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The Effect of Dental Hygienists' Empathy the Elderly on their Communication Skills

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Abstract

Purpose: As life expectancy increases and interest in oral health increases, the opportunity to visit the dentist increases. To provide safe dental care for elderly patients and accurately identify their needs. We aim to understand the impact of knowledge, image, and empathy for the elderly on communication skills. **Research design, data, and methodology:** This study conducted an online survey using a convenience sample of 201 dental hygienists working in dental hospitals and clinics from October 4 to October 6, 2023. The purpose of the survey was explained and consent was obtained in the research consent form before being conducted. **Results:** Differences in knowledge, image, empathy, and communication skills among the elderly include age, clinical experience, need for elderly-related education, and confidence in oral care in elderly patients with systemic diseases ($p < 0.05$, $p < 0.01$, $p < 0.001$). The factor affecting communication skills toward the elderly was empathy ($t = 15.416(0.000^{***})$). **Conclusions:** Through this study, the communication skills with the elderly is a basic quality and attitude that dental hygienists must have. Therefore, it is essential to develop and implement empathy and communication skills training programs for dental hygienists, which can significantly contribute to fostering a positive trust-based relationship between elderly patients and dental professionals. This proactive measure is crucial in preparing for the upcoming era of an increasingly aged society.

Keywords : Communication Skills, Elderly, Empathy, Image, Knowledge

JEL Classification Code : A22, I10, I21, I23

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1. Introduction

Due to an extended life expectancy and a decrease in birth rates, the elderly population (aged 65 and over) in South Korea is expected to constitute over 18.4% of the total population in 2023, signifying the entry into an aging society. Furthermore, it is projected to reach 20.8% in 2026, indicating the arrival of an ultra-aging society (Kostat, 2023).

Elderly people undergo many physical, psychological, and social changes as they age, and have risk factors for chronic diseases in addition to oral diseases (Park et al., 2012). In addition, as the opportunity to visit the dental clinic increases due to the increase in life expectancy and interest in oral health, it is very important to provide high-quality oral health care services for elderly patients (Choi, 2007) and to have communication skills to provide safe dental care and accurately understand the needs of elderly patients. There are various competencies required to live in modern society, but communication is an important competency that must live by communicating with others (Son, 2016).

Communication is a means of understanding the lifestyles of members of society and sharing feelings, and it is used as a key means of connecting human relationships by building mutual understanding and trust between human beings (Lee, 2011). Ford and Martin (1982) reported that communication skills are the ability to achieve interaction goals by using appropriate means and methods in specific social situations. Furthermore, Ko et al. (2016) suggested that improving dental hygienists' communication skills can lead to enhanced job satisfaction and patient satisfaction, and Lee and Kim (1999) proposed that communication skills are not innate but can be acquired through systematic training. They emphasized the need for communication training to maintain smooth relationships between patients and colleagues in the workplace.

Dental hygienists need to make an effort to understand the characteristics of the elderly in general and to communicate positively in order to promote oral health (Gwon & Han, 2015) and at the same time, they must have emotional intelligence, that is, empathy, to identify the mood and emotions of patients in order to effectively meet the needs of elderly patients. This empathy refers to the ability to feel and understand the patient's emotions and to communicate what is understood to the patient (La Monica, 1981). This not only makes them more sensitive to and responsive to the patient's needs, but also has a positive effect on their emotional bonding (Han & Kim, 2004). In a study involving nurses, it was found that those with high levels of empathy were observed to provide positive and effective care to the elderly (Ko & Han, 2021), and communication with empathy affected the patient's

satisfaction with the implementation of treatment instructions (Kim, 2017). In recent years, the demand for oral health care services has been increasing, and the empathy and communication skills of dental hygienists are necessary factors to increase the efficiency of medical organizations as well as to increase the satisfaction of patients with whom they have the most direct and lasting relationships (Jung, 2006). Studies related to empathy and communication skills among dental hygienists have been reported in studies (Lee, 2012; Lee et al., 2020, Kim, 2021) on the communication skills of dental hygienists in adults, but there are few studies examining the effect of empathy in dental hygienists on communication skills in the elderly. On the other hand, the image of dental hygienists towards the elderly was found to be the lowest compared to other healthcare professions (Sim & Kim, 2010; Lim & Kim, 2016), and research has suggested that knowledge about the elderly can influence this image (Lim & Kim, 2016). Acquiring specialized knowledge about the elderly is why it is necessary to try to understand the characteristics of the elderly in order to improve the positive image of the elderly before entering the super-aged society, and empathy and communication skills are elements that dental hygienists must have, so it will be meaningful to grasp this relationship.

Therefore, we aim to elucidate the correlation between the knowledge, image, empathy, and communication skills of dental hygienists towards the elderly when treating elderly patients in dental clinics and hospitals. The goal is to provide foundational data for systematic and specialized education in geriatric dental hygiene, which is essential for elderly oral health management.

2. Research Methods and Materials

2.1. Survey Subject and Period

This study conducted an online survey (Google questionnaire) with a convenience sample of 201 dental hygienists working in dental clinics from October 4 to October 6, 2023. The research subjects were asked to fully explain the purpose of the survey and fill out a structured questionnaire after voluntarily agreeing to the study consent form.

2.2. Sample Size

The sample size for this study was calculated using the G*Power 3.1 program for multiple regression analysis, with a significance level (α) of 0.05, a medium effect size of 0.10, and a power of 0.95, and the required number of samples was 204. In consideration of the dropout rate, a

survey of 210 people was conducted, and 201 copies were used for the final analysis, excluding 9 copies in which the responses were insincere.

2.3. Survey Measurement Tool

The questionnaire in this study consisted of 6 questions on general characteristics, 8 questions on characteristics related to the elderly, 23 questions on knowledge of the elderly, 20 questions on images, 17 questions on empathy skills, and 11 questions on communication skills, for a total of 85 questions.

2.3.1. Tools to Measure Knowledge about the Elderly

The knowledge measurement tool about the elderly refers to the degree of knowledge about the elderly, and was first developed by Palmore (1977), and modified and supplemented in 1998 by True-False version's Fact on Aging (part-1 FAG I) The tool was modified with 23 questions modified and supplemented by Lee (2009) according to the situation of the elderly in Korea.

This tool consists of a total of 23 questions, and after receiving responses as 'right', 'wrong', and 'I don't know' for each question, the correct answer was reclassified into 1 point, and the wrong answer or 'I don't know' was reclassified into 0 points and summed up, and the total score was 23 points, and the higher the score, the higher the degree of knowledge of the dental hygienist about the elderly. Knowledge of the elderly was also measured by Cronbach's $\alpha = 0.856$.

2.3.2. The Measurement Tool for Image of the Elderly

The measurement tool for image of the elderly utilized a version adapted by Han (2000), which was originally developed by Sander et al. (1984). This tool consists of 20 pairs of opposing adjectives, and each item is rated on a 7-point Likert scale ranging from 'Extremely positive' (1 point) to 'Extremely negative' (7 points). To maintain consistency in the meaning of the items, reverse coding was applied for statistical processing. A lower score indicates a more negative image towards the elderly, while a higher score signifies a more positive attitude. The reliability of the measurement tool for the image of the elderly, assessed by Cronbach's α , was 0.922.

2.3.3. The Measurement Tool for Empathy of the Elderly

The tool for measuring empathy for the elderly was measured with a tool developed by Lee (2014) and revised and supplemented in 2016, and consists of a total of 17 items. Assessment is conducted on a Likert 5-point scale, with 'not at all' scored as 1 point and 'very much' as 5 points, with a higher score indicating a higher level of

empathy. At the time of tool development, the reliability was Cronbach's $\alpha=0.91$, while in this study, it was Cronbach's $\alpha=0.876$.

2.3.4. The Measurement Tool for Communication Skills of the Elderly

The measurement tool for communication skills of the elderly was developed by Choi (2014) based on geriatric and adult nursing, aimed at assessing the degree of direct nursing care in the mental, physical, and psychological aspects of the elderly. The original tool consisted of 16 items. The current researcher, excluding aspects related to end-of-life care, unconsciousness, rehabilitation, and focusing on areas relevant to dental hygiene, revised and refined it into 11 items. It was measured on a 5-point Likert scale, ranging from 'very much' (5 points) to 'not at all' (1 point). A higher score indicates a higher level of communication skills towards the elderly. The Cronbach's α for communication skills towards the elderly was 0.843.

2.4. Analysis Method

The statistical software used for analysis in this study was SPSS Windows version 25.0 and the significance level for statistical tests was set at 0.05.

1) The general characteristics of the research subjects, the characteristics related to the elderly, and the accuracy of knowledge about the elderly were calculated in terms of frequency and percentage for the study subjects.

2) To analyze knowledge, image, empathy, and communication skills towards the elderly based on general characteristics and characteristics related to the elderly, independent samples T-tests and one-way ANOVA were conducted to calculate means and standard deviations. For variables showing significant differences in the one-way ANOVA, a post-hoc Tukey multiple range test was conducted.

3) To examine the interrelationships between knowledge of the elderly, image, empathy, and communication skills towards the elderly, Pearson correlation analysis was conducted.

4) To identify factors influencing communication skills the elderly, Multiple Regression Analysis was conducted.

3. Results

3.1. The Degree of Knowledge of the Elderly of the Study Subjects

The total score of the knowledge level of the elderly was 11.28 ± 2.75 out of 23. Among the questions with the highest correct answer rate among the knowledge questions

about the elderly, "All five sensory functions (sight, hearing, taste, touch, and smell) tend to decline with age" had a high correct answer rate of 96.6%, and the question with the lowest correct answer rate was "The health and

socioeconomic status of the elderly in 2028 will be about the same or worse than the current one" with the lowest answer rate (13.2%)(Table 1).

Table 1: The Degree of Knowledge of the Elderly of the Study Subjects

	Questions	Correct answer	Percentage of correct answers
1	All five sensory functions (sight, hearing, taste, touch, and smell) tend to decline with age.	○	197 (96.6)
2	Lung capacity tends to decrease with age.	○	195 (95.6)
3	Physical fitness tends to decline with age.	○	196 (96.1)
4	Elderly drivers over the age of 65 have fewer accidents per person than younger drivers.	○	51 (25.0)
5	Most 65-year-olds are less able to work more effectively than younger workers.	×	53 (26.0)
6	More than 50% of people over the age of 65 are healthy enough to carry out normal activities of daily living.	○	127 (62.3)
7	Older people generally take longer to learn new things than younger people.	○	177 (86.8)
8	Older people tend to react more slowly than younger people.	○	183 (89.7)
9	Older workers over the age of 65 are more likely to have accidents on the job than younger workers.	×	39 (19.1)
10	The majority of elderly people feel miserable most of the time.	×	83 (40.7)
11	For most older people, it's impossible to adapt to new changes.	×	110 (53.9)
12	Depression is more prevalent in people over 65 years of age than in younger people.	×	65 (31.9)
13	Most seniors say that their daily lives are "rarely boring."	○	49 (24.0)
14	As older people get older, they are more inclined to believe in religion	×	36 (17.6)
15	Most seniors say that they seldom get excited or angry.	○	90 (44.1)
16	At least 5% of people over the age of 65 live in long-term accommodation facilities (e.g., nursing homes, psychiatric hospitals, and residential facilities for the elderly).	×	32 (15.7)
17	Seniors over the age of 65 now make up more than 10% of the population.	○	158 (77.5)
18	Most elderly people are socially marginalized.	×	40 (19.6)
19	Seniors over the age of 65 are similar in every way.	×	74 (36.3)
20	Most health care providers tend to give low priority to the elderly.	○	102 (50.0)
21	Most of the elderly earn below the minimum cost of living (as stipulated by the government).	×	46 (22.5)
22	Most seniors are working, or want to have a job that they can do, such as household chores or volunteer work.	○	170 (83.3)
23	The health and socioeconomic status of the elderly in 2028 will be about the same or worse than it is today.	×	27 (13.2)
	mean ± standard: 11.28±2.75		49.02%

3.2. Differences in Knowledge, Image, Empathy, and Communication Skills about the Elderly According to the General Characteristics of the Research Subjects

The differences in knowledge, image, empathy, and communication skills about the elderly according to general characteristics are as follows. Knowledge of the elderly according to age was 13.15 ± 2.58 ($p < 0.01$) in the '40s', empathy was 3.84 ± 0.42 ($p < 0.01$) in the '30s', and

communication skills was 4.01 ± 0.40 ($p < 0.01$) in the '30s' ($p < 0.001$). According to marital status, the knowledge of the elderly was 11.91 ± 2.50 ($p < 0.05$) in the case of 'married', and in the case of clinical experience, the knowledge was 12.15 ± 2.52 ($p < 0.05$) in the case of '10 years or more', 3.79 ± 0.72 ($p < 0.05$) in the case of '1~4 years', and 3.84 ± 0.54 ($p < 0.01$) in the '10 years or more'. There were no statistically significant factors for final education, religion, and place of work ($p > 0.05$) (Table 2).

Table 2: Differences in Knowledge, Image, Empathy, and Communication Skills about the Elderly According to the General Characteristics of the Research Subjects

Classification	N(%)	Knowledge	Image	Empathy	Communication Skills	
		M±SD				
Age	20s	65(32.3)	11.20±2.81 ^a	3.66±0.88	3.62±0.50 ^a	3.79±0.53 ^a
	30s	117(58.2)	11.03±2.64 ^a	3.52±0.76	3.84±0.42 ^a	4.01±0.40 ^a
	40s	19(9.5)	13.15±2.58 ^b	3.78±0.80	3.69±0.46 ^a	3.83±0.44 ^a
	p-value		0.007**	0.297	0.007**	0.005**
Marital Status	Single	134(66.7)	10.97±2.82	3.60±0.87	3.71±0.45	3.89±0.48
	Married	67(33.3)	11.91±2.50	3.56±0.66	3.84±0.46	3.97±0.41
	p-value		0.023*	0.759	0.054	0.222
Education Level	Undergraduate (3-year)	83(40.7)	11.55±2.57	3.61±0.74	3.70±0.43	3.87±0.37
	Undergraduate (4-year)	111(55.2)	11.09±2.84	3.60±0.80	3.81±0.44	3.97±0.48
	Graduate (Master/ PhD)	7(3.5)	11.14±3.43	3.05±1.40	3.50±0.87	3.76±0.90
	p-value		0.519	0.198	0.097	0.222
Religion	Catholicism	26(12.9)	11.46±3.20	3.84±0.45	3.68±0.40	3.82±0.44
	Christianity	52(25.9)	10.88±2.46	3.47±0.66	3.79±0.35	3.94±0.35
	Buddhism	21(10.4)	10.76±1.92	3.53±0.70	3.98±0.42	4.13±0.39
	No religion	102(50.7)	11.55±2.90	3.59±0.94	3.71±0.52	3.89±0.51
	p-value		0.397	0.299	0.066	0.104
Clinical career	1~4	63(31.3)	11.28±2.86 ^{ab}	3.79±0.72 ^a	3.62±0.42 ^a	3.85±0.40
	5~9	94(46.8)	10.88±2.70 ^a	3.48±0.89 ^a	3.80±0.43 ^{ab}	3.93±0.49
	10≤	44(21.9)	12.15±2.52 ^b	3.50±0.67 ^a	3.84±0.54 ^b	4.01±0.46
	p-value		0.039*	0.048*	0.019**	0.214
Types of workplace	Dental clinic	144(71.6)	11.41±2.60	3.64±0.73	3.72±0.41	3.91±0.39
	Dental Hospital	57(28.4)	10.96±3.08	3.44±0.95	3.83±0.55	3.94±0.60
	p-value		0.295	0.105	0.120	0.642

Note: p-value was determined from t-test or one-way ANOVA. ^{ab} post hoc test was conducted from Tukey test. values are presented as mean±standard deviation. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

3.3. Differences in Knowledge, Image, Empathy, and Communication Skills about the Elderly According to the Characteristics Related to the Elderly of the Research Subjects

The differences in knowledge, image, empathy, and communication skills about the elderly according to the characteristics related to the elderly are as follows. The image of the elderly according to the experience of completing the geriatric curriculum was higher for 'experienced' 3.70±0.8 (p<0.05) and 3.81±0.39 (p<0.01) for empathy, and there was a statistically significant difference.

For the elderly, 'experienced' was 11.56±2.64 (p<0.05), empathy was 3.83±0.43 (p<0.001), communication skills was 3.97± 0.41 (p<0.05), and 'elderly-related education is required' was 11.38±2.70 (p<0.01) in knowledge of the elderly, image was 3.63±0.76 (p<0.001), empathy was 3.78±0.42 (p<0.001), and communication skills was 3.94±0.41 (p<0.001). According to the confidence in oral care of elderly patients with systemic diseases, 'confident' was 3.71±0.96 (p<0.05) in the image of the elderly, 3.91±0.39 (p<0.001) in empathy, and 4.01±0.47 (p<0.01) in communication skills which was statistically significant (Table 3).

Table 3: Differences in Knowledge, Image, Empathy, and Communication Skills about the Elderly According to the Characteristics Related to the Elderly of the Research Subjects

Classification		N(%)	Knowledge	Image	Empathy	Communication skills
M±SD						
Education for the elderly	Yes	130(64.7)	11.26±2.82	3.70±0.82	3.81±0.39	3.94±0.41
	No	71(35.3)	11.32±2.63	3.39±0.73	3.66±0.55	3.88±0.53
	p-value		0.893	0.009**	0.026*	0.341
Education type	Geriatric Dental Hygiene Care	81(40.3)	11.44±2.77	3.80±0.85	3.82±0.40	3.93±0.45
	Some of the other subjects	49(24.4)	10.97±2.91	3.53±0.77	3.83±0.38	3.96±0.36
	p-value		0.365	0.077	0.676	0.696
Clinical practice experience for the elderly	Yes	143(71.1)	11.56±2.64	3.65±0.83	3.83±0.43	3.97±0.41
	No	58(28.9)	10.60±2.89	3.43±0.72	3.57±0.49	3.79±0.54
	p-value		0.024*	0.086	0.000***	0.011*
Geriatric education in clinical practice	Yes	135(67.2)	11.40±2.78	3.69±0.82	3.80±0.46	3.95±0.46
	No	66(32.8)	11.06±2.68	3.38±0.74	3.66±0.45	3.85±0.45
	p-value		0.413	0.012*	0.039*	0.124
Education for the elderly	Necessary	195(97.0)	11.38±2.70	3.63±0.76	3.78±0.42	3.94±0.41
	Not required	6(3.0)	8.00±2.28	2.20±1.17	2.91±0.73	3.13±1.03
	p-value		0.003**	0.000***	0.000***	0.000***
Residency experience with elderly	Yes	95(47.3)	11.38±2.60	3.64±0.83	3.82±0.43	3.99±0.43
	No	106(52.7)	11.19±2.88	3.53±0.78	3.69±0.48	3.85±0.48
	p-value		0.624	0.335	0.038*	0.036*
Resident family	Grandparents	84(41.8)	11.32±2.59	3.63±0.74 ^{ab}	3.81±0.39	3.97±0.41
	Parent	9(4.5)	11.66±2.64	4.30±0.97 ^a	3.72±0.65	4.04±0.58
	Relatives	2(1.0)	13.00±4.24	3.02±2.36 ^b	4.40±0.57	4.18±0.51
	p-value		0.635	0.035*	0.126	0.739
Intimacy	Intimacy	88(43.8)	11.43±2.69	3.76±0.76	3.83±0.43	3.98±0.43
	Not intimate	7(3.5)	10.85±1.06	2.63±0.80	3.66±0.46	3.93±0.35
	p-value		0.577	0.000***	0.338	0.747
Volunteer work experience for the elderly	Yes	113(56.2)	11.19±2.50	3.66±0.86	3.82±0.45	3.98±0.46
	No	88(43.8)	11.40±3.04	3.49±0.73	3.67±0.46	3.84±0.45
	p-value		0.585	0.133	0.029*	0.030*
Elderly patient per day (person)	0~5	125(62.2)	11.74±2.65 ^a	3.57±0.80	3.77±0.48	3.94±0.47
	6~10	49(24.4)	10.65±2.96 ^{ab}	3.73±0.91	3.74±0.45	3.87±0.49
	10≤	27(13.4)	10.33±2.36 ^b	3.39±0.61	3.71±0.36	3.91±0.35
	p-value		0.009**	0.193	0.789	0.707
Confidence in oral care of elderly patients with systemic diseases	Yes	99(49.3)	11.25±2.28	3.71±0.96	3.91±0.39	4.01±0.47
	No	102(50.7)	11.32±3.14	3.47±0.60	3.60±0.48	3.83±0.43
	p-value		0.855	0.035*	0.000***	0.007**

Note: p-value was determined from t-test or one-way ANOVA. ^{ab} post hoc test was conducted from Tukey test. values are presented as mean±standard deviation. * p<0.05, ** p<0.01, ***p<0.001.

3.4. Correlation Analysis of the Research Subjects' Knowledge, Image, Empathy, and Communication Skills about the Elderly

Knowledge and images of the elderly ($r=0.162$), empathy ($r=0.165$), and communication skills ($r=0.150$)

were statically correlated, while images were highly statically correlated with empathy ($r=0.176$) and empathy ($r=0.790$) ($p<0.05$, $p<0.01$). There was no statistically significant correlation between images and communication skills (Table 4).

Table 4: Correlation Analysis of the Research Subjects' Knowledge, Image, Empathy, and Communication Skills about the Elderly

	Knowledge	Image	Empathy	Communicative skills
Knowledge	1			
Image	0.162*	1		
Empathy	0.165*	0.176*	1	
Communicative skills	0.150*	0.099	0.790**	1

Note: p-value was determined from person's correlation coefficient. * $p<0.05$, ** $p<0.01$

3.5. The Effect of the Research Subjects' Knowledge, Image, and Empathy on their Communication Skills with the Elderly

Hierarchical multiple regression analysis was performed after controlling for exogenous variables to analyze the effect on the communication skills of the elderly of the study subjects. In Model I, age was used as a control variable to determine the effect on communication skills, and in Model II, the control variables of practical experience for the elderly, education needs related to the elderly, living experience with the elderly, volunteer

activities for the elderly, and confidence in oral care for the elderly with systemic diseases were additionally introduced. Model III analyzed whether the variables of knowledge, image, and empathy about the elderly affect their communication skills. Models I., II., III. all had tolerances greater than 0.1 and VIF less than 10, confirming that there was no multicollinearity problem between the variables. As a result of hierarchical multiple regression analysis, the explanatory power of Model III was 62.2%, and higher empathy was found to be a factor affecting communication skills for the elderly ($p<0.001$) (Table 5).

Table 5: The Effect of the Research Subjects' Knowledge, Image, and Empathy on their Communication Skills with the Elderly

	Model I			Model II			Model III		
	B(SE)	β	t(p)	B(SE)	β	t(p)	B(SE)	β	t(p)
(Constant)	3.833 (.104)		36.844 (.000***)	4.044 (.116)		34.754 (.000***)	.938 (.249)		3.763 (.000***)
Age	.221 (.070)	.236	3.157 (.002*)	.198 (.067)	.211	2.959 (.000***)	.046 (.046)	.049	.998 (.319)
20s	-.042 (.118)		-.358 (.721)	-.070 (.115)	-.044	-.610 (.543)	.043 (.079)	.027	.548 (.584)
40s		-.027							
Clinical practice experienced (yes)				-.055 (.074)	-.053	-.736 (.463)	.031 (.051)	.030	.603 (.547)
Education for the elderly needed (yes)				-.707 (.181)	-.260	-3.900 (.000***)	-.135 (.133)	-.050	-1.019 (.309)
Resident experience (yes)				-.092 (.063)	-.100	-1.460 (.146)	-.038 (.042)	-.041	-.894 (.372)
Volunteer activities (yes)				-.054 (.066)	-.058	-.815 (.416)	-.050 (.044)	-.054	-1.134 (.258)
Confidence in oral care of elderly patients with systemic diseases (yes)				-.126 (.066)	-.136	-1.902 (.059)	.075 (.046)	.081	1.619 (.107)
Knowledge							.006 (.008)	.033	.697 (.487)
Image							-.026 (.027)	-.046	-.970 (.333)
Empathy							.785 (.051)	.785	15.416 (.000***)
F(p)		5.402**			6.126***			81.306***	
R2		0.052			.182			.642	
Adjusted R2		0.042			.152			.623	

Note: p-value was calculated by multiple regression analysis. B: unstandardized coefficients, SE: standard error, β : beta. * $p<0.05$, ** $p<0.01$, *** $p<0.001$

4. Discussion

This study analyzes the relationship between knowledge, image, empathy, and communication skills about the elderly for dental hygienists working in dental hospitals and clinics that provide high-quality services for the promotion and improvement of oral health of the elderly in a medical environment that has entered an aging society due to changes in the demographic structure.

Among the results of this study, the research subjects' knowledge of the elderly was 11.28 ± 2.75 points on average out of a total of 23 points, and the correct answer rate was 49.02%, which was slightly higher than the results of Lim (2016), which was conducted by dental hygienists, showed a correct answer rate of 48.57% on 11.14 ± 2.84 points. On the other hand, it is lower than the average correct answer rate range of 52 to 69% of the college student group analyzed by Palmore (1977), and the average correct answer rate of nurses' knowledge of the elderly was 51.07% and 52.40%, respectively, indicating that the knowledge level of dental hygienists was lower than that of nurses. Among the questions about the knowledge of the elderly, the question with the highest correct answer rate was "All five sensory functions (sight, hearing, taste, touch, and smell) tend to decline with age" with 96.6%, and "The health and socioeconomic status of the elderly in 2028 will be about the same or worse than the current one" was the lowest for social and environmental questions with 13.2%. This seems to be attributed to an education bias that leans more towards the physical aspects of aging, rather than considering the emotional and environmental aspects of the elderly, in terms of information or educational content about the elderly (Choi, 2002). In addition, the low knowledge score of dental hygienists can be seen as an important factor in the fact that the proportion of geriatric-related education in the dental hygiene department is smaller than that of nursing departments to date. Recognizing the importance of geriatric-related education in the Department of Dental Hygiene, it is necessary to prepare education that can provide high-quality services for the elderly by organizing subjects in geriatric dental hygiene as a compulsory major that can acquire knowledge suitable for the physical, emotional, and environmental characteristics of the elderly.

The image of the elderly was statistically significant when they had completed a geriatric curriculum, had clinical geriatric education, lived with the elderly, and were intimate with the elderly ($p < 0.05$, $p < 0.01$, $p < 0.001$). In this study, a positive image of the elderly showed a significant correlation with higher knowledge about the elderly, although in the results of the study by Lim (2016), there was no significant difference in the above-mentioned items. It has suggested that the establishment of a positive image

of the elderly is possible with appropriate education at the undergraduate level, and suggested the importance of geriatric-related education in the undergraduate and clinical fields (Yoo, 2007). Therefore, it will be possible to positively improve the image of the elderly if they have the opportunity to become intimate with the elderly by participating and serving through programs in the community that can get close to the elderly, as well as theoretical education through conservative education so that they can acquire specialized knowledge about the elderly.

The difference in empathy for the elderly was significant in those who were 30 years of age or older, had more than 10 years of clinical experience, had experience in completing geriatric curriculum, had practical experience and volunteer activities for the elderly, and had experience in education related to the elderly in clinical practice ($p < 0.05$, $p < 0.01$, $p < 0.001$). Jang and Yoon (2002) confirmed that the higher the clinical experience of dental hygienists, the higher their empathy for the elderly, which is similar to the results of this study. In a study of nurses, nurses' empathy was higher in those in their 40s and older, and higher in head nurses (Kim, 2019). In the case of healthcare professions who have a lot of contact with patients, the ability to understand the patient's emotions increases as age and clinical experience increases (Kim, 2021), and problem-solving skills and work proficiency are thought to be highly relevant. As a way to increase empathy, we will propose a method to increase the level of empathy by applying expert coaching programs for medical services in clinical practice, especially for the elderly.

The difference in the communication skills of the elderly in the study subjects was statistically significant when they were in their 30s or older, had practical experience with the elderly, lived with the elderly, and had experience in volunteer work with the elderly ($p < 0.05$, $p < 0.01$, $p < 0.001$). It was similar to the results of the study of Lim (2016), and Lim and Kim (2016), and a study of nurses (Kim, 2011) also showed significant differences in age and clinical experience, but higher than that of dental hygienists. Nurses have a lot of experience with the elderly while caring for inpatients, and their long clinical experience has shown them to be able to communicate more confidently and positively when dealing with the elderly face-to-face (Lim, 2016). Therefore, in order to improve the level of communication ability for the elderly, long-term education should be implemented rather than short-term, and it is necessary to expand various educational opportunities related to the elderly and to provide education that combines repeated theory and practice.

The results of this study showed significant differences

in knowledge, image, empathy, and communication skills of the elderly according to the presence or absence of education needs related to the elderly ($p < 0.01$, $p < 0.001$) and the confidence in oral care of elderly patients with systemic diseases ($p < 0.05$, $p < 0.01$, $p < 0.001$). According to the result of Lim's study (2016), the confidence in oral health care in elderly patients with systemic diseases was 1.906 times higher than that of those who had no experience in geriatric curriculum and 2.590 times higher than that of those who had no experience in geriatric education in clinical practice, confirming the importance of education for the elderly. In addition, the higher level of the knowledge and communication of the elderly, the higher the confidence in oral health care in elderly patients with systemic diseases. In most dental hygiene departments, lectures related to the elderly were offered as elective or general courses, and they were theory-oriented courses (Lim, 2016). Clinical dental hygiene is important for dental hygiene students, but it should be accompanied by education on the psychological, social, and environmental characteristics of the patients. Furthermore, in order to prepare for a super-aged society, we will propose a way to cultivate confidence and ability in oral care of elderly patients with systemic diseases through the training of professional dental hygienists in the field of elderly dental hygiene and a systematic education program.

As a result of regression analysis to investigate the effect of communication ability on the elderly of the study subjects, it was found that empathy ($p = 0.000$) was a factor in communication skills. Jang and Yoon (2002) mentioned that the attitude of dental hygienists towards the elderly and the empathy were related to the empathy as an important variable in smoothing interpersonal relationships. In other words, it has a positive effect on the ability to work in dental hygiene when dental hygienists correctly understand and empathy with the feelings of the subjects and patients. Educational opportunities should be provided to enhance the empathy with the thoughts and emotions of the elderly while feeling the same situation and mood (Jang, 2023), and research should focus on developing programs that can improve the level of communication skills, including the practice of oral care and satisfaction with dental services, as well as identifying the needs of elderly patients.

The communication skills of dental hygienists are the beginning of the interaction with the patient, and it can be said that it is an important skill along with professional knowledge. In order to properly adapt to the clinical field as a dental hygienist, it is necessary to provide systematic education to improve communication skills from the time of university students (Lee et al., 2020). Therefore, dental hygienists should strive to give positive communication to patients and patients who come to the clinic to motivate

and trust them to change their attitudes and behaviors in oral health care.

The limitation of this study is that it was compiled for dental hygienists in dental hospitals and clinics, so there is a limit to generalizing, expanding, and interpreting the results of this study. If a tool for measuring communication skills for the elderly is developed, it will be an opportunity to improve communication skills not only for dental hygienists but also for medical health professionals.

The communication skills with the elderly is the basic qualities and attitudes that dental hygienists should have, and it can be seen as the starting point for helping elderly patients and subjects to manage their oral health. The elderly can choose oral hygiene management methods through the communication of dental hygienists, and results can be seen to increase the dental hygiene practices of the elderly. Thus, it is necessary to provide educational opportunities to understand the minds of the elderly and to enhance their empathy with their thoughts and feelings.

5. Conclusions

As life expectancy increases and interest in oral health grows, there is a rising opportunity for seniors to seek dental care. To ensure safe dental treatment for elderly patients and accurately understand their needs, we aimed to investigate the impact of knowledge, perception, empathy, and communication skills regarding the elderly on communication skills effectively.

The differences in the knowledge, image, empathy, and communication skills of the elderly were age, clinical experience, need for education related to the elderly, and confidence in oral care of elderly patients with systemic diseases ($p < 0.05$, $p < 0.01$, $p < 0.001$), and the factor affecting the communication skills of the elderly was empathy ($t = 15.416$ (0.000^{***})).

Through this study, it can be said that the communication skills with the elderly is the basic qualities that dental hygienists should have and the necessary elements for elderly patients. It is necessary to understand the minds of the elderly and enhance their empathy with their thoughts and feelings, so as to provide an opportunity to help the subjects manage their oral health. Moreover, it is hoped that geriatric dental hygiene will be presented as a basic data that can be established as an essential subject in the educational process.

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