

A Study on the Awareness of Medical and Non-medical Personnel on the Inclusion of Dental Hygienists in the Category of Medical Personnel

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ABSTRACT

The study conducted a survey of medical and non-medical personnel living in Seoul and Gyeonggi province for about two months from April to June 2018 to explore ways to improve people's awareness on the need to include dental hygienists in the category of medical personnel and obtained the following results. Looking at the factors that affect the changes that would be made to the dental hygienists if they were to be included in the category of medical personnel, we found that people who thought it was appropriate or fair for dental hygienists to be included as medical personnel ($p < 0.001$) and those who had a high opinion on the role of dental hygienists ($p < 0.001$) tended to have a positive awareness on the changes that would occur after the inclusion of dental hygienists as medical personnel. Based on the above results, it is believed that the government needs to raise people's awareness on the role of dental hygienists and actively inform the public of the need for dental hygienists to be classified as healthcare professionals.

1. Introduction

Dental hygienists can work regarding the removal of deposits such as plaque, fluoride application, temporary filling, temporary attachment fitting, attachment removal, tooth tracing, the installation and removal of brace arc line, prevention and hygiene of dental and oral diseases, and dental radiography in accordance with Article 2-1-6 of the modified Enforcement Decree on Medical Technicians Act

(May 17, 2013).

In the past, the main task of dental hygienists in dentistry was centered on treatment, but the revision of the Enforcement Decree of the Medical Technicians Act (May 17, 2013) has recently changed it to prevention-oriented. Thus, the importance of preventive and treatment tasks, which are unique to dental hygienists, is growing with these changes. However, the current enforcement decree is too limited to reflect the clinical work of dental hygienists and makes them in violation of the medical technicians act when performing tasks that do not fall under the act. In particular, dental hygienists have to do all their work under the guidance of dentists, so the limit is even greater (Hyeong & Jang, 2017).

Medical personnel are those who have a mission to help improve public health and secure a healthy life for the people, including doctors, dentists, doctors of Korean medicine, nurses, and midwives. Medical personnel are allowed to do medical performance on their own, but medical technicians are not allowed to do arbitrary medical practice. Medical practice means an act of prevention or treatment of a disease by performing diagnosis, examination, prescription, medication, or surgical procedures with experience and skill based on medical expertise, and which, if not performed by medical personnel, may result in a health and sanitation hazard. These differences between medical personnel and medical technicians create limitations for dental hygiene work, and to address this issue, it is necessary to include dental hygienists in the category of medical personnel and specify their work, which will result in providing more flexible dental services (Hyeong & Jang, 2017).

Previously, various research studies were conducted on the awareness on the role of dental hygienists in the oral health academia in Korea. Studies by Hyeong and Jang (2017) and others who surveyed medical personnel showed that most of the respondents viewed preventive activities performed by dental hygienists as medical practice, and Kim et al. (2017) argued that dental hygiene professional circle should promote cooperation and form a national consensus through public relation activities and discussions because the work of dental hygienists is not legally assured due to the problems with the current law. Choi et al. (2016) argued that most of the respondents agreed on the inclusion of dental hygienists in the category of medical personnel and that the medical technicians act should reflect such awareness and relevant problems. Consequently, to provide professional and quality dental services to the public, the scope of work of dental hygienists should be clearly recognized and institutionalized through the inclusion of dental hygienists in the category of medical personnel. This will require ceaseless attention and efforts to raise awareness among non-medical personnel as well as the dental hygiene community.

Based on the preceding studies above, this study intended to explore the ways to improve the public awareness on the need to include dental hygienists in the category of medical personnel by studying the current level of awareness of medical and non-medical personnel on the issue.

2. Research method

2.1 Research subjects

This study was conducted on applicants who wanted to participate in the study and had signed a consent form for participation when the researchers explained the purpose of the study and how to participate, based on convenient sampling for the general population over 20 years of age living in the country from April to June 2018. Questionnaires were used as research tools and Self-filling and online survey were used for data collection (Naver format). A total of 340 questionnaires were retrieved, of which 327 were used for the final analysis, except for those that were insufficient due to the omission of entries.

2.2 Research tools

Tools of Hyeong and Jang (2017) and Choi et al. (2016) were modified and used as research tools to identify the awareness on the inclusion of dental hygienists in the category of medical personnel, and the questionnaire draft was written by the researchers and consulted and modified by 2 professors of dental hygiene to enhance its validity. The survey items consisted of 5 questions for general characteristics, 17 questions for awareness of dental hygienists' role, 5 questions for awareness on the inclusion of dental hygienists in the category of medical personnel, and 11 questions for awareness on the changes that would be made by the inclusion of dental hygienists in the category of medical personnel.

The awareness on the role of dental hygienists and the changes that would be made by the inclusion of dental hygienists in the category of medical personnel were scored based on Likert scale, where the higher the score the higher the awareness, with 1 point for "strongly disagree" and 5 points for "strongly agree." The reliability of the awareness on the role of dental hygienists and the changes that would be made by the inclusion of dental hygienists in the category of medical personnel in this research tool were shown with Cronbach's α value of 0.735 and 0.929, respectively.

2.3 Data analysis

This study was analyzed using SPSS/WIN 21.0, and the significance level of the statistical test was $\alpha=0.05$. Frequency and percentage were calculated to identify the general characteristics of the study subjects. T-test and One-way ANOVA were conducted to measure the awareness on the role of dental hygienists and the changes that would be made due to the inclusion of dental hygienists in the category of medical personnel by the general characteristics, and Scheffe was used as a post hoc test on the group that showed statistical significance after One-way ANOVA. In addition, a cross-analysis (χ^2 (Chi-square) test) was conducted to measure the awareness of medical and non-medical personnel on the inclusion of dental hygienists in the category of medical personnel, and multiple regression analysis was conducted to measure the factors affecting the change that would be made by the inclusion of dental hygienists in the category of medical personnel.

3. Research result

3.1 General characteristics of the research subjects

The general characteristics of the study subjects are as follows in Table 1. Women accounted for 68.5% and men accounted for 31.5%. In terms of age, the 20-29 group accounted for 60.2%, and for education level, high school graduates were the largest group, accounting for 51.1%. Non-medical personnel accounted for 67.9%, followed by 14.4% of students in the health and medical sectors, 11.0% of medical technicians, and 6.7% of medical personnel. Gyeonggi Province had the largest number of residents with 58.7%.

Table 1. General characteristics of the research subjects

Characteristics	Division	N	%
Sex	Male	103	31.5
	Female	224	68.5
Age	20-29 years	197	60.2
	30-39 years	34	10.4
	40-49 years	34	10.4
	≤ 50 years	62	19.0
Education level	High school grad.	167	51.1
	2-year college grad.	68	20.8
	4-year college grad	22	21.4
	Graduate school and above	22	6.7
Occupation	Medical personnel	22	6.7
	Medical technician	36	11.0
	Students in the health and medical sector	47	14.4
	Non-medical	222	67.9
Residence	Seoul	135	41.3
	Gyeonggi	192	58.7
Total		327	100.0

3.2 The awareness of medical and non-medical personnel on the inclusion of dental hygienists in the category of medical personnel

The awareness of medical and non-medical personnel on the inclusion of dental hygienists in the category of medical personnel is as follows in Table 2.

To the question asking whether they are familiar with the medical act, medical personnel (57.1%) showed higher awareness than non-medical personnel (12.2%), and there were statistically significant differences ($p < 0.001$). To the question asking whether they are familiar with the medical occupational

categories, medical personnel (81.9%) showed higher awareness than non-medical personnel (52.7%), and there were statistically significant differences ($p < 0.001$). To the question regarding the skill level of dental hygienists, medical personnel (77.1%) answered more "yes" than non-medical personnel (60.8%), and there were statistically significant differences ($p < 0.001$). To the question whether it was appropriate to include dental hygienists in the category of medical personnel, medical personnel answered more "yes" than non-medical personnel (65.8%), but there was no statistically significant difference. To the question asking what did they think was most necessary to promote the inclusion of dental hygienists in the category of medical personnel, both medical and non-medical personnel selected the improvement of the dental hygienists' expertise (25.7% and 32.0%, respectively), but there was no statistically significant difference.

Table 2. The awareness of medical and non-medical personnel on the inclusion of dental hygienists in the category of medical personnel N(%)

Characteristics	Division	Medical	Non-medical	Total	χ^2	p^*
Awareness on the medical act	Yes	60(57.1)	27(12.2)	87(26.6)	73.860	<0.001
	No	45(42.9)	195(87.8)	240(73.4)		
Awareness on the medical occupational categories	Yes	86(81.9)	117(52.7)	203(62.1)	25.823	<0.001
	No	19(181.1)	105(47.3)	124(37.9)		
Skill level of dental hygienists	No	13(12.4)	19(8.6)	32(9.8)	15.923	<0.001
	Don't know	11(10.5)	68(30.6)	79(24.2)		
	Yes	81(77.1)	135(60.8)	216(66.1)		
Inclusion as medical personnel	No	15(14.3)	27(12.2)	42(12.8)	4.380	0.112
	Don't know	13(12.4)	49(22.1)	62(19.0)		
	Yes	77(73.3)	146(65.8)	223(68.2)		
Factors to promote the inclusion as medical personnel	Public relations	13(12.4)	27(12.2)	40(12.2)	7.714	0.103
	Improvement of dental hygienists' expertise	27(25.7)	71(32.0)	98(30.0)		
	Law revision for dental hygienists	27(25.7)	68(30.6)	95(29.1)		
	Perception change of medical personnel	27(25.7)	30(13.5)	57(17.4)		
	Level of interest of non-medical personnel	11(10.5)	26(11.7)	37(11.3)		

* by chi-square test

3.3 Awareness on the role of dental hygienists by the general characteristics

Awareness on the role of dental hygienists by the general characteristics is as follows in Table 3. Women scored 3.67 ± 0.50 points on average, which is higher than men (3.47 ± 0.46 points), and there were statistically significant differences ($p < 0.01$). Graduate school graduates and above showed the highest awareness with 3.88 ± 0.55 points and high school graduates showed the lowest awareness

with 3.51 ± 0.53 points, and there were statistically significant differences ($p < 0.01$) and a post hoc test confirmed the differences. Medical technicians showed the highest awareness with 3.94 ± 0.46 points, and medical personnel showed the lowest awareness with 3.48 ± 0.55 points, and there were statistically significant differences ($p < 0.01$). A post hoc test showed that there were differences between medical personnel and technicians and students in the health and medical sector and non-medical personnel. Research subjects living in Seoul showed a high level of awareness with 3.67 ± 0.48 points, there were statistically significant differences ($p < 0.05$).

Table 3. Awareness on the role of dental hygienists by the general characteristics

Characteristics	Division	Mean±SD	t/F	<i>p</i> [*]
Sex	Male	3.47±0.46	-3.399	0.001
	Female	3.67±0.50		
Age	20-29	3.61±0.47	0.377	0.770
	30-39	3.67±0.53		
	40-49	3.57±0.54		
	50 and above	3.57±0.54		
Education level	High school grad.	3.51±0.53 ^a	5.621	0.001
	2-year college grad.	3.88±0.55 ^b		
	4-year college grad.	3.66±0.40 ^{ab}		
	Graduate school and above	3.70±0.43 ^{ab}		
Occupation	Medical personnel	3.48±0.55 ^a	16.144	<0.001
	Medical technician	3.94±0.46 ^a		
	Students in the health and medical sector	3.89±0.52 ^b		
	Non-medical	3.50±0.44 ^b		
Residence	Seoul	3.67±0.48	2.143	0.033
	Gyeonggi	3.55±0.50		

^{*} by the t-test for two groups and one-way ANOVA (post-test Scheffe) for three or more groups.
^{a, b} The same character indication shows that there is no statistical significance.

3.4 Awareness on the changes that would made due to the inclusion of dental hygienists in the category of medical personnel by the general characteristics

Awareness on the changes that would made due to the inclusion of dental hygienists in the category of medical personnel by the general characteristics is as follows in Table 4.

Students in the health and medical sector showed the most positive response with 4.10 ± 0.58 points and non-medical personnel scored the lowest point of 3.80 ± 0.49 , and there were statistically significant differences ($p < 0.001$). A post hoc test showed the difference between them.

Table 4. Awareness on the changes that would made due to the inclusion of dental hygienists in the category of medical personnel by the general characteristics

Characteristics	Division	Mean ±SD	t/F	p*
Sex	Male	3.86±0.45	-0.236	0.814
	Female	3.88±0.54		
Age	20-29	3.87±0.50	0.583	0.627
	30-39	3.98±0.49		
	40-49	3.86±0.61		
	50 and above	3.84±0.53		
Education level	High school grad.	3.86±0.52	0.108	0.955
	2-year college grad.	3.86±0.48		
	4-year college grad.	3.91±0.51		
	Graduate school and above	3.88±0.60		
Occupation	Medical personnel	3.88±0.43 ^{ab}	5.482	0.001
	Medical technician	4.03±0.59 ^{ab}		
	Students in the health and medical sector	4.10±0.58 ^a		
	Non-medical	3.80±0.49 ^b		
Residence	Seoul	3.94±0.51	1.859	0.064
	Gyeonggi	3.83±0.53		

* by the t-test for two groups and one-way ANOVA (post-test Scheffé) for three or more groups.
^{a,b} The same character indication shows that there is no statistical significance.

3.5 Factors affecting changes that would be made due to the inclusion of dental hygienists in the category of medical personnel

To examine the factors affecting changes that would be made due to the inclusion of dental hygienists in the category of medical personnel, we designated occupation that showed statistical significance in the general characteristics and awareness on the inclusion of dental hygienists in the category of medical personnel (medical act, medical occupational categories, dental hygienists' expertise, and the inclusion as medical personnel) as evaluation parameter, awareness on the role of dental hygienists as independent variable, and changes that would be made due to the inclusion of dental hygienists in the category of medical personnel as dependent variable and conducted multiple regression analysis (see Table 5).

The fitted regression model was statistically significant (F=13.140, p<0.001), with 27.1% model explanation power. In addition, it has been shown that the inclusion of dental hygienists as medical personnel among the selected independent variables (yes, fair, p<0.001) and awareness on the role of dental hygienists (p<0.001) have a statistically significant effect on the changes that would be made, the dependent variable. In other words, if the subject thought that it was appropriate or fair for dental hygienists to be included in the category of medical personnel and the higher the awareness on the role of dental hygienists, the more likely the subject had a positive awareness

on the changes that would be made due to the inclusion.

Table 5. Factors affecting changes that would be made due to the inclusion of dental hygienists in the category of medical personnel

Independent variables	B	SE	β	t	p^*
(Invariable)	2.330	0.226		8.753	<0.001
Occupation (medical vs non-medical)	0.089	0.102	0.043	0.875	0.382
Occupation (medical technician vs non-medical)	0.027	0.093	0.016	0.285	0.764
Occupation (Students in the health and medical sector vs non-medical)	0.120	0.078	0.018	1.537	0.125
Awareness on the medical act (yes vs no)	-0.028	0.068	-0.024	-0.410	0.682
Awareness on medical occupational categories (yes vs no)	-0.008	0.055	-0.007	-0.139	0.889
Dental hygienists' expertise (good vs poor)	0.009	0.100	0.008	0.089	0.929
Dental hygienists' skill level (fair vs poor)	-0.060	0.105	-0.049	-0.570	0.569
Inclusion as medical personnel (yes vs no)	0.488	0.089	0.438	5.470	<0.001
Inclusion as medical personnel (fair vs no)	0.318	0.097	0.240	3.291	<0.001
Awareness on the role	0.332	0.057	0.319	5.846	<0.001

$R^2=0.294$, $adj.R^2=0.271$, $F= 13.140$, $p<0.001$ $DW= 1.843$

* by multiple regression analysis

4. Summary and suggestion

The scope and role of work among the workforce are not legally distinct in the dental/oral healthcare sector compared to the reality of the people's growing interest and demand for dental/oral health (Choi et al., 2016; Park & You, 2004; Jung & Song, 2008; Kwon & Lee, 2016; Korean Dental Hygienists Association magazine, 2018). In particular, the dental hygienists related law specified in the current Medical Technicians Act does not reflect the actual work of dental hygienists (Kang et al., 2010; Korean Dental Hygienists Association magazine, 2018). This situation not only increases the ratio of turnover and change of career by discouraging dental hygienists from performing their duties and lowering their sense of mission and self-esteem, but can also lead to instability in the dental healthcare delivery system and an imbalance in the workforce structure. Therefore, the following results were obtained by investigating awareness on the inclusion of dental hygienists in the category of medical personnel of both medical and non-medical personnel.

The research showed that medical personnel had higher awareness on the medical act and occupational categories than non-medical personnel ($p<0.001$). This is thought to be because non-medical personnel had fewer opportunities to obtain medical-related information than medical personnel. Therefore, it is very important to continue to promote relevant information and pay attention to improve awareness on the inclusion of the dental hygienists in the category of medical personnel. In this regard, Korean Dental Hygienists Association strives to improve the work condition of dental hygienists by implement-

ing the 1 million signature movement (2017.07) or the mandatory wearing of name tags (Enforcement Decree on Medical Act, 2019 - Article 2-2, Enforcement Decree of the Medical Act). However, based on the ratio of newspaper articles in Kim et al. (2017). Choi et al. (2016) research and that less than 50,000 people participated in the 1 million signature movement conducted by Korean Dental Hygienists Association as of Nov. 13, 2018, awareness on their role and the inclusion of dental hygienists in the category of medical personnel is still low.

Both medical and non-medical personnel showed high awareness on the dental hygienists' expertise ($p < 0.001$). It is understood that the subjects showed high awareness because they recognized that a professional dental hygienist had to obtain a license through a regular 3- or 4-year education at a university and worked at a dental care institution.

In regards to awareness on the dental hygienists' role by the general characteristics, graduate school or higher was the highest in education (0.001). There were significant differences in sex as well, with women higher than men ($p < 0.001$). This is thought to have been based on the professional nature of dental hygienists to the public, as well as the stereotyped perception that it is a career for a woman.

Most medical (73.3%) and non-medical personnel (65.8%) answered yes to the inclusion of dental hygienists in the category of medical personnel, but there was no statistically significant difference, which was similar to the 90.74% (245 cases) of "pro" opinions shown by the analysis of newspaper articles on the issue done by Kim et al. (2017).

The most necessary factor for promoting the inclusion of dental hygienists in the category of medical personnel was the improvement in the professionalism of dental hygienists for both medical and non-medical personnel ($p < 0.001$). This is thought to be because medical personnel must have expertise and professionalism to be able to take the initiative in performing his or her work without the direction of someone else. In addition, students in the health and medical sector showed the most positive view on changes that would be made by the inclusion of dental hygienists in the category of medical personnel, followed by medical technicians, medical personnel, and non-medical personnel ($p < 0.001$). This is thought to be because medical personnel at the forefront of the work relationship with dental hygienists were more aware of the limitations on the scope of dental hygienists' work.

The higher the awareness on the role of dental hygienists and when they thought it was appropriate or fair to include dental hygienists in the category of medical personnel, the more positive awareness they had on changes that would be made due to the inclusion ($p < 0.001$). Therefore, it is necessary to make greater efforts to raise awareness on the role of dental hygienists and to actively inform the public of the need for dental hygienists to be included as medical personnel. In addition, it will be important to ensure that dental hygienists are recognized as professionals who can take the lead in dental institutions by improving their professionalism and skill level to win the public's favor for including them as medical personnel.

The limitation of this study is that the survey area was limited to Seoul and Gyeonggi Province so caution should be taken in representing the population, but it is meaningful in that awareness on the inclusion of dental hygienists in the category of medical personnel was investigated via both medical and non-medical personnel. Therefore, it is believed that the study could contribute

to the promotion of the inclusion dental hygienists in the category of medical personnel in the future by expanding the research target to a wider range of areas and further investigating the cause of low awareness despite the continued promotion and efforts.

5. Conclusion

The study conducted a survey of medical and non-medical personnel living in Seoul and Gyeonggi province for about two months from April to June 2018 to explore ways to improve people's awareness on the need to include dental hygienists in the category of medical personnel and obtained the following results.

1) To the question asking whether they are familiar with the medical act and medical occupational categories, medical personnel showed high awareness (57.1% and 81.9% respectively, $p < 0.001$ for both).

than non-medical personnel (12.2%), and there were statistically significant differences ($p < 0.001$). To the question asking whether they are familiar with the medical occupational categories, medical personnel (81.9%) showed higher awareness than non-medical personnel (52.7%), and there were statistically significant differences ($p < 0.001$). To the question regarding the skill level of dental hygienists, medical personnel (77.1%) answered more "yes" than non-medical personnel (60.8%), and there were statistically significant differences ($p < 0.001$). Both medical and non-medical personnel said "yes" to the inclusion of dental hygienists in the category of medical personnel and thought the improvement of dental hygienists' expertise and professionalism were most important to promote the inclusion. To the question regarding the skill level of dental hygienists, medical personnel answered mostly "yes" (77.1%, $p < 0.001$).

2) As to awareness on the role of dental hygienists by the general characteristics, women ($p < 0.01$), graduate school or above, medical technicians ($p < 0.001$), and Seoul residents ($p < 0.05$) showed the highest awareness.

3) As to awareness on changes that would be made due to the inclusion of dental hygienists in the category of medical personnel by the general characteristics, students in the health and medical sector showed the most positive response ($p < 0.01$).

4) Looking at the factors that affect the changes that would be made to the dental hygienists if they were to be included in the category of medical personnel, we found that people who thought it was appropriate or fair for dental hygienists to be included as medical personnel ($p < 0.001$) and those who had a high opinion on the role of dental hygienists ($p < 0.001$) tended to have a positive awareness on the changes that would occur after the inclusion.

Based on the above results, it is believed that the government needs to raise awareness of the role of dental hygienists and actively inform the public of the need for dental hygienists to be included as medical personnel to promote the inclusion.

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