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Relationship of Critical Thinking Disposition, Self-Esteem and Self-Efficacy among Dental Hygiene Majors*

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ABSTRACT

The purpose of this study is to investigate critical thinking disposition, self-esteem, and self-efficacy among dental hygiene majors to determine the degree of relevance among the three factors. From Oct. 15 to Dec. 6, 2012, a total of 935 students from five three-year universities and six four-year colleges nationwide were conducted. A structured questionnaire was used to conduct correlation and regression analysis on the degree and mutual relevance among critical thinking disposition, self-esteem, and self-efficacy. When measuring the degree of critical thinking disposition, self-esteem, and self-efficacy, the results showed that the score was 3.40 for critical thinking disposition, 3.53 for self-esteem and 3.03 for self-efficacy. Critical thinking disposition is composed of seven factors: intellectual passion/interest, prudence, self-confidence (A), systemicity, intellectual fairness, sound skepticism, and objectivity, and significant influencing factors were found to be self-regulation efficacy among self-esteem and self-efficacy. Factors that were significant for self-esteem included confidence (A), intellectual passion/interest, systemicity in critical thinking disposition and confidence (B) and self-regulation efficacy in self-efficacy. Self-efficacy was classified into three factors: confidence (B), self-regulation efficacy, and task difficulty preference, and the significant factors of influence were self-esteem, systemicity, confidence (A), intellectual passion/interest, and sound skepticism in critical thinking disposition. The relevance between critical thinking disposition, self-esteem, and self-efficacy showed a positive correlation among all items except for sound skepticism and confidence (B).
From the above results, critical thinking disposition, self-esteem, and self-efficacy were significantly related to each other, and it is expected that they will be used as basic data for the development of the dental hygiene curriculum where each factor can be systematically and continuously enhanced.

* This paper is excepted from a part of the master's thesis authored by SO-Yeon You of the Graduate School of Hanseo University.

1. Introduction

Today, dental hygienists have become an important part of the oral health workforce structure, working not only at the clinical site, but also at local community institutions such as health centers, schools, kindergartens, and so on (Hwang, 1999). In addition, recent dentistry has taken a step further from treatment to prevent and early detection of dental diseases (Won & Jeong, 2004). Accordingly, dental hygienists trained for oral disease prevention, oral health education, and optimal oral health are required to play a greater role as experts with both expertise and skills to provide oral service (Kim, 1992; Jang, 2003).

In addition, the rapidly changing health care environment today desperately needs critical thinking skills to adapt to faster and more accurate decisions and new environments due to patients' diverse characteristics (Kim & Kim, 2007). Critical thinking is a logical and rational thought for evaluation and judgment (Facione & Facione, 1994), and the fundamental reason why it should be fostered is that it provides an important process pattern for rational decision-making (Kim et al., 2008).

Students can become self-reliant people who judge and decide on their own through critical thinking and can learn on their own. Critical thinking is so important in education that it is decided as "the ability to think critically, communicate effectively, and solve problems" as the skills that college graduates should have (Kim & Kim, 2007). Recently, the U.S. dental community has also begun to stress the importance of critical thinking, and the new Dental Hygiene Competence Descriptions, established by the American Dental Education Association (ADEA, 2001), states that "dental hygienists must have transitive skills: communication, problem-solving, and critical thinking."

Self-esteem refers to evaluating oneself as a person of value or a person of no value. In other words, as a subjective judgment of one's own importance, ability, success, etc. (Coopersmith, 1967), a person with a high sense of self-esteem maintains an amicable relationship with others to become a leader that their peers follow, to exercise independent and creative abilities, to feel the overall value of life, and to value others as well as to oneself (Rosenberg, 1965). It is also reported that the higher the self-esteem, the more likely the person finds the value in his or her job and gains a sense of achievement through the job and that the sense of achievement helps promote professional conviction and development (Gwon & Yoon, 2007).

Self-efficacy is a belief in one's ability to successfully perform the actions required to achieve results, and when one expects to do something well, one can do it more efficiently (Bandura, 1977). It is reported that the higher the sense of self-efficacy, the higher the level of adaptability of college students' school life and the lower the level of stress regarding academic performance and finding a job, which result in better academic performance and have a positive impact on the organizational socialization (Park et al., 2002).

To work as a dental hygienist, it is necessary to have knowledge and technical support regarding the prevention and hygiene of dental and oral diseases, as well as a thorough sense of service and mission as a medical worker, and to have proper judgment and responsibility for one's actions. Also, because students with high self-esteem and self-efficacy have an optimistic belief that they can change their behavior and can cope with various problems occurring in the adaptation process efficiently and actively (Lee & Yoo, 2008), dental hygienists, whose role is increasing in the field

of specialized and segmented dental care, need to have critical thinking, high self-esteem, and self-efficacy.

Since the ultimate purpose of dental hygiene education is to produce more competent dental hygienists who can perform the tasks required by society through professional education (Kim et al., 2011), this study aims to measure and analyze critical thinking disposition, self-esteem, and self-efficacy among students to provide basic data for the development of dental hygiene curriculum.

2. Research subjects and methods

2.1 Research subjects and data collection procedures

A total of 11 schools were selected randomly from six regions of the country among the dental hygiene departments in universities nationwide and studied. From October 15 to December 6, 2012, a structured questionnaire was prepared with a research consent form, sent to the universities by mail to have the person who agreed to participate in the study respond by self-administering, and collected. Of the 1010 questionnaire sent out, 942 were collected, and 935 (93%) were selected as the final target for analysis, excluding seven insincere responses.

2.2 Research tools

The composition of this study was based on 6 demographic characteristics (age, gender, grade, religion, academic performance, and the level of satisfaction in the major), 27 questions on critical thinking disposition, 10 questions on self-esteem, and 24 questions on self-efficacy by consulting 2 oral health experts and conducting a preliminary survey on 10 college students majoring in dental hygiene to verify the reliability and utility of the research tools. To measure the critical thinking disposition, this study used a tool for measuring critical thinking dispositions developed by Jin (2004). This research tool consists of a total of 27 questions in 7 sub-categories: intellectual passion/interest (5 questions), prudence (4 questions), confidence (A) (4 questions), systemicity (3 questions), intellectual fairness (4 questions), sound skepticism (4 questions), and objectivity (3 questions). To measure self-esteem, a tool that Kim (1995) modified based on the Self-Esteem Scale (SES) of Rosenburg (1986) was used. The research tool consists of a total of 10 questions: 5 positive self-esteem questions and 5 negative self-esteem questions. Each question consists of a 5-point Likert scale, and negative self-esteem areas were analyzed after reverse coding. The higher the score, the higher the level of self-esteem. To measure the sense of self-efficacy, a tool developed by Kim and Cha (1996) was used. This measure consists of a total of 24 questions: confidence (B) (7), self-regulation (12), and task difficulty preference (5). Each question consists of a 5-point Likert scale, and the higher the score, the higher the level of self-efficacy.

2.3 Data analysis

The collected data were analyzed using the SPSS (SPSS 12.0 for Windows, SPSS Inc., Chicago, USA). The technical statistics were obtained with the general characteristics of college students majoring in dental hygiene as the frequency and percent and the critical thinking disposition, self-esteem, and self-efficacy as average and standard deviation. The multiple regression analysis was conducted for the relevant factors for critical thinking disposition, self-esteem, and self-efficacy of college students majoring in dental hygiene, and Pearson's correlation analysis was conducted for the relationship among critical thinking disposition, self-esteem, and self-efficacy.

3. Research results

3.1 The level of critical thinking disposition, self-esteem, and self-efficacy among college students majoring in dental hygiene

The level of critical thinking disposition, self-esteem, and self-efficacy are as follows in Table 1. In critical thinking disposition, intellectual fairness was the highest with 3.70 points. It was followed by 3.68 points for objectivity, 3.52 points for sound skepticism, 3.33 points for intellectual passion/interest, 3.32 points for confidence (A), 3.28 points for prudence, and 2.97 points for systemicity. Self-esteem was 3.53 points, self-efficacy was the highest with confidence (B) of 3.20 points, self-regulation efficacy of 3.11 points, and task difficulty preference of 2.60 points.

Table 1. The level of critical thinking disposition, self-esteem, and self-efficacy among college students majoring in dental hygiene

Characteristics	N	Min. value	Max. value	Average± standard deviation
Critical thinking disposition	935	2.04	4.70	3.40±.34
Intellectual passion/interest	935	1.00	5.00	3.33±.55
Prudence	935	1.00	5.00	3.28±.66
Confidence (A)	935	1.00	5.00	3.32±.60
Systemicity	935	1.00	5.00	2.97±.64
Intellectual fairness	935	1.75	5.00	3.70±.54
Sound skepticism	935	1.75	5.00	3.52±.57
Objectivity	935	2.00	5.00	3.68±.58
Self-esteem	935	1.20	5.00	3.53±.57
Self-efficacy	935	1.58	4.83	3.03±.41
Confidence (B)	935	1.00	5.00	3.20±.70
Self-regulation efficacy	935	1.25	5.00	3.11±.50
Task difficulty preference	935	1.00	5.00	2.60±.65

3.2 Factors affecting critical thinking disposition

The results of a regression analysis that analyzes the relevant factors that influence critical thinking disposition by using self-esteem and self-efficacy as independent variables are shown in Table 2. In the analysis, the entire critical thinking disposition, which is not classified as a sub-factor, such as intellectual passion/interest, prudence, confidence (A), systemicity, intellectual fairness, sound skepticism, and objectivity, was set as a dependent variable. Self-esteem (β =.127, P<0.001) and self-regulation efficacy (β =.538, P<0.001) were found to be affecting, with 38.9% explanation power and 38.6% modified explanation power in this model.

Table 2. Factors affecting critical thinking disposition

		Nonstandardized coefficient		Standardized coefficient	t	P
		B	Standard error	β		
Self-esteem		.077	.021	.127	3.748	<.001*
Self-efficacy	Confidence (B)	.019	.015	.039	1.253	.210
	Self-regulation efficacy	.366	.021	.538	17.627	<.001*
	Task difficulty preference	.019	.015	.036	1.294	.196

R^2=.389, Adjust R^2=.386, F=147.818, P<0.001
* Statistically significant differences by Multiple regression at α =0.01

3.3 Factors affecting self-esteem

The results of a regression analysis on the relevant factors affecting self-esteem by setting critical thinking disposition and self-efficacy as independent variables are shown in Table 3. Confidence (B) (β =.495, P<0.001) and self-regulation efficacy (β =.291, P<0.001) in self-efficacy and confidence (A) (β =.113, P<0.001), intellectual passion/interest (β =.072, P=0.013), and systemicity (β =-.102, P=0.001) were found to be affecting, with 45.5% explanation power and 44.9% modified explanation power in this model.

Table 3. Factors affecting self-esteem

		Nonstandardized coefficient		Standardized coefficient	t	P
		B	Standard error	β		
Critical thinking disposition	Intellectual passion/interest	.075	.030	.072	2.502	.013*
	Prudence	.018	.022	.020	.808	.419
	Confidence (A)	.107	.029	.113	3.700	<.001**
	Systemicity	-.091	.026	-.102	-3.480	.001**
	Intellectual fairness	.022	.029	.021	.762	.446
	Sound skepticism	.006	.027	.006	.210	.834
	Objectivity	.057	.030	.059	1.923	.055
Self-efficacy	Confidence (B)	.398	.021	.495	18.962	<.001**
	Self-regulation efficacy	.326	.038	.291	8.553	<.001**
	Task difficulty preference	-.015	.023	-.017	-.627	.530

R^2=.455, Adjust R^2=.449, F=77.114, P<0.001
* Statistically significant differences by Multiple regression at α =0.05
** Statistically significant differences by Multiple regression at α =0.01

3.4 Factors affecting self-efficacy

The results of a regression analysis on the relevant factors affecting self-efficacy by setting critical thinking disposition and self-esteem as independent variables are shown in Table 4. In the analysis, the entire set of self-efficacy that is not classified as a sub-factor, such as confidence (B), self-regulation efficacy, and task difficulty preference, was set as a dependent variable. Self-esteem (β =.401, P<0.001) and systemicity (β =.214, P<0.001), confidence (A) (β =.214, P<0.001), intellectual passion/interest (β =.167, P<0.001), and sound skepticism (β =-.070, P=0.004) in critical thinking disposition were found to be affecting, with 53.0% explanation power and 52.6% modified explanation power in this model.

Table 4. Factors affecting self-esteem

	Nonstandardized coefficient		Standardized coefficient	t	P
	B	Standard error	β		
Critical thinking disposition					
Intellectual passion/interest	.125	.019	.167	6.445	<.001*
Prudence	.027	.015	.044	1.859	.063
Confidence (A)	.146	.019	.214	7.790	<.001*
Systemicity	.138	.017	.214	8.224	<.001*
Intellectual fairness	.021	.019	.028	1.100	.272
Sound skepticism	-.050	.018	-.070	-2.858	.004*
Objectivity	.021	.020	.031	1.092	.275
Self-esteem	.290	.018	.401	15.788	<.001*

R^2=.530, Adjust R^2=.526, F=33.986, P<0.001
* Statistically significant differences by Multiple regression at α =0.05

3.5 Correlation among critical thinking disposition, self-esteem, and self-efficacy

The analysis of the correlation among critical thinking disposition, self-esteem, and self-efficacy is shown in Table 5. The correlation between self-esteem and confidence (B), confidence (A) and self-regulation efficacy, systemicity and self-regulation efficacy, and intellectual passion/interest and self-regulation efficacy was markedly high, and a positive correlation was shown among all but sound skepticism and confidence (B).

Table 5. Correlation among critical thinking disposition, self-esteem, and self-efficacy

	1	2	3	4	5	6	7	8	9	10	11
1. Intellectual passion/interest	1										
2. Prudence	.141**	1									
3. Confidence (A)	.299**	.045	1								
4. Systemicity	.378**	.228**	.339**	1							
5. Intellectual fairness	.211**	.140**	.328**	.170**	1						
6. Sound skepticism	.245**	.027	.184**	.120**	.198**	1					
7. Objectivity	.351**	.124**	.406**	.343**	.374**	.364**	1				
8. Self-esteem	.263**	.114**	.410**	.179**	.231**	.054	.270**	1			
9. Confidence (B)	.074*	.083*	.269**	.095**	.145**	-.105**	.080*	.548**	1		
10. Self-regulation efficacy	.464**	.181**	.499**	.494**	.273**	.162**	.433**	.397**	.078*	1	
11. Task difficulty preference	.300**	.073*	.206**	.259**	.073*	.082*	.123**	.201**	.152**	.389**	1

* by the spearman rho test at α =0.05
** by the spearman rho test at α =0.01
*** critical thinking disposition: intellectual passion/interest, prudence, confidence (A), systemicity, intellectual fairness, sound skepticism, objectivity (No. 1~7)
self-efficacy: confidence (B), self-regulation efficacy, task difficulty preference (No. 9~11)

4. Discussion and Conclusions

The purpose of this study is to measure the level of critical thinking disposition, self-esteem, and self-efficacy among college students who are majoring in dental hygiene and understand relevant factors and their correlation. The critical thinking disposition of those studied were 3.70 points for intellectual fairness, 3.68 points for objectivity, 3.52 points for sound skepticism, 3.33 points for intellectual passion/interest, 3.32 points for confidence (A), 3.28 points for prudence, and 2.97 points for systemicity. The results are similar to those of Hwang (2012) who studied dental hygiene students. The comparison of lower factor scores is consistent with other studies in that high intellectual fairness and objectivity score high and systemicity scores low (Jeong, 2011; Jo, 2005; Choi, 2011). The higher the score in intellectual passion/interest, prudence, and systemicity in this study and in intellectual passion/interest, confidence (A), and prudence in the preceding study, the more critical thinking disposition is shown, indicating that the area of intellectual passion/interest and prudence are particularly relevant to students' learning ability. Self-esteem was 3.53 points, higher than preceding study using the same research tools (Kim & Kim, 2003; Kim et al., 2011). Self-efficacy was 3.20 points for confidence (B), 3.11 points for self-regulation efficacy, and 2.60 points for task difficulty preference. This is somewhat lower compared to the preceding study (Jeong, 2012), which showed results of 3.63 points for confidence (B), 3.86 points for self-regulation efficacy, and 3.12 points for task difficulty preference. In addition, while confidence (B) is the highest score factor and task difficulty preference is the lowest score factor in this study, in the preceding study, task difficulty preference is the lowest score, but the highest score was self-regulation efficacy. Looking at the correlation among critical thinking disposition, self-esteem, and self-efficacy, there is a positive correlation among all items except sound skepticism and confidence (B). In particular, the factors

that showed a high correlation were self-esteem and confidence (B), confidence (A) and self-regulation efficacy, systemicity and self-regulation efficacy, and intellectual passion/interest and self-regulation efficacy. This is consistent with the results of study on the correlation between critical thinking disposition and self-efficacy of nursing college students (Kim & Kim, 2007) and among critical thinking disposition, self-esteem, and self-efficacy of college students (Lee, 2009).

Critical thinking is a rational, reflective thought that focuses on deciding what to believe and what to do (Ennis, 1987), and a critical thinking disposition is considered an important factor that actually enables critical thinking (Ennis, 1991). Recently, the U.S. dental industry began to emphasize the importance of critical thinking (Jo, 2011), and also in Korea it is suggested through relevant reports (Kim et al., 2005) to include "critical thinking, problem solving, decision-making skills" in education curricula for dental hygiene and that "dental hygiene graduates should have comprehensive ability to execute strategies related to patient care and management (Hwang, 2012). Self-respect is the degree of self-respect and the degree to which one considers oneself worthy (Rosenberg, 1979), and it can change positively through systematic training and experience (Shin, 1990). Self-efficacy is the degree of confidence in specific situations or belief in one's own values and abilities (Choo, 2005), and the higher the self-efficacy is, in other words, the more confidence one has in one's ability to successfully perform an action, the more likely one is to try and continue the action (Hong, 2009, re-quoted).

There was a high correlation among critical thinking disposition, self-esteem, and self-efficacy. Accordingly, it is believed that a curriculum is needed to develop critical thinking skill that is emerging as a necessary capacity for dental hygienists and the affecting factors, namely self-esteem and self-efficacy. The above results show that there is a positive correlation among critical thinking disposition, self-esteem, and self-efficacy, and it is thought that it will be foundational data for establishing curricula to develop critical thinking disposition, self-esteem, and self-efficacy of dental hygienists whose role is increasing.

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