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# The Influence of Oral Health Status and Causes of Dental Caries on the OHQoL of University Students

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***Abstract***

*The study was performed between March and June 2013 using students currently enrolled in a comprehensive dental hygiene care course. They were informed of the purpose of the study, underwent an oral cavity examination, and completed the self-administered questionnaire. The study produced the following results. To conclude, the oral health-related quality of life of university students is shown to be related to oral-health satisfaction and agreed with the objective oral health indices. Such results may have a positive influence on middle- and long-term oral care. It is necessary to increase the number of university students who benefit from the promotion of oral-health maintenance and periodic dental-hygiene care programs. Regarding oral-health related quality of life, pain, psychological discomfort, and social defects and impairment areas, students also had a tendency to score high marks. All these variables presented a significant difference between sexes. Concerning the state of oral environments, the causes of caries, and the level of oral-health satisfaction that affects the oral health-related quality of life, oral health satisfaction and intake of sugar-containing foods demonstrated a significant influence*

***Keywords:*** *Dental caries, OHIP-14, Oral health status, OHQoL*

## 1. Introduction

The increase of life expectancy in Korea (from 73.9 years for males and 80.8 years for females in 2003[1], to 77.8 years for males and 84.7 years for females in 2013[2]) has led to increased interest in health. The interest is not only in physical health, but also in the improvement of quality of life by pursuing life satisfaction and happiness. If diseases [3] of the oral cavity occur once, it is impossible to recover to the original state. Diseases of oral cavity are non-reversible, and continue as chronic diseases. Therefore, systematic preventive care is a priority. According to a 2006 study [4], the prevalence of periodontal diseases is 27.7% among 15–19 year olds, and 56.8% among 35–44 year olds. The prevalence of periodontal diseases increases after adolescence, and rapidly increases after the age of 35. According to the 2008 study [5] by the Ministry of Health and Welfare, of the 59.6% of people aged over 65 who complain of chewing discomfort, many experience a decrease in the quality of life due to loss of teeth. Because oral health problems are chronic, studies of the oral health-related quality of life have been performed primarily with elderly subjects or adolescent subjects, as adolescence is the period when health-related habits are formed. However, an insufficient number of studies use university students as subjects. University students are typically free from the controlled life environment of adolescence, and widening the scopes of their life experience. This leads to various changes in health-related habits, and lifestyle habits. Therefore, student life is an important period, as practicing the correct oral-health habits and maintaining a healthy oral cavity can help maintain and enhance oral health for the lifetime. Accordingly, this study analyzes how the oral-cavity environment and causes

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of dental caries influence the oral health-related quality of life of university students. Additionally, it offers the baseline data that contributes to medium– and long–term oral care.

## 2. Subjects and Method

### 2.1. Subjects

This study was performed between March and June 2013. The subjects of this study were 303 students currently enrolled in comprehensive dental hygiene care course at a university in Busan Metropolitan City, South Korea. The purpose of the study was explained to the subjects, and they underwent an oral cavity examination and completed the self-administered questionnaire. Data that contained mistakes were excluded, and 299 subjects were included in the final analysis.

### 2.2. Methods

**Oral Health Status**

(1) DMFT rate (decayed, missing, filled teeth): DMFT rate (the number of teeth affected by caries) for every subject.
(2) O'Leary index: Oral hygiene inspection index that determines the presence of plaque, based on the presence of staining after coloring the teeth surface. A lower index indicated poor oral hygiene status.
(3) OHI-S (Oral hygiene index-simplified): Represents the amount of deposit on the tooth surface (food residue and tartar) and was used to measure individual oral hygiene status.
(4) Cervical Abrasion and Hypersensitivity
(5) Unstimulated salivary flow rate: Salivary flow rate (ml) was measured for 5 minutes in the resting state (non-stimulated).

**Causes of Dental Caries**

(1) Caries activity time: The total number of cariogenic products consumed in 5 days × 20
(2) Number of snack intake
(3) Intake number of sugar-containing foods
(4) Intake number of carbonated beverages
(5) Oral Health Behavior Index (OHB)[6] : HB1(the frequency of teeth brushing), HB2(the point of teeth brushing), HB3(the intensity of teeth brushing), HB4(the time of teeth brushing), HB5(the way of using the toothbrush), HB6(using fluoride toothpaste), HB7(cleaning between the teeth), HB8(cleaning the tongue). The maximum number of points is 17.

**Table 1. Oral Health Status and Caries Occurrence Factors**

| Variables[1)] | Mean±SD | Variables[2)] | Mean±SD |
|---|---|---|---|
| S-OHI | 1.65±0.96 | Caries activity time | 222.68±186.79 |
| O'Leary index | 30.53±18.65 | Number of snack intake | 1.40±0.90 |
| DMFT | 34.88±15.74 | Intake number of sugar-containing food | 1.68±1.20 |
| Hypersensitivity teeth | 1.91±3.62 | Intake number of carbonated beverages | 1.18±1.22 |
| Salivary flow rate | 1.33±0.19 | Oral Health Behavior | 11.30±1.97 |

[1,2)] N=299

 

**Oral Health-Related Quality of Life (OHQoL)**

Oral Health Impact Profile(OHIP) developed by Slade & Spencer(1994)[7] is an instrument that is based on Locker's theoretical model of oral health. The contracted form of OHIP-14 was based on the work of Kim[8]. All 14 items of OHIP-14 were classified by the following seven subordinate factors: functional limitations, psychological anxiety, physical defects, social defects, and impaired areas. The 14 items were measured by the Likert 5-point scale, and a higher score meant lower oral health-related quality of life. The Cronbach's alpha in this study was 0.878.

### 2.3. Statistical Analysis

The analysis of collected data was performed using SPSS ver. 20, with the significance level of 0.05. The average values related to oral cavity environment status, causes of dental caries, and OHIP-14 of each item were presented. Then, t-test and ANOVA were performed for oral cavity environment status, causes of dental caries, and OHIP-14 depending on sex and oral-health satisfaction. The multiple regression analysis was performed on factors that influence oral health-related quality of life.

## 3. Results

### 3.1. Oral Health Status Depending on Sex and Oral-Health Satisfaction

According to the analysis of oral health status in terms of sex, males have a higher S-OHI (at 1.88) compared to females (at 1.42) ($p<.000$). Considering the causes of dental caries, the intake of sugar-containing foods was higher in females (at 1.84), compared to males (at 1.50) ($p<.05$); intake of carbonated beverages was higher in males (at 1.45), compared to females (at 0.91) ($p<.05$). For oral health satisfaction, DMFT was “satisfactory” (40.02), rather than “dissatisfactory” (27.61), or “ordinary” (33.83) ($p<.000$). Snack intake was “satisfactory” (1.59), rather than “dissatisfactory” (1.35) ($p<.05$). Intake of sugar-containing foods was “satisfactory” (1.97) rather than “dissatisfactory” (1.42) ($p< .01$).

### 3.2. Oral Health-Related Quality of Life Depending on Sex and Oral-Health Satisfaction

According to the analysis of oral health-related quality of life, depending on sex, females had higher psychological discomfort (1.89) than males (1.67) ($p<.05$). Pain depending on oral-health satisfaction had higher marks for “satisfaction” (1.98) than “dissatisfaction” (1.64) ($p<.000$). Psychological discomfort was the highest in case of “satisfaction” (2.13), compared to “dissatisfaction” (1.59) ($p< .000$). Psychological area was higher in case of “satisfaction” (2.01) than “dissatisfaction” (1.71) ($p<.05$), and social disability scored the highest for “satisfaction” (1.93), compared to “dissatisfaction” (1.70) ($p< .05$).

### 3.3. The Relation between Oral Health-Related Quality of Life and Oral Health Status and Causes of Dental Caries

According to the analysis of the mutual correlation between the variables of study subjects, S-OHI had mutual correlation with functional limitation ($p=.039$), and pain ($p=.043$); snack intake had mutual correlation with pain ($p=.015$), psychological discomfort ($p=.006$), and handicap ($p=.033$); and intake of sugar-containing foods had mutual correlation with pain ($p=.001$), psychological discomfort ($p=.005$), physical disability($p=.019$), and social disability ($p=.025$). Oral health satisfaction had mutual correlation with pain ($p=.000$), psychological discomfort ($p=.000$), psychological ($p=.013$), social disability ($p=.017$), handicap ($p=.042$).

**Table 2. Oral Health Relater Quality of Life (OHIP-14) Factor**

| Variables | B | SE | β | T | P |
|---|---|---|---|---|---|
| Constant | 1.717 | .311 | | 5.521 | .000 |
| Oral Health Satisfaction | .106 | .043 | .151 | 2.453 | .015 |
| S-OHI | .038 | .034 | .071 | 1.099 | .273 |
| O'Leary | -.002 | .002 | -.062 | -.960 | .338 |
| DMFT | -.002 | .002 | -.053 | -.864 | .388 |
| Hypersensitivity teeth | .014 | .008 | .098 | 1.669 | .096 |
| Salivary flow rate | -.074 | .154 | -.028 | -.484 | .629 |
| Caries activity time | .000 | .000 | -.057 | -.982 | .327 |
| Number of snack intake | .040 | .036 | .071 | 1.099 | .273 |
| Intake number of sugar-containing food | .063 | .028 | .150 | 2.294 | .023 |
| Intake number of carbonated beverages | -.024 | .026 | -.058 | -.938 | .349 |
| Oral Health Behavior | -.022 | .016 | -.086 | -1.429 | .154 |
| Durbin-Watson = 2.117 adj. $R^2$ =.056 F=2.605 P=.004 | | | | | |

* p<.05

### 3.4. The Relation between Oral Health-Related Quality of Life and Oral Health Status and Causes of Dental Caries

The multiple regression analysis was performed to identify the influence of oral cavity environment status, causes of dental caries, and oral health satisfaction on oral health-related quality of life. The results of the analysis were verified as adapted to the regression model obtained using multicolllinearity and autocorrelation(Durbin-Watson). According to the analysis of factors that influence oral health-related quality of life, oral health satisfaction ($p < .05$) and intake of sugar-containing foods ($p < .05$) were shown to have significant influence, with the explanation power of .056.

## 4. Discussion

With the increase of the average life expectancy, the interest in health has grown, and this has led to the increased interest in quality of life. Quality of life [9] places more emphasis on subjective measurements, such as individual satisfaction, rather than objective measurements such as physical conditions. Health-related quality of life is estimated through personal psychological satisfaction, rather than through the results of objective indices. Health [10] is one of the conditions for happiness, and although oral health is a necessary component of a healthy life, poor oral health is not life threatening. Therefore, the interest in oral health is lower, compared to bodily health, and people may neglect oral care.

University students [11, 12] are in a period that offers indices to comprehensively evaluate the oral health treatment they have received up to adolescence, and at the same time offers baseline data estimating the level of diseases that need to be treated in adulthood. Therefore, this study aims to analyze the influence of the oral cavity environment, and the causes of dental caries on the university students' oral health-related quality of life, and offer baseline data that contributes to continuous oral care in university students. According to the results of this study, oral health status depending on sex in S-OHI was found to be higher for males

 

(1.88) than females (1.42) (p<.000). Lee et al [13], the plaque index in university students was reported to be higher in males compared to females, and the oral health status of male students was worse, which is consistent with the results of this study. As to the causes of caries depending on sex, the intake of sugar-containing food was higher in females (1.84) than males (1.50) (p<.05). Regarding oral health-related quality of life, females demonstrated a tendency toward higher psychological anxiety, with females scoring 1.89, and males scoring 1.67 (p < .05). This may be explained by the fact that many students consume sweet foods as a method of decreasing stress related to employment and specialization-related study courses. Oliver et al [14] mentioned that, in stressful states, people choose sweet foods more often and according to Cheon [15], the fact that daily stress leads to higher numbers in females rather than in males, proves there are habitual lifestyle differences between males and females. Additionally, Jo et al [16] demonstrated that, when experiencing high levels of stress, students most often choose to consume spicy and sweet food, and female students prefer sweet food. Such results are consistent with the fact that, even without stress factors, the consumption level of sweet foods is higher for female students. The intake of carbonated beverages was higher in males (1.45 times) compared to females (0.91 times) (p< .05). According to Park et al [17], the group that consumed more than 3 carbonated drinks a day for 3–5 days a week, consisted of more males than females, which is consistent with the results of the present study.

Those who replied "satisfied" to DMFT rate and the intake of snacks in oral health status, as well as for oral health satisfaction in the intake of sugar-containing food, had higher marks. Those who reported to be "satisfied" about oral health in the areas of psychological discomfort, pain, physical defects, and social defects of oral health-related quality of life demonstrated a tendency toward higher marks. In this study, using university students as a sample, the relation between oral health-related quality of life and oral-health status, as well as the causes of dental caries were investigated. Several areas demonstrated significant differences. The valuable result was identifying that the tendency of oral health-related quality of life decreased with the increase of factors such as intake of sugar-containing foods and oral-health satisfaction. It is also suggested that factors such as stress experienced by university students and being female are highly related to the intake of sugar-containing foods.

This result may be explained by the fact that the higher the level of self-satisfaction, the lower the understanding of the need to establish healthy oral habits, which leads to poor oral-health status, and further influences oral health-related quality of life. University students, unlike people older adults, do not experience a decline in quality of life due to decreased oral function resulting from oral diseases. Therefore, it may be difficult for them to understand that incorrect oral-care habits may decrease oral health. During this period, the appropriate education and continuous practice of oral care may be useful for promoting the correct oral-health habits, and long-term oral-health maintenance.

## 5. Conclusion

This study investigates the influence of oral health status and causes of dental caries on the oral health-related quality of life of university students. It offers baseline data that can contribute to continuous oral-health promotion. The study was performed between March and June 2013 using students currently enrolled in a comprehensive dental hygiene care course.

The study produced the following results. There were significantly higher results for males over females in OHI-S and females over males in the intake of sugar-containing foods and carbonated drinks. There was a tendency for higher DMFT rate, snack intake, and intake of

sugar-containing foods to be observed in those who positively replied "satisfied" about oral health.

The mutual relation between the variables showed the connection between the OHI-S and functional limitations and pain; the intake of snacks and sugar-containing foods and pain and psychological discomfort; and the level of oral-health satisfaction and areas of pain, psychological discomfort, social defects, impairment, and discomfort. Concerning the state of oral environments, the causes of caries, and the level of oral-health satisfaction that affects the oral health-related quality of life, oral health satisfaction and intake of sugar-containing foods demonstrated a significant influence.

Characteristics such as entering adulthood and reversible change are potential factors that may influence oral health, and should not be overlooked. It is necessary to increase the number of university students who benefit from the promotion of oral-health maintenance and periodic dental-hygiene care programs.

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