54.9% of elementary school students and 13.1% of middle school students had school oral health education experience, and oral health education experience after entering middle school was lower than that in elementary school. This is a result that the present middle school oral health project is not active.

Of the brushing behaviors before and after oral health education, the questionnaire, "brushing teeth after lunch" showed a high positive change, which was consistent with the result of Lee.^[15] In this study, after oral health education, there was a positive rate of change of 15%, but that was 55.6% of all, so it is judged that it is necessary to create a school environment, like operating a program for toothbrushing after lunch at school or a brushing class. There was a high percentage of correct answers generally for the brushing method and the problem of smoking in knowledge about oral health, which was significantly similar to the result of Doh^[16], and it is expected that they got such knowledge through school oral health education in elementary school or home education. And yet, they showed a relatively lower level of correct answers to the questions asking the causes of oral diseases or foods that help clean teeth, so it turned out that they lacked accurate knowledge. However, in the question asking knowledge about oral health, all the subjects who responded correctly showed a positive rate of change, so the effect of oral health education was proven. Thus, it is necessary to improve oral health education concerning information about oral health and preventive method.

As a limitation of this study, after the termination of the education, the effect of the oral health education was measured, but no follow-up assessment was conducted on whether they continuously maintain the oral health knowledge and brushing behavior learned in the education. In Kim^[17], immediately after oral health education, there were significant differences; however, considering the decrease as compared to the time immediately after the education in four weeks after that, it is judged that it is desperately necessary to conduct long-term and repetitive oral health education in order to induce the proper oral health behavior. In addition, it is possible to induce positive changes in oral health knowledge, but it does not connect to behavior change, so it is necessary to be concerned about the method of

oral health education in depth, and it is urgently necessary to provide a repetitive program with a participatory education in which students can have practice, which should be continuously implemented.

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