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Original Article

## The perception and practice of privacy protection in some dental hygiene students



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### Abstract

**Objectives:** This study explored the perception and practice of privacy protection of some dental hygiene students. **Methods:** On the basis of survey data from 126 respondents, the correlation between the perception and the practice was analyzed. Also the multiple regression analysis was performed on the variables that affect the practice. Cronbach's  $\alpha$  of the questionnaire was more than 0.6. The items were scored on 5 points scale or true-false type. **Results:** The perception of privacy protection was 3.23 points, the law is 0.88 points, and the practice is 3.47 points. The educated students were more perceive than those who did not ( $p<0.05$ ). The higher the perception, the higher the practice ( $r=0.230$ ,  $p<0.01$ ). The practice was influenced by the perception ( $p<0.05$ ). **Conclusions:** Dental hygiene students should be educated to perceive and protect the personal and medical information of a patient. Also, an educational institutions need a efforts to protect personal information.

**Key Words:** Dental hygiene student, Information protection act, Perception, Personal information, Practice, Privacy protection

### Introduction

Depending on the Personal Information Protection Act, a personal information is an information about a living person and an information that can identify an individual, such as name, resident registration number, and image. In addition, it includes an information that can be easily identified and combined with other information even if the information is not known to a specific individual [1].

Currently, our society is an information society where not only offline but also online an information can be easily obtained. The development of technology has convenient access to information, but it can lead to the leakage of personal information that could invade a privacy or threaten a safety. According to e-Nara index of the Korea Communications Commission, the number of personal information

infringements rose to 98,210 in 2016, more than four times that of 23,333 in 2006, and 48,557 cases of an identity theft, including a resident registration number, accounted for the highest percentage[2].

Medical information is being computerized and networked[3], and the digital system is changing in the dentistry. If the patient's personal information and medical information well do not manage, those will be leaked[4]. In particular, if the medical information were leaked, it will have a catastrophic adverse effect on the privacy of individual patients[5].

Therefore, in Korea, Personal Information Protection Act was enacted in March 2011 and has been in operation since September[2]. In the past, according to Act on Protection of Personal Information of Public Institutions, it was protected only for public period or corporations. However, as the Privacy Act was enforced, it was also applied to medical institutions[6]. The dental hygienist performs the duties, such as resource management, patient care, medical record management, insurance claim, management of materials and medicines, and continuous patient management. In spite of a dental administrator who play an important role of protecting a personal information of patients, they were lower the knowledge and practice than the other professionals in medical institution[7]. If the personal information were not enough protected, the patients will not only be anxious but also distrust the dentist.[8].

It was reported that the leakage of patient's personal information was caused by an insiders who had easier accessed to information than an outsiders[9]. Therefore, it is important to recognize the protection of personal information in medical institutions as well as the systems and the laws for the protection of medical information, and to establish their practical will[10].

Recently, the efforts to protect medical information have been started, but those is a lack in dentistry[5,7]. The most of the studies related to the protection of medical information were targeted at nurses[11], doctors, nursing assistants, medical technicians, and general administrative staff[9,10]. The previous studies[9-11] were limited to the study subjects and to the medical institution[10]. There have been studied on the dental protection of personal information[7], but the researches on dental hygiene students have been lacked.

A dental hygienist deals with patient's personal information such as social security number, address, and telephone number. They also handle sensitive medical information, for example medical history, family history, taking medications, and physical condition. Therefore, it is necessary to investigate the perception and practice of personal information protection of students who are preliminary dental hygienists.

The purpose of this study is to recognize the importance of personal and medical information and to provide the basic data for practice by investigating them.

## Methods

### 1. Study subjects

The conveniently sampled 136 study subjects were the dental hygiene students of Cheongam college in Suncheon city. They were explained the purpose and method of the study, filled out the self-administered questionnaire when they agreed. The survey period was 5 days from March 16 to 21, and the questionnaire

was collected directly by the researcher. The total 126 questionnaires were used in the final data analysis, except for the number of missing 8 copies and incomplete 2 responses.

The minimum number of study samples was calculated as 102 using G Power 3.0[12,14] program by analysis of variance(ANOVA), 0.05 significance level, 95% power of test, and 0.40 effect size. Assuming the elimination by 10%, 136 subjects were suitable for the analysis. The size effect was referenced the results of Jung[15] that compared the perception for protection of patient's personal information.

This study was approved by Cheongam college Institutional Review Board(CA17-180316-HR-004-01).

## 2. Study method

The questionnaire consisted of 33 items which were 5 items of subjects characteristics, 8 items of the perception of privacy protection, 8 items of Personal Information Protection Act, and 12 items of the practice of privacy protection. The items were modified and adapted according to the study purpose by referring to the questionnaire of Bae[5]. It was scored on a 5 point Likert scale that was the perception and practice of privacy protection. The question related to Personal Information Protection Act was the true-false item. Cronbach's  $\alpha$  was 0.603 for the internal consistency of perception of privacy protection. There were 0.614 in Information Protection Act and 0.666 in the practice of privacy protection.

## 3. Data analysis

The characteristics of the subjects were frequency and percentage. It was calculated the mean and standard deviation that was the perception and practice of privacy protection, and Personal Information Protection Act. The analysis method was two independent samples t-test, one way ANOVA, pearson correlation coefficient. In addition, the multiple regression analysis was performed to the variable that affected the practice. The data were analyzed using Statistical Package for Social Science(SPSS ver. 18.0, Chicago, Illinois, USA).

# Results

## 1. The characteristics of the study subjects

The study subjects were 126 female dental hygiene students in Cheongam college and were shown in <Table 1>. 55.6% have not educated on the privacy protection, and 50.0% desired an online lecture.

## 2. The perception of privacy protection

It was 3.23 points that was the perception of privacy protection. They thought that the personal information of others should be protected(4.46 points), and the perception of personal information was changed(3.65 points). However, they did not know about Personal Information Protection Act(2.42 points) and was not protected myself(2.48 points)<Table 2>.

## 3. The perception of Personal Information Protection Act

It was 0.88 points that was the perception of Personal Information Protection Act. They thought that the additional agreement should be need when the personal information be used or be provided to others(0.97 points). When the sensitive information and Personally Identifiable Information must be agreed additionally(0.94 points), and it should be taken the measures to ensure the security of personal information(0.94 points). However, it was low points that the personal information should no be required online, should use the others, such as Internet Personal Identification Number(I-PIN) or public certificate(0.68 points), if Closed Circuit Television(CCTV) were installed in a public place, a signboard mu st be installed(0.85 points)<Table 3>.

**Table 1.** The characteristics of the study subjects

Characteristics	Division	N	%
Gender	Female	126	100.0
Grade	1	43	34.1
	2	41	32.5
	3	42	33.3
Region	Suncheon	61	48.4
	etc.	65	51.6
Education experience	Yes	56	44.4
	No	70	55.6
Desirable education method	Lecture	63	50.0
	Online	63	50.0
Total		126	100.0

**Table 2.** The perception of privacy protection

Variables	Mean	SD
Perception of personal information protection act	3.65	1.11
Change of perception	2.48	0.81
Protection to myself	3.24	0.87
Protection at medical institution	4.46	0.76
Protection to others	3.16	0.97
Impact of education on practice	3.23	0.46
Total	3.23	0.46

**Table 3.** The perception of Personal Information Protection Act

Variables	Mean	SD
Personal information should be collected to a minimum and additional information must be agreed.	0.93	0.26
When the personal information be used or be provided to others, those must be agreed additionally.	0.97	0.18
When the sensitive information and Personally Identifiable Information must be agreed additionally.	0.94	0.23
The personal information should no be required online, should use the others, such as I-PIN or public certificate.	0.68	0.47
It should be taken the measures to ensure the security of personal information.	0.94	0.23
It should take the necessary measures for a safety of personal information.	0.86	0.35
When the personal information is leaked, it should be reported without delay.	0.88	0.33
If CCTV were installed in a public place, a signboard must be installed.	0.85	0.36
Total	0.88	0.16

## 4. The practice of privacy protection

It was 3.47 points that was the practice of privacy protection. They did not read the personal information of others(4.55 points), and used their identification(ID) and password online(4.52 points). But they did not periodically change their ID and password(1.87 points), and did not use the personal computer(PC)'s screen saver(2.09 points)<Table 4>.

## 5. The differences of the variables according to the subject characteristics

It was shown in <Table 5> that was the differences in the perception, the Act, and the practice of privacy protection according to the characteristics of study subjects. The education experience showed statistically significant difference in the perception of privacy protection. The educated subjects were more perceive than those who did not. However, there were no statistically significant differences in the other.

## 6. The correlative among the variables

It was shown in <Table 6> that was the correlation in the perception, the education experience, the Act, and

**Table 4.** The practice of privacy protection

Variables	Mean	SD
Use my ID and password online	4.52	0.97
Check out the logout	4.14	1.26
Use the PC screen saver	2.09	1.24
Change my ID and password periodically	1.87	1.04
Not sharing ID and password	4.13	1.15
Not reading the personal information of others	4.55	0.98
Crush up the printout related to personal information	3.42	1.39
Update of the PC anti-virus program periodically	3.21	1.39
Keep in locking cabinet the printout	2.8	1.30
Not talking about personal information in public places	3.41	1.20
Not providing the personal information of others	4.06	0.98
Total	3.47	0.57

**Table 5.** The differences of the variables according to the subject characteristics

Characteristics	Variables	Protection			Law			Practice		
		Mean	SD	p*	Mean	SD	p*	Mean	SD	p*
Grade	1	3.21	0.43	0.242	0.89	0.11	0.663	3.43	0.63	0.516
	2	3.16	0.51		0.86	0.18		3.44	0.52	
	3	3.33	0.45		0.89	0.19		3.56	0.54	
Region	Suncheon	3.26	0.44	0.554	0.86	0.19	0.09	3.45	0.54	0.648
	Etc	3.21	0.49		0.90	0.13		3.50	0.59	
Education experience	Yes	3.32	0.48	0.050	0.91	0.11	0.061	3.54	0.61	0.226
	No	3.16	0.44		0.86	0.19		3.42	0.53	
Desirable education method	Lecture	3.29	0.52	0.132	0.89	0.15	0.844	3.51	0.58	0.488
	Online	3.17	0.40		0.88	0.18		3.44	0.55	

\*by t-test or one-way ANOVA

the practice of privacy protection of the study subjects. The perception has a positive correlation with the education experience( $r=0.175, p<0.05$ ), the Act( $r=0.263, p<0.01$ ), and the practice( $r=0.230, p<0.01$ ).

## 7. The affecting variables on the practice of privacy protection

It was statistically significant that was the multiple regression analysis of the variables affecting the practice of privacy protection( $p<0.05$ ). The perception had an effect on the practice( $p<0.01$ )*<Table 7>*, but the act did not affect it.

**Table 6.** The correlation between the perception and the practice of privacy protection

Variables	Practice	Perception	Act	Education experience
Practice	1			
Perception	0.230**	1		
Act	0.033	0.263**	1	
Education experience	0.109	0.175*	0.158*	1

\* $p<0.05$ , \*\* $p<0.01$  by pearson's correlation analysis

**Table 7.** The affecting variables on the practice of privacy protection

Variables	B	SE	$\beta$	t	$p^*$
	2.630	0.396		6.643	0
Perception	0.289	0.111	0.237	2.612	0.010
Act	-0.104	0.318	-0.030	-0.326	0.745
$R^2=0.54$ , Adjusted $R^2=0.38$ , F=3.481, $p<0.05$					

\*by multiple regression analysis at  $\alpha=0.05$

## Discussion

In 2015, the Social Network Services(SNS) of Seongnam mayor was the big issue because he revealed the residence, the workplace, the school name of the people who were tested positive on the Middle East Respiratory Syndrome(MERS)[16]. He disclosed those in accordance with the Act on Prevention and Management of Infectious Diseases, but seriously infringed the personal information of patient. A patient's medical information is very sensitive, and if those were infringed, those will not be reversed.

Ministry of Health and Welfare issued the guidelines for the privacy protection of medical institutions[17], and a medical institutions are establishing the system for patients and legally obligating the education of privacy protection at least once a year. Dental hygienists should also try to perceive the knowledge and the Act and to practice the privacy protection as a oral care professional. They also need to be educated about medical privacy protection in educational institutions. This study investigated the perception, the Act and the practice of privacy protection of the students as a pre-dental hygienist.

In the study of Bae[5], the perception of privacy protection was changed due to the abuse of personal information and the increase in the right consciousness. And the perception path was the personal information education, the broadcasting media, and the internet. Since Personal Information Protection Act was enacted

in 2011, the perception was changing through various media. Also they were more perceive it because of the education.

The study subjects responded that Personal Information Protection Act(2.42 points) was unfamiliar, but the most of the main contents of the Act were already known(0.88 points). They thought that the provider would need additional the consent when providing the personal information to others, and for the sensitive information and Personally Identifiable Information. They also said that the measures should be taken to protect privacy. But, it was low points than others that was protecting a personal information online, for example I-PIN, public certificate, and setting up the CCTV signage. In the study of Lee and So[7], It was higher points that was the CCTV installation guide(92.7%) and the patient's consent when using those for study purpose(84%), while it was lower points that was the personal information collection(15.4%) and the periodic letters to non-visiting patients(30.8%). In study of Choi and Kang[12], it was high points that the personal information was not provided to other departments(3.3 points) and to other(3.3 points), but it was low points that was Logout(2.76 points), and the screen saver(2.98 points). The results of this study were slightly different from those of the previous study because of the differences in the subjects or the study methods.

The practice of privacy protection was the normal level at the average of 3.47 points. It was the high level that was reading others information(4.55 points), and using own ID and password(4.52 points). However, It was the low level that was changing the ID and password(1.87 points), and using the screen saver(2.09 points). The reasons of difficulty in practicing were the complexity(32.3%), and busy and annoying(21.2%). In study of Choi and Kang[12], it was high points that was the patient's privacy protection(2.94 points) and the consent(2.94 points), but it was low points that was the participation in education(1.48 points) and the dialogue on patient information(2.98 points). In the study of Kim et al.[18], the practice of privacy protection was 3.84 points. It was the higher items which were the medical records manage(4.46 points), and the use of ID and password(4.34 points). But It was the lower items which were the minimum communication about a patient's information(3.35 points), and the conversations about a patients in public places(3.39 points). In the study of Jeong et al.[19], the conversation about a patient's information(95.3%) and reading about patient information(94.8%) were the high level, but the education participation on privacy protection(44.1%), and the counseling room for a patient's privacy(47.7%) were the low level. In this study, the practice of privacy protection was the normal level, it was similar to the previous studies[18,19], However there were a bit different from it of the previous study[12] due to differences in study subjects.

The educated subjects were more perceive than those who did not. However, there were no statistically significant differences in the grade, the region, and the desirable education method. In the study of Lee and So[7], the perception of privacy protection varied according to the gender, the academic background, and the working experience. The perception of the Act was the age and the working experience, the practice was a statistically significant difference by the age, the gender, the academic background, the working experience, the work organization and the job. In the study of Choi and Kang[12], the perception varied according to the position and the number of employees, and the practice varied according to the position and the work experience. In the study of Kim et al.[18], there were differed in the perception according to the educational

background and the age, and there were differences in their practices according to the education experience, the education programs, and the education time.

In this study, the higher the perception of privacy protection, the higher the practice of those. In previous studies[7,12,19], the higher the perception, the higher the practice. In addition, similar to previous studies[12], the perception was found to influence the practice.

This study is a significant study investigating the perception and practice of privacy protection of dental hygiene students. However, this study has the limitations that the sampling was the convenience sampling and it was difficult to generalize because of the female student, the limitation in some areas, and some subjects. In a follow-up study, it should also be investigated in a broader range of subjects and regions, by systematic probability sampling.

Since 2015, it had been begun a self-check on personal information protection at medical institution[20]. However, as from 2016, only 11.0% of the dental hospitals and 14.0% of the dental clinics had been enforced, the practice was still lacking[21]. It was trying to the compulsory education, but it has not had the legal enforcement. Also it is not punishable even if it is not enforced.

As a preliminary dental hygienist, dental hygiene students should be trained to perceive and to protect a patient's information. If educational institutions strengthen the effort to protect personal information, a perception and practice of students will be improved.

## Conclusions

This study was investigated the perception and practice of privacy protection of dental hygiene students, and was provided a basic data. The results of the questionnaire survey of 126 students were as follows.

1. The perception of privacy protection was 3.23 points, the Act was 0.88 points, and the practice was 3.47 points.
2. The educated students were more perceive the personal information than those who did not( $p<0.05$ ).
3. The higher the perception of privacy protection, the higher the practice( $r=0.230, p<0.01$ ).
4. The practice of privacy protection was influenced on the perception.

Dental hygiene students should be educated to perceive and protect the personal and medical information of a patient.

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