

**EFFECT OF DENTAL HYGIENE STUDENTS' SELF-EFFICACY ON EMPATHY FOR THE ELDERLY: FOCUS ON THE MEDIATING EFFECT OF COMMUNICATION SKILLS****Kyeung-Ae Jang**Department of Dental Hygiene, College of Health and Welfare, Silla University, Busan, Korea 46958  
jka@silla.ac.kr**ABSTRACT**

*This study was conducted to identify the effect of self-efficacy on empathy for the elderly by focusing on the mediating effect of communication ability and targeting dental hygiene (major) students in Busan Metropolitan City in some regions of Korea. Significant results were shown in the communication ability and empathy for the elderly among college students who had experienced living together with the elderly and received education related to the elderly. Significant results were shown in self-efficacy, communication ability, and empathy for the elderly among college students who had experience in oral care for the elderly. Self-efficacy, communication ability, and empathy for the elderly were found to be related, and it was confirmed that communication ability played a partial mediating role between these factors. Therefore, the development of and participation in a curriculum that can increase empathy for the elderly by recognizing the importance and necessity of communication skills is suggested.*

*Keywords: Communication Skills, Dental Hygiene Student, Elderly, Empathy, Self-Efficacy*

**1. INTRODUCTION**

With the development of modern medicine, the average lifespan of humans is increasing, and the proportion of the elderly population in the total population is rapidly increasing. In the case of the Republic of Korea, by 2021, the elderly aged 65 or older accounted for 16.5% of the total population, It is predicted that the Republic of Korea will enter a super-aged society, with the elderly accounting for 20.3% of the total population in 2025 and 43.9% in 2060 (<https://www.kostat.go.kr>). The rapid increase in the elderly population causes age-related health problems and increases the use of medical institutions and medical costs. However, despite the continuous demand for professional treatment for the elderly, medical personnel capable of caring for the elderly remain scarce (Wallace et al., 2006).

In Korea, 86.2% of the elderly experienced discrimination, indicating that discrimination against the elderly has become generalized to a level similar to that in the West (Kim, 2003). It is believed that the choice of access to work in the health care sector for the elderly is decreasing. It is reported that the level of differential recognition of the elderly indicates a low level of knowledge about aging (Kim et al., 2012), and it has been reported to affect the experience of contact with the elderly, knowledge of aging, recognition of discrimination against the elderly, empathy, and communication skills (Allen et al., 2008).

Medical personnel who actually provide medical services for the elderly must have smooth communication skills and empathy for the elderly before clinical performance (Kim et al., 2021). Communication skills and empathy for the elderly among dental hygiene students who will work in the field in the future will make a positive change in the provision of dental hygiene care for the elderly. In addition, one's own beliefs and judgments are required in order to successfully perform the duties of a dental hygienist.

In other words, personal judgments or beliefs about one's ability to successfully perform the tasks required to produce a certain outcome require self-efficacy to affect performance outcomes through behavioral changes. Self-efficacy is an important component of social cognitive theory and has been shown to be related to the effect of communication ability as an evaluation of the ability to complete a specific task (Silvia et al., 2022).

Communication skills and empathy comprise a basic and essential requirement to smoothly perform dental hygiene for the elderly. Communication ability is an essential part of understanding patients and performing

dental hygiene for each patient, improving the quality of dental hygiene services, and is very important in dental hygiene practice. It has been reported that poor communication can negatively affect patients' health care and treatment (Bramhall et al., 2004). As a further complication, dental hygiene college students have difficulties in directly performing dental hygiene courses in clinical practice both inside and outside the school, and opportunities for direct communication with patients are also decreasing.

In this situation, the communication ability and empathy of dental hygiene students need to be trained through theory and clinical practice. It is necessary to have the ability to understand and empathize with the needs of the elderly by facilitating smooth communication with the elderly. Empathy for the elderly is one of the important interpersonal skills that can identify what the subjects need in order to build trust with the subjects (Chung, 2014).

Nursing college students' empathy training for the elderly has been reported as a method of promoting positive attitudes toward the elderly (Gholamzadeth et al., 2018).

Therefore, college students majoring in dental hygiene need to have their own concepts and expectations to successfully perform their duties as dental hygienists. It is thought that the communication process and empathy to deal with the elderly will be an important area that medical personnel should basically have. However, convergence studies on self-efficacy, communication skills, and empathy for the elderly are insufficient for dental hygiene students.

In this study, we investigated the effect of self-efficacy on empathy for the elderly, focusing on the mediating effect of communication ability, targeting dental hygiene (graduate) students, and by increasing dental hygiene (graduate) students' self-efficacy and communication ability. The findings are intended to be used as basic data for the direction and curriculum of dental hygiene education for improving empathy for the elderly.

## **2. LITERATURE REVIEW**

Countries that have entered an aging society due to an increase in life expectancy are facing social, cultural, and economic changes. In the context of population aging, health promotion of elderly patients has become an urgent public health issue (Kim et al., 2020). In dental practice, dental hygienists are among the first-line providers interacting with older patients. Therefore, as pre-dental hygienists, dental hygiene students have their own beliefs and judgments in performing their duties. They also understand better the patient's oral health education and communication skills to deliver oral health information and the perspective of empathy for the elderly. In this regard, this study aims to seek understanding and specific methods for communication ability by confirming the mediating effect of communication ability and self-efficacy on empathy for the elderly targeting students of some dental hygiene departments in Busan, Korea.

The results of the correlation between self-efficacy, empathy for the elderly, and communication ability of dental hygiene (major) students are as follows. Communication ability is positive in the order of empathy for the elderly ( $r=0.744$ ,  $p<0.01$ ), self-efficacy in empathy for the elderly ( $r=0.625$ ,  $p<0.01$ ), and communication ability ( $r=0.526$ ,  $p<0.01$ ). The relationship was found to be significant. It was reported that self-efficacy and communication skills showed significant improvement after education compared to before simulation education similar to community nursing for the elderly with dementia. There was a positive (+) relationship between communication ability and self-efficacy (Choi et al., 2022). The result of providing education to nursing college students had a positive effect on students' communication ability and self-efficacy was similar to that of this study. Therefore, in providing regular education and extracurricular programs related to the elderly to students, it can be seen that enhancing the experience of approaching the elderly is also important in the relationship between communication ability and self-efficacy. Empathy is also an important factor in the professional development of medical students. It has been reported that the Geriatric Advanced Pharmacy Practice Experience (APPE) influences pharmacology students' empathy for the elderly with a focus on the elderly (Covington et al., 2022). The increased opportunity to communicate during practice experience for the elderly gives a positive change in empathy.

The results of the communication ability centered on the effect of self-efficacy on empathy for the elderly among dental hygiene students are as follows. Self-efficacy affects empathy for the elderly. As communication ability, a parameter, was input, it was found that empathy for the elderly had a partial mediating effect. It has been reported that nursing students' empathy skills for the elderly helped improve attitudes towards the elderly and care for the elderly (Sakineh et al., 2018). Empathy is considered to be a necessary element of students majoring in dental hygiene. Educators reported the need for educational interventions to improve and assess communication skills to increase pre-service nurses' ability to communicate effectively with the elderly (Lena et al., 2017). In addition, empathy for the elderly was found to be related to the practice of dental hygiene for the elderly (Jang et al., 2022). Furthermore, as dental hygiene majors prepare for an aging population, smooth communication and empathy are expected to show positive changes in the active dental hygiene process for the elderly.

This study has limited generalization because the survey was limited to dental hygiene (graduate) students in some regions of Korea. For generalization, future studies will require studies that include various regions. Nevertheless, there are few studies that have confirmed the relationship between self-efficacy and empathy for the elderly among dental hygiene (graduate) students. It is considered meaningful because communication ability was confirmed as a mediating effect. Therefore, we provide education that prioritizes the enhancement of empathy for the elderly. There is a need to develop curricula and extracurricular programs related to dental hygiene for the elderly in the undergraduate course. Alternatively, it is considered necessary to develop an education program for geriatric clinicians. In addition, it is necessary to build understanding and experience of the elderly through experiences similar to the elderly through the operation of a non-curricular program and facilitate acceptance of positive attitudes with the elderly.

Therefore, an institutional device that can communicate through various knowledge and activities is required by indispensably including subjects in the dental hygiene course for the elderly for the purpose of improving empathy for the elderly.

### **3. RESEARCH**

#### **3.1. Subject of Research**

Convenience sampling was used to gather study subjects among students enrolled in dental hygiene departments in Busan, Korea. For ethical consideration, the survey was conducted with subjects who agreed to participate in the survey after sufficiently explaining the purpose of the study before the survey. The survey period was from September 5, 2022 to November 25, 2022. Based on Cohen's Power analysis, G\*power 3.1.3 is used. Under a significance level of 5% (two-sided), power of 80%, and effect size of 0.5, the minimum sample size required was 132, but a total of 150 questionnaires were distributed considering the dropout rate. For the final analysis, 135 copies of the questionnaire were analyzed, excluding 15 copies of the questionnaire with missing answers.

#### **3.2. Research Method**

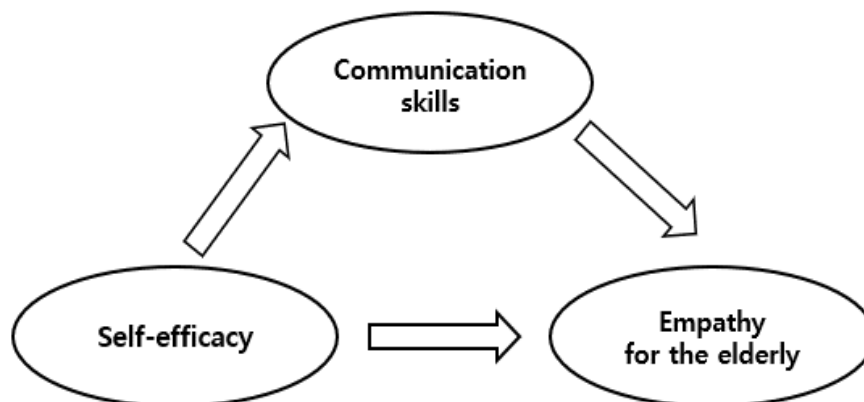
For data collection in this study, a structured self-administered questionnaire was used. The general characteristics consisted of age and grade, and the elderly-related characteristics included experience of living with the elderly, experience of receiving education related to the elderly, and oral care for the elderly. It consists of 6 questions based on the experience of receiving related education and the path of education.

The measurement tool for identifying the subject's self-efficacy consisted of a total of 19 questions by modifying and supplementing the research tool of Alavi (Alavi et al., 2008) to suit the purpose of the study. The tool allowed responses on a 5-point Likert scale, and higher scores meant higher self-efficacy. Negative survey contents by item were reverse-coded for consistency and data was analyzed. The measurement tool for understanding empathy toward the elderly was modified and supplemented in Kim's (Kim et al., 1984) study so that a total of 60 questions could be answered using a 5-point Likert scale, and higher scores meant higher empathy. The measurement tool to identify communication ability was modified and supplemented in the study by Lee et al. (Lee et al., 2020) so that a total of 49 questions could be answered on a 5-point Likert scale, and higher scores meant higher communication skills. The Cronbach's  $\alpha$  coefficient of this study was self-efficacy 0.981,

communication ability 0.966, and empathy for the elderly 0.967.

### 3.3. Data Analysis

For data analysis, SPSS version 27.0 (IBM Crop, Armonk, USA) statistical program was used, and the significance level was tested at 0.05. General characteristics were calculated in terms of frequency and percentage, and according to general characteristics, age, grade, experience living with the elderly, experience receiving education related to the elderly, self-efficacy for the educational path, empathy for the elderly, and communication skills. To confirm the difference in degree, t-test and ANOVA were conducted. Correlation analysis was conducted to determine the relationship between self-efficacy, empathy for the elderly, and communication ability. In order to understand the effect of dental hygiene students' self-efficacy on their empathy for the elderly by focusing on their communication skills, a mediation analysis method was used to examine the mediating effect according to the three-step procedure presented by Baron & Kenny (Baron et al., 1986). The Sobel test was used to verify the significance of the indirect effect of the independent variable (self-efficacy) on the dependent variable (empathy for the elderly) through the mediating variable (communication ability). Model 1 was designed to determine the effect of dental hygiene students' self-efficacy on their ability to deal with the elderly, focusing on their communication skills. Model 2 is the effect of the independent variable (self-efficacy) on the dependent variable (empathy toward the elderly). A hierarchical regression analysis was conducted (Figure 1). The variance inflation factor coefficient was found to be less than 10 as a result of multicollinearity diagnosis.



**Fig. 1:** Research Model

## 4. RESULT

### 4.1. General and Geriatric Characteristics

(Table 1) shows the general characteristics and elderly-related characteristics of the research subjects. As for age, '20~22 years old' was the highest at 94.8%, and '23 years old or older' accounted for 5.2%. By grade, '3rd grade' accounted for 39.3%, '4th grade' 27.4%, '1st grade' 18.5%, and '2nd grade' 14.8%. The experience of living together with the elderly was the highest at 78.5% with 'no', followed by 'less than 1 year' with 16.3%, 'less than 1 to 5 years' with 3.7%, and 'over 5 years' with 1.5%. 88.1% of 'yes' and 11.9% of 'no' for education related to the elderly, and 81.5% of 'yes' and 18.5% of 'no' for education related to the oral cavity of the elderly.

### 4.2. Self-efficacy, Empathy for the Elderly, and Degree of Communication Ability according to the Characteristics Related to the Elderly

(Table 2) shows the experience of living together with the elderly, receiving education related to the elderly, and receiving oral education related to the elderly according to the elderly-related characteristics of the research subjects. The self-efficacy according to the experience of living together with the elderly was 3.42 points for 'yes' and 3.55 points for 'no', and the communication ability was 3.94 points for 'yes' and 3.20 points for 'no' ( $p < 0.001$ ).

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The empathy was 3.75 points for 'yes' and 3.34 points for 'no' ( $p<0.05$ ). According to the experience of receiving education related to the elderly, self-efficacy showed 'yes' 3.45 points and 'no' 3.50 points, while communication skills showed 'yes' 3.87 points and 'no' 3.16 points ( $p<0.01$ ), Empathy for the elderly was 3.73 points for 'yes' and 3.21 points for 'no' ( $p<0.05$ ). Self-efficacy according to the experience of oral education for the elderly was 'yes' 3.72 points and 'no' 2.30 points ( $p<0.001$ ), while communication skills were 'yes' 3.99 points and 'no' 2.88 points. ( $p<0.01$ ), empathy for the elderly was 3.89 points for 'yes' and 2.67 points for 'no' ( $p<0.001$ ).

### 4.3. Relationship between Self-Efficacy, Empathy for the Elderly, and Communication Skills

(Table 3) shows the results of the correlation between the subjects' self-efficacy, empathy for the elderly, and communication ability.

Self-efficacy showed a significant positive correlation between communication ability ( $r=0.526$ ,  $p<0.01$ ) and empathy for the elderly ( $r=0.625$ ,  $p<0.01$ ). Communication ability showed a significant positive correlation with empathy for the elderly ( $r=0.744$ ,  $p<0.01$ ).

### 4.4. Effect of Dental Hygiene Students' Self-Efficacy on Empathy for the Elderly, Focusing on Communication Ability

(Table 4) shows the results of hierarchical regression analysis on the mediating effect of communication ability on dental hygiene students' self-efficacy and its effect on their empathy for the elderly. In the relationship between self-efficacy and communication ability, examining the mediating effect of dental hygiene students' empathy toward the elderly, self-efficacy was found to be significant in communication ability, which is a parameter, in the first stage ( $\beta=0.526$   $p<0.001$ ). Self-efficacy in the 2nd stage was significant in empathy toward the elderly ( $\beta=0.625$ ,  $p<0.001$ ), and the second condition was satisfied. In the last 3 stages, self-efficacy was significantly shown in empathy toward the elderly ( $\beta=0.163$ ,  $p<0.001$ ), and it was confirmed that there was a partial mediating effect. The mediating effect of communication ability was found to be significant.

**Table 1:** General characteristics of subjects

Classification	Categories	N	%
Age(years)	20~22	128	94.8
	over 23	7	5.2
Grade	1	25	18.5
	2	20	14.8
	3	53	39.3
	4	37	27.4
Elderly cohabitation experience	No	106	78.5
	less than 1 year	22	16.3
	1 to 5 years	5	3.7
	more than 5 years	2	1.5
Senior-related education experience	Yes	119	88.1
	No	16	11.9
Oral education experience related to the elderly	Yes	110	81.5
	No	25	18.5
<b>Total</b>		135	100.0

\*\*\*  $p<0.001$ , \*\*  $p<0.01$ , \*  $p<0.05$

Data were analyzed by t-test

**Table 2:** Self-efficacy, empathy for the elderly, and degree of communication ability according to the characteristics related to the elderly

Classification	Categories	N	Self-efficacy	Communication skills	Empathy for the elderly
			M±SD		
Elderly cohabitation experience	yes	106	3.42±0.76	3.94±0.87	3.75±0.80
	no	22	3.55±0.85	3.20±0.20	3.34±0.37
	t(p)		-0.706(0.481)	3.936(0.000)	3.720(0.020)
Experience in education related to the elderly	yes	119	3.45±0.77	3.87±0.85	3.73±0.76
	no	16	3.50±0.70	3.16±0.15	3.21±0.28
	t(p)		-0.262(0.793)	3.318(0.001)	2.634(0.009)
Senior-related education experience	yes	110	3.72±0.53	3.99±0.78	3.89±0.62
	no	25	2.30±0.48	2.88±0.20	2.67±0.28
	t(p)		12.159(0.000)	7.033(0.002)	9.578(0.000)

\*\*\*  $p < 0.001$ , \*\*  $p < 0.01$ , \*  $p < 0.05$

Data were analyzed by t-test

**Table 3:** Relationship between self-efficacy, empathy for the elderly, and communication skills

Variables	Self-efficacy	Communication skills	Empathy for the elderly
Self-efficacy	1.000		
Communication skills	0.526**	1.000	
Empathy for the elderly	0.625**	0.744**	1.000

\*\*  $p < 0.01$

Data were analyzed by Pearson correlation coefficient

**Table 4:** Effect of dental hygiene students' self-efficacy on empathy for the elderly, focusing on communication ability

Step	Model	B	SE	$\beta$	t(p)	F(p)	R <sup>2</sup>	Adj R <sup>2</sup>
1	Constant	1.796	0.286		6.280***	50.902***	0.277	0.271
	1→2	0.576	0.081	0.526	7.135***			
2	Constant	1.527	0.238		6.415	84.832***	0.391	0.387
	1→3	0.621	0.067	0.625	9.210***			
3	Constant	0.176	0.091		1.926	870.769***	0.930	0.929
	1→3	0.161	0.027	0.163	5.948***			
	2→3	0.775	0.024	0.868	31.764***			

\*\*\*  $p < 0.001$ , Sobel Z=6.944

**Model 1:** Self-efficacy, 2: Communication skills, 3: Empathy for the elderly

### 5. CONCLUSION

This study was conducted to determine the effect of self-efficacy on empathy for the elderly by focusing on communication ability and targeting dental hygiene (major) students in Busan Metropolitan City in some regions of Korea.

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Significant results were shown in the communication ability and empathy for the elderly among the research subjects who experienced cohabitation with the elderly and received education related to the elderly. Significant results were found in self-efficacy, communication ability, and empathy for the elderly among the study subjects who experienced oral education for the elderly. Communication ability showed a significant positive correlation with empathy for the elderly ( $r=0.744$ ,  $p<0.01$ ). Self-efficacy showed a significant positive correlation with empathy for the elderly ( $r=0.625$ ,  $p<0.01$ ) and communication ability ( $r=0.526$ ,  $p<0.01$ ). As a result of the mediating effect of dental hygiene students' communication ability on the relationship between self-efficacy and empathy toward the elderly, a partial mediating function was found.

Based on the above results, self-efficacy, communication ability, and empathy for the elderly were related to dental hygiene (major) students in Busan Metropolitan City in some areas of Korea. It was confirmed that communication ability played a partial mediating role between these factors. Therefore, dental hygiene students recognize the importance and necessity of communication skills and based on this study's findings, the development of and participation in a curriculum that can increase empathy for the elderly are recommended.

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