Effect of High School Students' Oral Health Behavior on the Subjective Oral Health

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Abstract

Objectives: Subjective oral health status is dependent on whether proper education and practice of the education. This study aims to investigate the effect of high school student entering adulthood on the subjective oral health. Methods/Statistical Analysis: It was investigated by distributing a questionnaire to high school student living in Seoul and Gyeonggi province to research the effect of high school students’ oral health behavior on the subjective oral health. The data was collected from November 15, 2011 to November 28, 2011. The data was analyzed using SPSS software Version 20.0(SPSS20.0 or Windows, SPSS Ins, USA) P-value for the test is less than 0.05, 0.01, and 0.001. Findings: The result of this study shows that gum bleeding presents negative correlation with instruction on tooth brushing (r=-.173) and practice of brushing (r=-.466) suggesting that a group which did not receive instruction and practiced the brushing presents more gum bleeding(p<0.05). Oral health activities which have influence on subjective oral health include the instruction on tooth brushing (B=0.263, t=2.621, p<0.05) and practice of brushing (B=-0.757, t=-6.788, p<0.001) and they presented statistically significant difference and explanatory power of 28.7%. In regards to number of brushing per day, twice a day (48.8%) was presented to be the highest in this study which is different from studies by³ which suggest that three times a day were the highest Improvements: The development of program was required for continuing to proper tooth brushing instruction, and it is considered the ideal oral health preventive behavior to make oral health instruction that could change the perception and attitudes of trainees by causing a practical motive.

Keywords: High School Student, Oral Health Behavior, Practice of the Education, Subjective Oral Health

1. Introduction

With the lengthening of life expectancy and improvement in quality of life followed by the advancement in medicine, we are in a world where we desire to lead healthy life up to 100 years old. An increase in attention paid to well-being supports this phenomenon. Healthy life does not signify no pain caused by no illness but health status that allow overall satisfaction in quality of life¹. Oral health is an important element to improve a quality of life together with physical health. As the relation between systemic disease and oral cavity is frequently featured not only in dissertations introducing research outcomes but also TV or newspapers which are seen by the public, the scope of interest that people have on health can be imagined. And now the maintenance of overall health including oral health has become prerequisite for healthy life. From biological perspectives, oral cavity protects body from systematic infection² and food intake through mastication is an act that not only maintains the life of human but also gives a pleasure in life. Lowered oral function followed by the loss of tooth has influence on quality of life for healthy individual as it impedes the food intake, conversation³, and acts against systematic health followed by malnutrition. As such, oral health has influence on quality of individual life either positively or negatively and oral health cannot be separated from overall health⁴. In terms of oral health, well-being refers to use of healthy tooth for
a long while and it is necessary to know the illness which causes loss of tooth in order to use health tooth for a long period of time. Representative illnesses that lead to loss of tooth are dental caries and periodontal disease. And both of them is caused by dental plaque.

Since the status of oral health depends on oral health behaviors, long use of health tooth may be available with active preventive measures for dental plaque. Education on tooth brushing and other oral health behaviors are conducted as traditional measures of oral health improvement against dental plaque. However, conducted follow-up study after 3 years of tooth brushing education with children as its subject and reported that there was improvement in oral health status of children during oral health education period but no effect upon the completion of oral health education. This study result implies the necessity for continuous education. Effective oral health education through oral health education experts can create sound oral health behaviors. There is an increase in interest upon recognition and a change in attitude and behavior upon increase in interest. What is necessary during the process of change is the motivation of trainee. Therefore, oral health education experts shall pay attention to development of custom-made oral health education method so that there is not only an increase in trainee's interest on oral health but also it leads to oral health behaviors for voluntary oral health management behaviors. Also, they shall recognize that it is role of oral health education experts to encourage trainees to voluntarily conduct effective oral health management by themselves for a lifetime.

Status of oral health depends on oral health behavior and oral health behavior is series of actions that can be accompanied the practice of interest through education and repetition. For this purpose there is a need for education all over school year from infancy to adolescence before adulthood. Although oral health activities are conducted in childhood upon active participation of parents, oral health activities of high school students in preparation for college entrance are reduced due to lack of time and stress from school work. There will be a continuous progress of dental caries among high school students due to many circumstantial factors and inattentive oral health behaviors in a period with possible periodontal disease will lead to loss of tooth. Also, an increase in snacking for stress relief has become sufficient cause to worsen oral health status. Adolescence, a stage prior to adulthood, with such traits is important period which determines oral health status that lasts to adulthood and the aged important period for not only harboring the responsibility for oral health but also receiving education on formation of sound oral health habits. However, there is a lack of prevention projects targeting high school students.

A study also reported that high school students have high recognition on oral health but insufficient regular check-up or oral health education in school for oral disease prevention. Habitual oral health activities developed through repeated education on students in adolescence, a period determining oral health status, enable healthy elderly life. Therefore, the purpose of this study is to investigate subjective oral health status and oral health activities based on general traits of high school students in adolescence who can conduct oral health management by themselves yet could become negligent to oral health management activities. Then, factors that have influence on oral health activities were located in order to develop measures to reduce such risk factors and provide basic data for oral health education.

2. Subjects and Methods

2.1 Subjects

It was investigated by distributing a questionnaire to high school student living in Seoul and Gyeonggi do province to research the effect of high school students’ oral health behavior on the subjective oral health. The data was collected from November 15, 2011 to November 28, 2011.

2.2 Statistical Analysis

The data was analyzed using SPSS software Version 20.0(SPSS20.0 or Windows, SPSS Ins, USA) P-value for the test is less than 0.05, 0.01, and 0.001.

3. Results

3.1 General Trait of Study Subject and Oral Health Status and Oral Health Activities

Table 1 includes the result of conducting frequency analysis to examine general trait, oral health status, and oral health activities of study subject.
Table 1. General trait, oral health status, and oral health activities of study subject

|                          | N  | %   |
|--------------------------|----|-----|
| **Grade**                |    |     |
| 1st grade                | 10 | 6.3 |
| 2nd grade                | 54 | 33.8|
| 3rd grade                | 96 | 60  |
| **Area**                 |    |     |
| Seoul                    | 80 | 50  |
| Gyeonggi do              | 80 | 50  |
| **Income Level**         |    |     |
| >5 mil won               | 28 | 17.5|
| 3 to 4.99 mil won        | 76 | 47.5|
| >2.99 mil won            | 56 | 35  |
| **Gum Bleeding**         |    |     |
| Yes                      | 78 | 48.8|
| No                       | 82 | 51.3|
| **Tooth Cold**           |    |     |
| Yes                      | 87 | 54.4|
| No                       | 73 | 45.6|
| **Visits to Dentist/year** |    |     |
| None                     | 58 | 36.3|
| 1 time/year              | 43 | 26.9|
| 2 times                  | 30 | 18.8|
| 3 times                  | 10 | 6.3 |
| 4 times or more          | 19 | 11.9|
| **No. of Brushing**      |    |     |
| 1 time/day               | 17 | 10.6|
| 2 times/day              | 78 | 48.8|
| 3 times/day              | 53 | 33.1|
| 4 times/day              | 9  | 5.6 |
| 5 times/day              | 3  | 1.9 |
| **Time of Brushing**     |    |     |
| Before breakfast         | 72 | 45.0|
| After breakfast          | 94 | 58.8|
| After lunch              | 56 | 35.0|
| After dinner             | 40 | 25.0|
| Before sleep             | 121| 75.6|
| **Instruction on tooth brushing** | Yes | 92 | 57.5 |

Table 2. Subjective health status based on residence

|                          | Residence | Mean | SD   | t     | Sig.     |
|--------------------------|-----------|------|------|-------|----------|
| **Gum Bleeding after brushing** | Seoul     | 1.75 | 0.436| 6.788 | ***0.000 |
|                          | Gyeonggi do | 1.28 | 0.449|       |          |
| **Tooth cold after brushing** | Seoul     | 1.49 | 0.503| 0.79  | 0.431    |
|                          | Gyeonggi do | 1.43 | 0.497|       |          |

The data were analyzed by Independent Samples Test, *p<0.05, ***p<0.001

3.2 Subjective Health Status based on Residence

As a result of conducting t-test to examine difference in subjective health status based on residence, there was a difference in gum bleeding while brushing the tooth as shown in table 2.

3.3 Oral Health Behavior in Accordance with the Residential District

T-test was used to investigate the difference of the oral health behavior in accordance with the residential district. The number of visiting dental hospitals in the past year, Practice of educated tooth brushing method showed significant differences (p<0.001) as shown in table 3.

3.4 Subjective Oral Health Status based on General Traits

As a result of conducting cross-analysis in order examine the difference in subjective oral health status based on general traits; there was significant difference in tooth-ache based on income level as shown in table 4. Moreover, there was significant difference in gum bleeding based on all of grade, residence, and income level. It was revealed that subjective oral health status of students from high...
Table 3. Oral health behavior in accordance with the residential district

| Area                        | Mean | Std. Deviation | F     | p    |
|-----------------------------|------|----------------|-------|------|
| The number of visiting dental hospital / year |      |                |       |      |
| Seoul                       | 1.7  | 1.297          | 1.249 | ***0.000 |
| Gyeonggido                  | 0.98 | 1.253          |       |      |
| Experience of tooth brushing instruction |      |                |       |      |
| Seoul                       | 1.41 | 0.495          | 0.394 | 0.751 |
| Gyeonggido                  | 1.44 | 0.499          |       |      |
| Practice of tooth brushing |      |                |       |      |
| Seoul                       | 1.41 | 0.495          | 22.439| ***0.000 |
| Gyeonggido                  | 1.77 | 0.422          |       |      |
| Duration of using toothbrush |      |                | 6.708 | 0.089 |

The date were analyzed by Independent Samples Test, ***p<0.001

Table 4. Oral health status based on general traits

| Grade | Residence | Income Level |
|-------|-----------|--------------|
|       | 1st Grade | 2nd Grade | 3rd Grade | Seoul | Gyeonggido | >5 mil won | 3 to 4.99 mil won | 2.99 mil won> |
| Tooth cold | Y 2 (2.3%) | 33 (37.9%) | 52 (59.8%) | 41 (47.1%) | 46 (53.9%) | 11 (12.6%) | 33 (37.9%) | 43 (49.4%) |
| N 8 (11.0%) | 21 (28.8%) | 44 (60.3%) | 39 (53.4%) | 34 (46.6%) | 17 (23.3%) | 43 (58.9%) | 13 (17.8%) |
| X² 5.752(0.056) | 0.630(0.526) | 17.583***(0.000) |
| Gum Bleeding | Y 6 (7.7%) | 40 (51.3%) | 32 (41%) | 20 (25.6%) | 58 (74.4%) | 3 (3.8%) | 22 (28.2%) | 53 (67.9%) |
| N 4 (4.9%) | 14 (17.1%) | 64 (78%) | 60 (73.2%) | 22 (26.8%) | 25 (30.5%) | 54 (65.9%) | 3 (3.7%) |
| X² 23.500***(0.000) | 36.123***(.000) | 75.349***(0.000) |

The date were analyzed by X², ***p<0.001

Table 5. Correlation between oral health activities and subjective oral health (Tooth cold)

|                      | Tooth cold | Instruction on tooth brushing | Practice of brushing | Normal brushing method |
|----------------------|------------|-------------------------------|----------------------|------------------------|
| Tooth cold           | 1          |                               |                      |                        |
| Instruction on tooth brushing | -0.254*      |                               |                      |                        |
| Practice of brushing | -0.303*     | 0.697*                        |                      |                        |
| Normal brushing method | -0.082     | 0.488*                        | 0.637**              |                        |

The date were analyzed by X², **p<0.01
income family, upper class, and Seoul was better compared to others (p<0.001).

### 3.5 Correlation between Oral Health Activities and Subjective Oral Health

As a result of analyzing the correlation between oral health activities and subjective oral health, negative correlation was presented for toothache from r=-0.254 to r=-0.303 and negative correlation was also exhibited for gum bleeding from r=-0.173 to r=-0.466 as shown in table 5. It suggests that subjective oral health status can be changed with instruction on tooth brushing and practice of brushing (p<0.001) as shown in table 6.

### 3.6 Oral Health Behaviors affecting Subjective Oral Health

To investigate oral health behavior affecting subjective oral health status (gingival bleeding) as independent variable. As a result, the multicollinearity among variables was no problem to analyze appeared the all tolerance limits was over 0.1 as shown in table 7. It was confirmed that suitable regression model through Durbin-Watson value appeared 1.706 approaching 2. The result of analysis of the oral health behavior presented tooth brushing instruction (B=0.263, t=2.621, p<0.05) and practice of tooth brushing (B=-0.757, t=-6.788, p<0.001). Practicing educated tooth brushing was investigated stronger impact to subjective oral health than experience of tooth brushing and it showed power of 26.4%.

### 4. Conclusion

Dental treatment is not just management of oral health anymore but preventive oral health management.

Nowadays, not only treatment but also prevention falls under scope of national health insurance. Moreover, the management on oral health of citizens is conducted as well. 2016 is the year in which government has legally designated the day of oral health and it suggests that oral health has become integral part of our lives.

Table 6. Correlation between oral health activities and subjective oral health (Gum bleeding)

|                          | Gum bleeding | Instruction on tooth brushing | Practice of brushing | Normal brushing method |
|--------------------------|--------------|-------------------------------|----------------------|------------------------|
| Gum bleeding             | 1            |                               |                      |                        |
| Instruction on tooth brushing | -0.173”     | 1                             |                      |                        |
| Practice of brushing     | -0.466”      | 0.697”                        | 1                    |                        |
| Normal brushing method   | -0.226”      | 0.488”                        | 0.637”               | 1                      |

The date were analyzed by $X^2$, *p<0.05, **p<0.01

Table 7. Oral health behavior affecting subjective oral health

| Dependent Variable | B   | SE   | β    | t         | p     |
|-------------------|-----|------|------|-----------|-------|
| Constant          | 2.419 | 0.173 | 14.008 | 0.000    |
| The number of visiting dental hospital/year | -0.009 | 0.027 | -0.024 | -0.341 | 0.734 |
| Experience of Tooth brushing instruction | 0.236 | 0.100 | 0.259 | 2.621 | **0.010 |
| Practice of tooth brushing | -0.757 | 0.112 | -0.744 | -6.788 | ***0.000 |
| Duration of using toothbrush | -0.118 | 0.064 | -0.132 | -1.852 | 0.066 |

R=0.536, R$^2$=0.287, modified R$^2$=0.264, F=18.937, p=.000, Dublin-watson=1.706
A study by\textsuperscript{5} reported that there was increase in interest, subjective health status, oral recognition, and oral practices through repeated and direct tooth brushing education. In a study by\textsuperscript{12} conducted with upper classmen of elementary school as its subject, it was revealed that one-time tooth brushing education is of no practical assistance in lasting improvement in oral environment and only through repeated individual education there was improvement in tooth brushing performance of trainees. In\textsuperscript{12} suggested that there is a correlation among knowledge, attitude, and behaviors of children on oral health and thus students shall be encouraged through repeated education to enable lasting tooth management habits for lifetime oral health not just education with focus on simple knowledge transfer. Recognition and habitual practice of oral health knowledge is available through oral health education\textsuperscript{14} and it shall change the attitude of trainee toward oral health and make habit of effective oral health management for a lifetime. Therefore, for preventive oral health management, not short-term and one time method but management for each life cycle shall be performed continuously.

Gum disease is a severe oral disease which brings about pain developed from curable gingivitis to incurable periodontitis. Sound oral health can be maintained only when there is awareness on necessity for correct brushing method and regular preventive management before adulthood. Habit of accurate oral health activities becomes a foundation on which we can lead healthy life.

The result of this study shows that gum bleeding presents negative correlation with instruction on tooth brushing ($r=-.173$) and practice of brushing ($r=-.466$) suggesting that a group which did not receive instruction and practiced the brushing presents more gum bleeding ($p<0.05$). It is similar with the result of study by\textsuperscript{13} which revealed a positive correlation between awareness on subjective oral health status and oral health activities. Oral health activities which have influence on subjective oral health include the instruction on tooth brushing ($B=0.263$, $t=2.621$, $p<0.05$) and practice of brushing ($B=-0.757$, $t=-6.788$, $p<0.001$) and they presented statistically significant difference and explanatory power of 28.7%. The result is similar with a study by\textsuperscript{16} which reported that there was a significant difference in oral health activities based on oral health education. The result was also similar with study by\textsuperscript{17} which revealed that group with oral health education presented higher practice of oral health activities compared to the group without education. A study by\textsuperscript{12} also presents similar result. There was significant difference in recognition on oral health behavior and practice based on interest in oral health and there also was significant correlation between oral health status, interest in oral health, recognition on oral health and oral health practices. In regards to number of brushing per day, twice a day (48.8%) was presented to be the highest in this study which is different from studies by\textsuperscript{2} and\textsuperscript{12} which suggest that three times a day were the highest.

Recognition does not automatically and immediately lead to practice. Therefore, it is difficult to achieve behavioral goal with one-time education\textsuperscript{12}. Oral health status of individual can differ according to so many variables including acquisition of correct tooth brushing method, education path, motivation toward individual education, interest in tooth brushing, recognition of importance, etc\textsuperscript{28}. Among motivational methods, it is reported that recognition that one's oral health status is great alone can become a motivation for health improvement behaviors\textsuperscript{12}. Ultimate goal of oral health education shall be habitual oral health activities through maintenance of interest on oral health and motivation for oral health behaviors of individual not through group education but by repeated individual education.

Accordingly, this paper examines the relation amongst gum bleeding and toothache symptoms that can be caused by gingivitis together with subjective oral health status and oral health activities with high school students in adolescence with possible gingivitis and periodontitis development as its subject. As a result, it was revealed that instruction on accurate tooth brushing and practice of instructed brushing have influence on subjective oral health status. Furthermore, there is a necessity to develop a program for maintenance of instruction on accurate tooth brushing and I believe that most ideal oral health preventive measure is to promote habit of accurate oral health activities through change in awareness and attitude by devising an education method to induce motivation for practice.

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