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The Relationship between Problem Solving Ability, Professional Self Concept, and Critical Thinking Disposition of Nursing Students

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Abstract

The purpose of this study was to identify problem-solving ability, professional self concept, and critical thinking disposition of nursing students in Korea. This study employed a cross-sectional survey design. The participants were 168 nursing students in the Republic of Korea. The factors that had the greatest influence on problem solving ability were ethics as subscale of professional self concept, intellectual honesty and prudence as subscale of critical thinking disposition, college type, and experience of clinical practice. The factors that had the greatest influence on problem solving ability were ethics (ß=.698, p=<.001) as subscale of professional self concept, intellectual honesty (ß=.211, p=<.001), prudence (ß=.157, p=<.001), college type (ß=.127, p=.002), experience of clinical practice (ß=.089, p=.031). These five factors were found to be the significant predictors for problem solving ability of nursing students. The findings from this study demonstrate the fundamental importance of professional self concept and critical thinking disposition to improve problem solving ability for nursing students. Our results suggest that in the long run, professional self concept and critical thinking disposition will enhance overall problem solving ability of nurse, thus improve nursing care for patient.

Keywords: *Nursing students, problem solving ability, self-concept of nursing professional, critical thinking disposition*

1. Introduction

Medical care in 21st century has accelerated the departmentalization and specialization of health care field. Consumers demand more qualitative medical services. In this situation, nurses should offer various nursing services with professional role and competency. Nursing units has been characterized as being uncertainty and instability. Therefore, problem solving ability is emphasized in order to solve the problem including client's health treatment and need.

Clinical practices in hospital setting are dynamic processes planning the patient care under emotional, physical and social health needs of the individuals by a systematic method. Nurses encounter a variety of problems and problematic situations related patients' therapy, symptom, and care daily, of varying levels of complexity and importance, urgency. Thus,

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today's nursing environment requires that the nurses be creative, analytic, critical thinking. Besides, the current health care settings are required that nurses are able to effectively resolve problems faced with. In other words, these days, nurses are required problem solving ability. Therefore, problem solving is important concept in nursing education but little understood part of the contemporary nursing [1]. Prior studies have shown that nurses were lacking problem solving skills [1-2].

Problem solving refers to a goal directed sequence of cognitive operations[3]and to a process by which the solver develops and implements plans within a range of constrains in the attempt to move from the current state towards the goal state[4]. Problem solving ability is the basic skill of identifying a problem and taking steps to resolve problem [1]. The skill of problem solving is acquiring the knowledge that will lead one to a solution, and one's ability to combine that knowledge in a ready-to-use format and utilize it to find a solution [1]. Since hospital condition is always unpredictable and emergency site, nurse's problem solving ability is important function in order to identify patient's need and to solve patient's health problem. Therefore, nursing student is needed to acquire problem solving skill in complicated medical environment.

According to previous study, problem based learning method was more effective in the development of problem solving skills [5]. The learning experiences performed by means of the problem solving approach makes it possible for the students to attain a development in their knowledge, skills and attitudes regarding the cognitive, perceptual and kinetic fields [6-7].

Nursing education requires problem solving ability that is able to perform efficiently in various nursing situations. The development of a problem-solving approach to nursing students has been one of the more important changes in nursing education during the last decade [8]. Nursing education consists of theory, basic practice, and clinical practice. Nursing students need to be educated to have effective problem-solving and management skills to be able to decrease the cost of the health care and to increase the quality of care in future [8]. Problem solving is the ability that is able to recognize hard obstacles and seek a solution with systematic process. Efficient nursing service needs the study of improvement of problem solving ability.

One definition of critical thinking disposition is: "Critical thinking is a realization that critical thinking is not a method to be learned, but rather a process, an orientation of the mind and so, includes both the cognitive and affective domains of reasoning." [9]. Skills in reasoning can provide the necessary broader outlook, creative solutions and multiple pathways needed for successful quality improvement initiatives [9]. A researcher asserted that the learning method which is based on problem solving will make progress in critical thinking [9].

Prior study by Park (1999) showed the difference of critical thinking dispositions between sexes, male students showed more critical thinking dispositions and differences of critical thinking ability depending on students' college experiences [10]. In another recent study, there is no statistically significant relationship between the critical thinking dispositions and clinical competency, but that there were statistically significant differences between interpersonal relationships, communication of clinical competency's subdomain and prudence, the development of expertise and intellectual honesty by subdomain of critical thinking disposition[11].

According to Delphi research project for critical thinking concept, "purposeful, self-regulatory judgment which results in interpretation, analysis, evaluation, inference, as well as the explanation of the evidential, conceptual, methodological, or contextual considerations upon which that judgment was based."[12]. In relationship between problem solving and

critical thinking disposition, Facione and Facione [13] describe critical thinking as ultimately a cognitive engine that drives problem solving and decision making.

Professional self concept is becoming more important in clinical practice. A researcher [12] reported that if the level of professional self concept is improved in a positive manner, clinical nurses will be able to enhance their nursing performance and thus provide efficient nursing service in the hospital. Therefore, in order to solve problem creatively, it is important for nurses to improve nursing professional self concept in critical nursing situation. The patients will receive more quality nursing, and the clinical nurses will have an opportunity to develop their knowledge and techniques [14]. Furthermore, in a different study [15], it suggested that the curriculum need to be structured systematically as the way which increases critical thinking ability to enhance positive professional self concept. When professional self concept would be established properly, nurse enhanced to understand the value and role of nursing.

There could be considered the critical thinking skills, professional self concept in order to increase problem solving ability of nursing major students. In other words, to understand the dynamic of students' problem solving ability, professional self concept, and critical thinking disposition better, therefore we investigate the basic data making progress in problem solving ability of nursing students.

The aim of this study is to analyze the problem solving ability of nursing students, and then explores how student's critical thinking and professional self concept affects their problem solving ability.

The specific purpose of the study is as follows:

1) Examines the current state of nursing student's problem solving ability, nursing professional self-conception, critical thinking.

2) Identifies the relationship between problem-solving ability and nursing professional self-conception and critical thinking.

3) Analyzes influencing factors on problem solving ability

2. Methods

2.1. Research Design

This study utilized a cross-sectional research design to analyze the problem solving ability of nursing students.

2.2. Participants and Data Collection

Our sample comprised nursing school students studied in four nursing college, two diploma course and two bachelor course in Kyungi and Chungnam Province, Korea. Participants were selected by convenience sampling. After a research assistant explained the purpose of the study, anonymity, data confidentiality, and possibility of withdrawal to participants, the written informed consent from college students was obtained. The survey was conducted from June to August in 2012 and 172 survey questionnaires among 180 distributed were collected, and 168 were analyzed. It required approximately 15-20 minutes completing the questionnaires.

2.3. Measurements

2.3.1. Problem Solving Ability: Problem solving ability was measured using 6-point Likert-type scale with 32 questions from the translated version [16] of the original tool by Heppner

and Petersen (1982) [17]. This tool could range from 32 to 192 points, with higher scores indicating greater problem solving ability. PSI is composed of problem solving confidence (11 questions), approach avoidance style (16 questions), and personal control (5 questions). The Cronbach′s alpha for the previous study was .94 (Heppner and Petersen, 1982), and that of the current study was .86.

2.3.2. Professional Self Concept: Professional self concept was measured using 4-point Likert-type scale with 30 questions from the translated version [18] of the original tool by Arthur(1995) [19]. Sores on this tool could range from 30 to 120points, with higher scores indicaing greater professional self concept. The Cronbach′s alpha for the previous study was .94 [16], and that of the current study was .92.

2.3.3 Critical thinking disposition: Critical thinking disposition was measured using 5-point Likert-type scale with 20 questions from the original tool by Park (1999) [10]. This tool could range from 20 to 100 points, with higher scores indicating greater critical thinking disposition. The Cronbach′s alpha for the previous study was .73 [10], and that of the current study was .74. Critical thinking disposition is composed of intellectual eagerness/ sound skeptical (7 questions), intellectual honesty (6 questions), prudence (4 questions), objectivity (3 questions).

2.4. Data Analysis

The collected data were analyzed with SPSS18.0 statistical program. Descriptive statistics for all study variables as well as the reliability assessment of the study instruments were computed. To analyze differences in the independent and dependent variables by gender t-tests were used. The factors that influenced problem solving ability were analyzed using stepwise multiple regression analysis.

2.5. Ethical Consideration

Prior to collecting the data, the decision regarding consent for participation was made by nursing students. Participants also received the information on this study including the purpose, potential risks and benefits of this study and data collection procedures. Participants who were reluctant to participate in this study, they could refuse for participation at any time.

3. Results

3.1. Demographic Characteristics

The baseline characteristics of the study participants are shown in Table 1. The mean age of participants was 20 years (*SD* = 2.3). Of the 168 participants, 160(95.2%) students were female, 8(4.8%) students were male. Ninety six (57.1%) students had religion. Regarding to college type, 107(63.7%) participants were students of diploma and 61(36.3%) participants were students of bachelor. The participants who practiced fundamental nursing were 134(79.8%) students and the participants who practiced clinical nursing were 69(39.2%) students. Regarding to personal relationship, 111(63.1%) students were good.

Table 1. General Characteristics of Subjects (n=168)

Variable	Categories	n(%)	Mean±SD
Age	≤ 20	94(56.0)	20.9±2.3
	≥ 21	74(44.0)	
Gender	Male	8(4.8)	
	Female	160(95.2)	
Religion	Yes	96(57.1)	
	No	72(42.9)	
School year	≤ 2nd year	97(57.5)	
	≥ 3rd year	71(42.3)	
College type(year)	Diploma(3)	107(63.7)	
	Bachelor(4)	61(36.3)	
Fundamental nursing practice	Yes	134(79.8)	
	No	34(20.2)	
Clinical nursing practice	Yes	69(39.2)	
	No	99(56.3)	
Major satisfaction	Satisfied	109(61.9)	
	Average or dissatisfied	59(33.5)	
Personal relationship	Good	111(63.1)	
	Average or bad	57(32.4)	

3.2. Descriptive Statistics

Table 2 present the means and standard deviations of problem solving ability, professional self concept, and critical thinking disposition. The students perceived they had middle level problem solving ability (M=3.95 on a 6-point scale). In the subscale of problem solving, problem solving confidence was the highest subscale (M=4.24 on a 6-point scale), personal control was the lowest subscale (M=3.29 on a 6-point scale). The students perceived they had somewhat professional self concept (M=3.14 on a 4-point scale). In the subscale of professional self concept, ethic of professional was the highest subscale (M=3.84on a 4-point scale), satisfaction of professional was the lowest subscale (M=3.02 on a 4-point scale). The students perceived they had somewhat critical thinking disposition (M=3.39 on a 5-point scale). In the subscale of critical thinking disposition, intellectual honesty was the highest subscale (M=3.76 on a 5-point scale), objectivity was the lowest subscale (M=2.88 on a 5-point scale).

Table 2. Mean Score of the Major Study Variables (n=168)

Variables	Categories	Mean	Min	Max
Problem solving ability	Problem solving confidence	4.24±0.59	2.18	6.00
	Approach avoidance style	4.05±0.49	2.69	5.50
	Personal control	3.29±0.73	1.20	6.00
	Total Mean	3.95±0.41	3.14	5.57
Professional self concept	Professional practice	3.11±0.33	1.91	3.91

	Leadership	3.04±0.43	2.00	4.00
	Satisfaction	3.02±0.48	2.00	4.00
	Ethics	3.84±0.48	2.38	6.00
	Total Mean	3.14±0.34	1.93	3.93
Critical thinking disposition	Intellectual eagerness/ sound skeptical	3.27±0.44	2.29	4.57
	Intellectual honesty	3.76±0.53	2.50	5.00
	Prudence	3.44±0.56	1.50	5.00
	Objectivity	2.88±0.65	1.33	5.00
	Total Mean	3.39±0.33	2.60	4.30

3.3. Problem solving, Professional self concept, and Critical Thinking Disposition According to General Characteristics

Table 3 shows problem solving ability, professional self concept, and critical thinking disposition according to general characteristics. Problem solving ability scores were higher in bachelor students, at 4.03, than in diploma students, at 3.90 (p=.047). Problem solving ability scores were higher in students who were satisfied in nursing major, at 4.03, compared with those who were average or dissatisfied in nursing major, at 3.80 (p<.001). Similarly, problem solving ability scores were higher in students who had good personal relationship, at 4.01, compared with those who had average of bad personal relationship, at 3.84 (p=.013). Professional self concept scores were higher in bachelor students, at 3.22, than in diploma students, at 3.10 (p=.024).

Professional self concept scores were higher in students who were satisfied in nursing major, at 3.27, compared with those who were average or dissatisfied in nursing major, at 2.91 (p<.001). Similarly, professional self concept scores were higher in students who had good personal relationship, at 3.22, compared with those who had average of bad personal relationship, at 2.98 (p=.013).

Critical thinking disposition scores were higher in students who were satisfied in nursing major, at 3.43 points, compared with those who were average or dissatisfied in nursing major, at 3.32 (p=.048). Similarly, critical thinking disposition scores were higher in students who had good personal relationship, at 3.44, compared with those who had average of bad personal relationship, at 3.30 (p=.013).

Table 3. Problem Solving, Professional Self Concept, and Critical thinking Disposition According to General Characteristics (n=168)

Variables	Categories	Problem solving ability(range 1~6)		Professional self concept(range 1~4)		Critical thinking disposition(range 1~5)	
		Mean±SD	t(p)	Mean±SD	t(p)	Mean±SD	t(p)
Age	≤ 20	3.91'±0.39	-1.463 (.145)	3.12'±0.38	-1.059 (.291)	3.38'±0.33	-.503 (.615)
	≥ 21	4.00'±0.43		3.17'±0.29		3.41'±0.34	

Gender	Male	4.15±0.37	1.374 (.171)	3.20'±0.33	0.508 (.625)	3.41'±0.42	0.189 (.850)
	Female	3.94'±0.41		3.14'±0.35		3.39'±0.33	
Religion	Yes	3.97±0.40	0.737 (.462)	3.15±0.37	0.476 (.635)	3.41±0.32	0.783 (.435)
	No	3.92±0.42		3.13±0.30		3.37±0.35	
Grade	Low	3.94±0.40	-0.469 (.640)	3.17±0.35	1.205 (.230)	3.41±0.34	0.796 (.427)
	High	3.97±0.41		3.10±0.33		3.37±0.32	
College type	Diploma	3.90±0.41	**-2.000 (.047)**	3.10±0.36	**-2.284 (.024)**	3.36±0.32	-1.702 (.091)
	Bachelor	4.03±0.39		3.22±0.29		3.45±0.34	
Fundamental nursing practice	Yes	3.96±0.43	0.789 (.431)	3.12±0.35	-1.703 (.091)	3.40±0.33	0.392 (.696)
	No	3.90±0.32		3.23±0.29		3.37±0.33	
Clinical nursing practice	Yes	3.89±0.37	-1.474 (.142)	3.09±0.32	-1.564 (.120)	3.36±0.33	-1.131 (.260)
	No	3.99±0.43		3.18±0.35		3.42±0.34	
Major satisfaction	Satisfied	4.03±0.40	**3.710 (<.001)**	3.27±0.30	**7.364 (<.001)**	3.43±0.36	**1.990 (.048)**
	Average/ dissatisfied	3.80±0.37		2.91±0.30		3.32±0.27	
Personal relationship	Good	4.01±0.43	**2.513 (.013)**	3.22±0.33	**4.496 (<.001)**	3.44±0.34	**2.695 (.008)**
	Average/ bad	3.84±0.33		2.98±0.31		3.30±0.30	

3.4. Correlation Analysis among Problem Solving Ability, Professional Self Concept, & Critical Thinking Disposition

Table 4 presents inter-correlations among problem solving ability, professional self concept, & critical thinking disposition. The results of a preliminary Pearson's correlation analysis revealed that student's problem solving ability was significantly correlated with their professional self concept (r =.519, p< .001). In subscale of professional self concept, student's problem solving ability was significantly correlated with professional practice (r = .504, p< .001), leadership (r =.479, p< .001), satisfaction (r =.375, p< .001), ethics (r =.824, p< .001).

The results of a preliminary pearson's correlation analysis revealed that student's problem solving ability was significantly correlated with their critical thinking disposition (r =.630, p< .001). In subscale of critical thinking disposition, student's problem solving ability was significantly correlated with intellectual eagerness/sound skeptical (r = .336, p< .001), Intellectual honesty (r =.510, p< .001), prudence (r =.458, p< .001), objectivity (r =.261, p< .001).

Table 4. Correlation Analysis among Problem Solving Ability, Professional Self Concept, & Critical Thinking Disposition

Variables	Problem solving ability	
	r	*p*
Professional self concept	.519	<.001
Professional practice	.504	<.001
Leadership	.479	<.001
Satisfaction	.375	<.001
Ethics	.824	<.001
Critical thinking disposition	.630	<.001
Intellectual eagerness/sound skeptical	.336	<.001
Intellectual honesty	.510	<.001
Prudence	.458	<.001
Objectivity	.261	.001

3.5. Factors Influencing on Problem Solving Ability

Table 5 shows the factors influencing problem solving ability of nursing students. A stepwise multiple regression analysis was conducted with ethics (subscale of professional self concept), intellectual honesty and prudence (subscale of critical thinking disposition), college type, experience of clinical practice(as dummy variable) as independent variables and problem solving ability as the dependent variable. The Durbin-Watson statistic was 1.73; we decided that there was no autocorrelation. The factors that had the greatest influence on problem solving ability were ethics (ß=.698, p=<.001) as subscale of professional self concept, intellectual honesty (ß=.211, p=<.001), prudence (ß=.157, p=<.001), college type (ß=.127, p=.002), experience of clinical practice (ß=.089, p=.031). These five factors were found to be the significant predictors for problem solving ability of nursing students. The explanatory power of these five factors was 77.2%.

Table 5. Multiple Regression with Stepwise Selection for Problem Solving Ability

	B	SE	Beta	t	p
(Constant)	.580	.149		3.905	.000
Ethics	.588	.034	.698	17.360	.000
Intellectual honesty	.161	.031	.211	5.153	.000
Prudence	.115	.030	.157	3.894	.000
College type*	.108	.035	.127	3.072	.002
Experience of clinical practice**	.091	.042	.089	2.170	.031
Adj. R^2 = .772, F=114.269, p=.000					

* College type (0:diploma, 1:bachelor) **Experience of clinical practice(0:no, 1:yes)

4. Discussion

The purpose of this study was to identify the factors predicting problem solving ability of nursing students. In many cases, nurses have been faced important decision making

associated with caring patients in the hospital. Understanding problem solving ability of nursing students is important to perform their professional job.

This study examined the relationship between student's problem solving ability, professional self concept, and critical thinking disposition according to general characteristics. Problem solving ability scores were higher in students of bachelor typed college and in students who were satisfied in nursing major, and in students who had good personal relationship. The outcomes of this study are partly consistent with a recent study [20-21]. Ma (2009) found that there was a statistically difference in problem solving ability according to interpersonal relationships and satisfaction with nursing[19]. A possible explanation for this might be that the nursing students with high satisfaction in nursing major or with good interpersonal relationship would be more interested in nursing problem and seek the method of problem solving in using various social resources. Also it was identified that nursing students who was satisfied with in their major or have good interpersonal relationship perceived their critical thinking disposition as more high level than the others.

This study determined the relationship between student's problem solving ability was significantly correlated with their professional self concept and their critical thinking disposition. That is, student's higher critical thinking disposition and profession self concept promoted positive problem solving ability.

The factors that had influence on problem solving ability were ethics as subscale of professional self concept. Our findings are in partly accordance with the results from a previous study examining problem solving ability [22]. Nursing professionalism included specialized education, standard for qualification and high professional ethics, and therefore nursing maintains independence of nursing activity. It is considered that the more a nurse has professional nursing ethics, the more she realizes social responsibility and role expectation and she has professional penetration to solve problem.

The factors that had influence on problem solving ability were intellectual honesty, prudence as substructure of critical thinking disposition. Our findings are in partly accordance with the results from a previous study examining problem solving ability [23]. It is showed that intellectual honesty and prudence were the high items on the critical thinking disposition, and they were major influence factor to problem solving. Honesty is considered that one of the important conditions for problem solving. A fact that problem can be showed through honesty and a clue for problem solving can be found through honesty. And prudence does not treat a problem absentmindedly but it enables an in-depth study for essence of problem.

The other factor that had influence on problem solving ability was college type. Problem-solving ability of a four-year-course college student was higher than that of a three-year-course college student. Our findings are in partly accordance with the results from a previous study examining problem solving ability. A researcher [23] reported that the students in baccalaureate course were higher clinical performance competency than the students in diploma course. In Korea, Four-year-course nursing students showed better school records and performance than three-year-course nursing students at admission of college [23]. The students in bachelor degree have accomplished discussion and team project in the course of nursing study and also were good at self managing ability for solving problems. Recently in Korea, diploma nursing course has been changed to bachelor nursing course. When the diploma nursing course showed excellent level in the educational outcome and achievements, that course would get promoted to bachelor nursing course. Through this process, we can make all nurses to be bachelor graduate students, thus professionalism of nursing and creativity of works will be acquired by this system.

On the other hand, the other factor that had influence on problem solving ability was experience of clinical practice. Clinical practice is an important part of nursing education.

Students acquire basic nursing techniques and communication techniques and understand hospital settings through a clinical practice. Students learn method of combining knowledge and practice which they learned before in the clinical practice which is unpredictable and unstructured.

Problem-solving ability is able to improve through curriculum of nursing and voluntary service affiliated major field. This study enforces to investigate level and influential factor of nursing student's problem-solving ability.

Affected factors to participant's problem-solving ability have appeared sense of ethics that is substructure of professional self concept, and prudence and honesty that are substructure of critical thinking disposition. Through clinical training experience, problem-solving ability has improved. High ethic and prudent attitude have effect on problem-solving ability. For the sake of developing about problem-solving ability of nursing students, it is necessary to open and ethical attitude towards patients and to make the best use of resources and information.

Our findings showed that problem solving ability was higher among who is satisfied with nursing course than who is not. Students who are satisfied with nursing course had great passion for studying and confidence of choosing job, so that they believed that they could solve the problems more efficiently when they faced in the problems. They can find a clue through inspection and analysis and insight of problem. On the other hand, students who are dissatisfied with nursing course were worried about whether they should keep their major or not, wasted their energy for conflict and suppression, and finally could not find creative way to solve the problems.

Finally, for the sake of developing about problem-solving ability of nursing students, it is necessary to open attitude towards professional self concept and to make critical thinking disposition to analyze the information. In this context, it is extremely important that nursing students need to be given critical thinking disposition and professional self concept in both educational curriculum and clinical practice.

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