

## **A STUDY ON THE EFFECT OF UNIVERSITY STUDENTS' ORAL HEALTH BEHAVIOR AND KNOWLEDGE ON THEIR VERBAL ORAL HEALTH LITERACY**

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### **ABSTRACT**

Oral health literacy is related to the understanding of oral health information and the obstacles to the use of preventive service. Oral health behavior included eight questions tooth-brushing method, scaling, frequency of eating sweet foods, tongue cleaning, use of oral hygiene products, tooth-brushing behavior before going to sleep and dental treatment behavior. Oral health knowledge and behavior were accordance with verbal oral health literacy score distribution. The level of oral health knowledge and behavior of university students is relevant to their oral health literacy. Individuals with low verbal oral health literacy fail to accurately understand information related to oral health and hinder the improvement of individual oral health conditions. Thus, in order to carry out mid to long term oral health management, it is imperative to establish an oral health program for improving the verbal oral health literacy of university students.

**Keywords:** Oral health literacy.

### **INTRODUCTION**

Contemporary society has an increasing interest in health compared to the past as a result of an extended average lifespan and economic growth. The interest in health is an attempt to improve health by finding various methods to not only manage disease but also to prevent it. In particular, the mouth is an important organ for the health of the whole body and interest in oral health has increased for the purpose of healthy living.

People are able to easily obtain information on oral health through various routes. But most of the information on oral health consists of professional terms. Thus, common people may have difficulty in accurately understanding them and adequately applying them to their health behavior. Hence, the general public is increasingly interested in oral health literacy, which is defined as the degree of ability by an individual to acquire process and understand basic oral health information and services necessary to make correct health-related decisions (Lee et al., 2015). Oral health literacy is related to the understanding of oral health information and the obstacles to the use of preventive service, and is known as an important factor that enables patients to carry out behavior that most benefit themselves during dental treatment (U.S. Department of Health and Human Services, 2000). However, man preceding studies report that the level of oral health literacy, which is necessary to understand oral health information and to utilize it, is low. Ju et al. (2012) report that 29.1% of adults have low verbal oral health literacy. Also, 60.4% of adults that visit dentists for treatment displayed a low level of oral health literacy, and 29% of adults who wanted to receive dental treatment were reported as at a level of being obstructed in terms of understanding and using oral health information (D'Cruz and Shankar Aradhya, 2013). Jones et al. (2007) reported that patients with low oral health literacy had a low level of dental knowledge, little experience in dental treatment, and bad subjective health. Lee et al. (2003) reported in their research that the literacy level of

understanding basic information like instructions on prescriptions was 34% in Korea, the lowest among OECD nations. 18.25% of outpatients visiting university hospitals reported obstructions in understanding in using health information, and 24.5% among them stated the possibility of failing to partially understand health information (Kim, 2011). Furthermore, many adults with a low level of literacy did not acknowledge the various difficulties resulting from their low literacy and were reluctant to ask for help (Parikh et al., 1996). In consideration of such research results, it is necessary to find out literacy levels and to make improvements so that individuals may properly receive the necessary medical services.

The emphasis on the importance of oral health literacy has brought about the development of tools for rectifying the general public's understanding of health information. A typical tool is the oral health literacy measurement tool, REALM (Rapid Estimate of Adult Literacy in Medicine) and the functional health literacy measurement tool (Test of Functional Health Literacy in Dentistry) (Davis et al., 1991; Gont et al., 2007). REALM in particular is a toll for measuring verbal health information comprehension, and is widely used to ascertain the degree of understanding medical terms. With the increased interest in oral health, oral health literacy has been recognized as an extremely important factor for oral health, but relevant studies are still scarce. Therefore, the present study investigates the verbal oral health literacy levels of university students and the relevant factors by using REALM, and based on the results, aims at being used as basic data necessary in the development of an efficient oral health education program.

## **METHODOLOGY**

### **Research Subjects**

The study surveyed 410 university students at Gyeongsangbuk-do during June 22-26, 2015. A preliminary inquiry was conducted on 20 university students during June 15-16, 2015, with the survey being implemented after modifications and supplementations to the survey by Ju et al. (2012). The collected data involved self-administered surveys, which were immediately retrieved, and the data from 398 subjects, excluding twelve surveys with errors, were used in the final analysis.

### **Research Methodology**

The present study examined general characteristics including gender, age, and department for classification. Oral health knowledge consisted of ten questions including cause of dental caries, number of permanent teeth, flossing, bad breath, fluorine, the relationship between oral and systemic diseases, periodontal diseases, food, metastasis of dental caries, and genetic factors. Oral health behavior included eight questions tooth-brushing method, scaling, frequency of eating sweet foods, tongue cleaning, use of oral hygiene products, tooth-brushing behavior before going to sleep and dental treatment behavior. The survey for verbal oral health literacy was drawn up, based on the research by Ju et al. (2012), and included 66 questions related to dentistry terms, medical terms, dental structure, dental material, and oral hygiene products.

### **Analysis Methodology**

The data retrieved underwent statistical analysis using SPSS 18.0. The general characteristics and oral health literacy of the subjects were converted into percentages through frequency analysis. Oral health knowledge and oral health behavior, in accordance with verbal oral

health literacy, underwent ANOVA, while verbal oral health literacy, oral health knowledge, and oral health behavior, in accordance with general characteristics, underwent T-testing. The analysis of factors affecting verbal oral health literacy underwent regression analysis, and the level of significance for determining statistical significance was set at 0.05.

## RESULTS

### The General Characteristics of Subjects

An examination of the general characteristics of the subjects shows that 53.5% were male and 46.5% were female. 37.7% of subjects were under the age of 19, and 62.3% were twenty or older. In terms of their department, 49.2% were health related majors, while 50.8% were non-health related majors.

### Subjects' Comprehension of Oral Health-related Terminology

The degree of literacy for oral health related terms shows that subjects responded with 'know well' to terms like 'toothbrush (97.5), dentures (95.7), gum (95.7), sugar (95.2), and molars (95.2), while responses were low for terms like hypoplasia (9.3), cavity (12.1), eruption (13.3), fistula (14.1), and apicoectomy (14.3). Based on the REALM standard, in terms of the score distribution of verbal oral health literacy, 53.5% scored between levels 4-6, 40.2% scored between levels 7-8, 3.8% scored level 9 or higher, and 2.5% scored between levels 0-3, indicating literacy levels equivalent to elementary school student grades 4-6 as the most common.

### Oral Health Knowledge and Behavior in accordance with the Distribution of Verbal Oral Health Literacy Scores

The distribution of verbal oral health literacy scores, based on REALM, revealed oral health knowledge at 8.00 for those in the 61-66 range, 7.43 for those in the 45-60 range, and 7.04 for those in the 19-44 range, indicating a high level of oral health knowledge when score distributions are higher, which makes the results statistically significant ( $p < .001$ ). Oral health behavior was 32.33 in the 61-66 range, 28.11 in the 45-60 range, and 26.25 in the 19-44 range, indicating a higher level of oral health behavior when the score distribution was higher.

**Table 1.** Verbal oral health literacy scores oral health and oral health knowledge, behavior classified

Division	N	Oral Health Knowledge	F(p)	Oral Health Behavior	F(p)
1~18(0-3ratings)	10	6.70±1.77	6.710 (.001 <sup>***</sup> )	22.40±7.07 <sup>a</sup>	13.642 (.001 <sup>***</sup> )
19~44(4-6ratings)	212	7.04±1.45 <sup>a</sup>		26.25±5.02	
45~60(7-8ratings)	159	7.43±1.42 <sup>b</sup>		28.11±4.46 <sup>b</sup>	
61~66(9ratings)	15	8.00±1.41 <sup>c</sup>		32.33±3.54 <sup>c</sup>	
Total	396	7.30±1.47		27.13±5.03	

\*\*\*  $p < 0.001$ .

### Verbal Oral Health Literacy, Knowledge and Behavior in accordance with the General Characteristics of the Subjects

Analysis of verbal oral health literacy, knowledge and behavior in accordance with the general characteristics of the subjects shows that those under 19 had a literacy of 39.94, while those 20 or older had a literacy of 43.78, indicating a statistically significant difference with a slightly higher score for the latter group. In terms of department, health majors scored 43.58 in literacy, while non-health majors scored 41.13, which reveals statistically significant result with the slightly higher score for health majors.

**Table 2.** Verbal oral health literacy scores oral health and oral health knowledge, behavior classified in accordance with the distribution

Division	N	Oral Health Literacy	Oral Knowledge	Health	Oral Behavior	Health
Sex						
Male	213	42.84±12.13	7.31±1.49		27.26±4.90	
Female	185	41.76± 8.47	7.29±1.46		26.98±5.19	
<i>t (p)</i>		1.013(.312)	.151(.880)		.551(.582)	
Age						
>19 years	150	39.94±10.52	7.22±1.40		26.87±5.52	
20 years≤	248	43.78±10.38	7.36±1.52		27.28±4.72	
<i>t (p)</i>		3.557(.001 <sup>***</sup> )	-.878(.380)		-.759(.448)	
Based classification						
health majors	196	43.58±11.81	7.34±1.54		27.57±4.47	
non-health majors	202	41.13± 9.11	7.27±1.41		26.71±5.50	
<i>t (p)</i>		2.319(.021 <sup>*</sup> )	.436(.663)		1.714(.087)	

\*\*\*  $p < 0.001$

### Factors affecting Verbal Oral Health Literacy

Regression analysis on verbal oral health literacy revealed that age, oral health knowledge, and oral health behavior were factors related to verbal oral health literacy, and that an older age and a higher level of oral health knowledge and behavior were accompanied by a higher level of verbal oral health literacy.

**Table 3.** Influence of oral health literacy on the oral health and oral health knowledge, behavior

Categories	B	SE	$\beta$	t	p
Constant	16.934	4.493	-	3.769	.001 <sup>***</sup>
Based classification	-1.729	.995	-.082	-1.738	.074
Age	3.452	1.036	.158	3.332	.001 <sup>***</sup>
Sex	-.461	1.005	-.022	-.459	.646
Oral health knowledge	1.433	.339	.200	4.228	.001 <sup>***</sup>
Oral health behavior	.465	.100	.222	4.668	.001 <sup>***</sup>
Functional literacy	.779	.508	.074	1.573	.117

$\hat{1}R^2=.246$  adj.  $R^2=.135$ .  $F=13.319$ .  $p=.001$ \* $p < 0.05$ , \*\*\*  $p < 0.001$ 

## DISCUSSION

University students are stressed from factors like an unstable future, unemployment, academic stress, the burden of tuition, and identifying a career (Kim and Park, 2012), and under the name of adulthood and the freedom of university, are being neglected. As a result, they are uninterested in health and careless toward oral health. Although much research on literacy in terms of health and medical information is currently being conducted by the medical world, studies on the oral health literacy of university students is nonexistent. Therefore, studies on literacy are necessary to improve university students' understanding of their oral health diseases and to improve their oral health education. The present study attempted to find out the relationship between the oral health literacy of university students on the one side and their oral health knowledge and behavior on the other side.

The general characteristics of subjects shows that 53.5% were male, and 46.5% were female, while 37.7% were under 19 and 62.3% were 20 or older. In terms of academic department, 49.2% were health majors, while 50.8% were non-health majors. The degree of literacy for oral health related terms shows that subjects responded with 'know well' to terms like 'toothbrush (97.5), dentures (95.7), gum (95.7), sugar (95.2), and molars (95.2), while responses were low for terms like hypoplasia (9.3), cavity (12.1), eruption (13.3), fistula (14.1), and apicoectomy (14.3). This is similar to the research results of Ju et al. (2012), with a high level of verbal oral health literacy toward terms and oral hygiene products used in everyday life and low toward technical terms used in dentistry. When dental hygienists conduct oral health education or explain oral diseases, they should explain technical terms used in dentistry in a simpler fashion or create various types of material for the same educational information in order to conduct an efficient education and to increase understanding toward oral health. 80.2% of subjects responded that they knew about fluorine in the present study, but in the research of Yoon et al. (2015), only 23.1% of male students and 46.0% of females students affirmed to have received education on fluorine, which necessitates additional research in the future. Based on the REALM standard (Ju et al., 2012), verbal oral health literacy scores in the 0-44 range were deemed lacking or low, those in the 45-60 range were deemed to be on the boundary, and those in the 61-66 range were deemed to be sufficient. In the present study, 53.5% scored in the 19-44 (elementary school grades 4-6) range, 40.2% scored in the 45-60 (upwards of middle school grade 3) range, 3.8% scored in the 61-66 range, and 2.5% scored in the 1-18 range. In the research of Ju et al. (2012), 29.1% were in the score range of under 44 (below elementary school grade 6), which is considered a low level of verbal oral health literacy, and 35% in the research by Kim et al. (2005), whereas in the current study, it was 56%, despite the fact that the age of subjects were the youngest. Thus, it is necessary to strengthen the oral health education of university students and to establish periodical oral examinations.

Analysis on oral health literacy, knowledge, and behavior in accordance with the general characteristics of the subjects shows no significant difference in regards to gender, but a statistically significant difference was revealed in terms of gender, with subjects under 18 scoring 39.94 in literacy and subjects 20 and older scoring at a slight increase of 43.78 ( $p < .001$ ). Verbal oral health literacy in the research of Ju et al. (2012), and medical information literacy in the research of Lee (2008) were both lower when the ages of the subjects were

higher, but it seems that literacy appeared when the age is older in the present study, because subjects were restricted to university students. In terms of department, health majors scored 43.58 in literacy, while non-health majors scored a slightly lower 41.13, which seems to be the result of medical terms like 'sterilization', 'infection', 'injury', and 'congestion' included in the survey. The factors related to verbal oral health literacy were age, oral health knowledge, and oral health behavior, and literacy was higher when age, oral health knowledge and oral health behavior were higher. In the medical information literacy research of Lee (2008), literacy was higher when the level of high blood pressure and diabetes knowledge was higher. Also, in the research of Kim et al. (2010), students taking oral health education displayed higher levels of oral health knowledge and behavior, so the improvement of a periodic oral health education is deemed necessary to increase the oral health literacy of university students.

## CONCLUSIONS

The present study surveyed 398 health major and non-health major students at a university located in Korea during June 22-25, 2015. The conclusions were obtained the following the relationships between the verbal oral health literacy of university students on the one side and their oral health knowledge and behavior on the other side.

1. In terms of general characteristics, 53.5% of subjects were male and 46.5% were female; 37.7% was under age 19 and 62.3% was twenty or older. In terms of department, health majors were shown 49.2% while non-health majors were 50.8%.
2. Based on REALM, 53.5% of subjects were at levels of 4-6 (elementary school grades 4-6) in terms of literacy score distribution.
3. Oral health knowledge and behavior were accordance with verbal oral health literacy score distribution. Verbal oral health literacy levels were high as they were old.
4. A comparison of oral health literacy, knowledge, and behavior in accordance with the general characteristics of subjects shows that verbal oral health literacy is high when age is old ( $p < .01$ ), while, in terms of department, verbal oral health literacy is higher for health majors rather than non-health majors ( $p < .05$ ).

A summary of the above results shows that the level of oral health knowledge and behavior of university students is relevant to their oral health literacy, so low levels of verbal oral health literacy imply that individuals fail to accurately understand information related to oral health and hinder the improvement of individual oral health conditions. Hence, in order to carry out mid to long term oral health management, it is imperative to establish an oral health program for improving the verbal oral health literacy of university students.

## REFERENCES

- Lee, H.J., Hong, J.S., Kim, J.Y., & Chang, K.W. (2015) Pilot study on development of oral health literacy evaluation tool for Korean adults. *J. Kor. Acad. Oral Health*. 39, 237-244.
- U.S. Department of Health and Human Services. (2000) Oral Health in America: A Report of the Surgeon General-Executive Summary. Rockville, MD: US Department of Health and Human Services, National Institute of Dental and Craniofacial Research. National Institutes of Health, 5-6.

- Ju, H.J., Oh, H.W., Kim, J.Y., & Lee, H.S. (2012) A cross-sectional study on oral health literacy and its influencing factors among adults: I. Verbal oral health literacy. *J. Kor. Acad. Oral Health*, 36, 87-95.
- D'Cruz, A.M., & Shankar Aradhya, M.R. (2013) Health literacy among Indian adults seeking dental care. *J. of Dental Research*, 10, 20-24.
- Jones, M., Lee, J.Y., & Rozier, R.G. (2007) Oral health literacy among adult patients seeking dental care. *J. Am. Dent. Asso.*, 138, 1199-1208.
- Lee, H.S., Park, H.J., & Lee, S.J. (2003) A Study on the adult literacy in Korea and international comparative survey among OECD countries. *J. Kor. Comp. Edu.*, 13, 193-219.
- Kim, J.E. (2011) Measuring the level of health literacy and influence factors: targeting the visitors of a university hospital's outpatient clinic. *J. Kor. Clin. Nurs. Res.*, 17, 27-34.
- Parikh, N.S., Parker, R.M., Nurss, J.R., Baker, D.W., & Williams, M.V. (1996) Shame and health literacy: the unspoken connection. *Patient Education and Counseling*, 27, 33-39.
- Davis, T.C., Crouch, M.A., Long, S.W., Jackson, R.H., Bates, P., George, R.B., Bairnsfather, L.E. (1991) Rapid assessment of literacy levels of adult primary care patients. *Family Medicine*, 23, 433-438.
- Gont, D.A., Lee, J.Y., Rozier, R.G., Pahel, B.T., Richman, J.A., & Vann, W.F. (2007) Development and testing of the test of functional health literacy in dentistry (TOFHLiD). *J. Public Health Dentistry*, 67, 105-117.
- Kim, M.O., & Park, Y.S. (2012) The relationship between career preparing behavior and jobs seeking stress in university students: Moderation effect of career decision-making self-efficacy. *K. J. Youth Studies*, 19, 69-90.
- Yoon, S.U., Oh, N.R., & Kim, J.S. (2015) Oral health conditions of college students in some regions based on fluorine awareness. *Kor. Cont. Soc*, 15, 329-337.
- Kim, S.S., Kim, S.H., & Lee, S.Y. (2005) Health Literacy: Development of a Korean health literacy assessment tool. *Journal of Korean Society Health Education Promotion*, 22, 215-227.
- Lee, E.J. (2008) A Study on the Health Literacy and Disease Knowledge of Hypertensive and Diabetics. Master's thesis. Keimyung University, Dea-Gu, Korea.
- Kim, G.R., Kim, M., & Kim, Y.S. (2010). Undergraduates oral health knowledge, attitude, and behavior relative to oral health education. *J. Kor. Acad. Oral Health*, 34, 178-186.