

Publication state: Japan
ISSN: 2189-7603

Publisher: J-INSTITUTE
Website: <http://www.j-institute.jp>

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<http://dx.doi.org/10.22471/crisis.2018.3.1.14>

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The Relations of NURSING Student's Problem Solving Ability, Nurses' Image and Leadership for Patients Safety

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Abstract

The purpose of this study is to investigate the relationship between the nursing students' problem solving skills, nurse image and leadership for patient safety by conducting a survey against nursing students of a university. A sample included 241 nursing students enrolled at a regional university's nursing program during November 3 to 7, 2014. Data were analyzed using mean, t-test, ANOVA, correlation with SPSS 21.0. The mean scores turned out to be 3.36, 3.73, 3.68, for problem solving skills, nurse image and leadership. There were significant mean differences in problem solving skills according to application motivation and a school record. There were significant mean differences in the nurse image according to satisfaction with nursing as major and clinical training. There were significant mean differences in leadership according to application motivation, satisfaction with nursing as major and personality. Significant positive correlation among problem solving skills, nurse image and leadership were found. This findings indicate that in order to enhance problem solving skills for patients safety, it would be necessary to develop programs that account for factors related to improving the nursing students problem solving skills for the patient safety based on the results of this study.

[Keywords] Patient Safety, Problem Solving Skills, Nurse Image, Leadership, Nursing Student

1. Introduction

1.1. Need for study

The drastically evolving medical field requires a lot of skills from nurses, the consciousness of the health of the subjects has risen, and the demand for high quality medical services is increasing[1]. In addition, due to the social interest in patient safety, enhancing the medical service providers' capacity to manage patient safety is called for[2].

Patient safety means "reducing the risk of unnecessary health related harms to the minimum possible" WHO(2009), which requires that medical personnel use patient safety principles and knowledge to provide safe health care[3].

Problem solving skills have the greatest impact on patient safety competence[4], and due to the nature of nursing students related to employment,

problem solving skills are an important task for providing safe medical care to patients and solving complex problems in future clinical practices[5].

The Oxford dictionary defines problem solving as 'a process of finding solutions to difficult or complex problems, and problem solving skills are the collective skills of individuals to eliminate obstacles that cause problems in a given state'[6]. Reviewing previous studies on problem solving skills, the skills to solve problems enhanced at the time of application of team-based learning[7], and problem-based learning(PBL)[8], further to enhancement after implementing integrated simulation training[9].

Leadership is a characteristic that a leader must possess, and is the technology required in every place of life, while being life skills that everyone should have in order to live well and improve their

community and society[6]. Reviewing previous studies on leadership, there is a positive correlation between self-leadership and clinical performance capability[10], self-leadership has an adjustment effect on the relationship between nurses' self-image and nursing performance[11], and transformative leadership can maximize organizational performance[12].

The nurse image refers to the professional, traditional, social impression or beliefs and nurse's prospects as a profession based on a combination of nurse's beliefs, thoughts and impressions inherent in the individual's thoughts[13]. For the study of nurse image, 75.5% of the factors influencing the formation of nurse image were called nurses' appearance at the hospital[14], 'kindness of nurse', and 'nurse's consideration of patient' carried the highest score[15], the higher the traditional image factor was, the higher the satisfaction of clinical practices[12], the nurse image and self-esteem were statistically correlated[16]. In addition, the 'negative perception of hospital nurses after clinical practice' was surveyed as the largest reason for career change[17].

It was reported that the problem solving skills of nurses has the greatest effect on patient safety competence, however, a study on problem solving skills of nursing students would require a study related to the problem solving skills following an approach in the learning aspect.

1.2. Purpose of study

The purpose of this study is to understand the relationship between problem solving skills, nurse image, and leadership of nursing students, whose details are as follows.

First, the problem solving skills, nurse image, and leadership of nursing students are identified.

Second, the problem solving skills, nurse image, and leadership according to general characteristics of nursing students are identified.

Third, the correlation between problem solving skills, nurse image, and leadership of nursing students is identified.

2. Research Method

2.1. Research design

The purpose of this study is to investigate the relationship between problem solving skills, nurse image, and leadership of nursing students.

2.2. Research subject

In this study, for the students who are enrolled in a nursing department of a university, when a minimum median effect size of .15, a power of .95, and a significance level of .05 using the G*Power 3.1.9.2 program were used, a minimum of 199 questionnaires were required, 243 copies of the questionnaires distributed in consideration of response rate and dropout rate were collected, and the responses were used for the complete 241 copies for the data analysis.

2.3. Data collection and ethical considerations

The data collection period ran from November 3, 2014 to November 7, 2014. The purpose of the study explained, further to explaining the confidentiality, anonymity, refusal of participation, and possible interruption of participation, among others, followed by obtaining consent from the subjects on the study to conduct self-reporting survey questionnaire. The response time was about 10 to 15 minutes, and a gift was offered.

2.4. Research tools

2.4.1. Problem solving skills

The problem solving skills tool used 12 items developed by Jung Tae-young(2011) using the research tools developed by Warner(2007) and adapted by PSI Consulting Co., Ltd. for diagnosing problem solving skills. The tool consists of the 3 factors of 4 horizontal thinking questions, 4 recognition and judgment questions, and 4 alternative evaluation and decision questions, on the Likert 5 point scale of 'Not at all' for 1 point to 'Very highly' for 5 points, and so, the higher the score, the higher the problem solving skills.

2.4.2. Nurse image

The nurse image total average measurement tool developed by Kang Hye-young et al.(2003)

was used. This tool consists of 6 items of professional image, 6 items of traditional image, 3 items of nurses' prospects as a profession, and 5 items of social image, on the Likert 5 point scale of 'Not at all' for 1 point to 'Very highly' for 5 points, and so, the higher the score, the higher the nurse image. In Kang Hye-young et al.'s(2003) study(for the reliability at the time of tool development), Chronbach's $\alpha = .940$ was provided, and Chronbach's $\alpha = .877$ was provided in this study.

2.4.3. Leadership

As for the leadership tool, the leadership diagnostic tool developed by the Korea Educational Development Institute[6] was used. This is comprised of 50 questions, with 5 factors of goal achievement skills, recreation skills, leadership skills, human relation skills and purposeful consciousness, on the Likert 5 point scale of 'Not at all' for 1 point to 'Very highly' for 5 points, and so, the higher the score, the higher the leadership skills. In [6] study(for the reliability at the time of tool development), Chronbach's $\alpha = .940$ was provided, and Chronbach's $\alpha = .939$ was provided in this study.

2.5. Data analysis

The data collected in this study were analyzed using the SPSS/WIN 21.0 program. The research subjects general characteristics, problem solving skills, nurse image, and leadership required yield and percentage, and the problem solving skills, nurse image, and leadership following general characteristics were analyzed by t-test and ANOVA. The correlation between problem solving skills, nurse image, and leadership were analyzed by using the Pearson correlation coefficients.

3. Research Results

3.1. General characteristics

The mean age of the participants was 20.52 years among the research participants. 38.6% of the respondents responded that 'easiness to secure employment' was their largest motivation, followed by 26.1% for 'aptitude and interest', and 22.4% for 'family recommendation'. Factors influencing the image of nurses were 'appearance of nurse during hospital visit' captured 33.6%, 'appearance of nurse during clinical practice' 22.4%, and 'mass media' captured 17.8%. The satisfaction level of nursing program was average with 46.9%, 'satisfied' was 41.9%, and 'dissatisfied' was 11.2% <Table 1>.

Table 1. General characteristics of participants(n=241).

	Characteristics	n(%) or M±SD
Age(yrs)		20.52±2.41
Grade	1 st	61(25.3)
	2 nd	62(25.7)
	3 rd	58(24.1)
	4 th	60(24.9)
Application motivation	Aptitude and interest	63(26.1)
	Accoding to grade	15(6.2)
	Persuaded by family	54(22.4)
	Get a gob	93(38.6)
	To serve	11(4.6)
	Except	5(2.1)
Having relation nurse	Yes	113(46.9)
	No	128(53.1)
Health status	Poor	12(5.0)

	Moderate	88(36.5)
	Healthy	141(58.5)
A school record	Low(below3.0)	22(9.1)
	Middle(3.0~below4.0)	175(73.6)
	High(over 4.0)	44(18.2)
Religion	None	146(60.6)
	Christian	62(25.7)
	Buddhism	9(3.7)
	Catholic	21(8.7)
	Except	3(1.2)
Most influencing events	Mess media	43(17.8)
	Book	6(2.5)
	Visit a hospital	81(33.6)
	From relation nurse	39(16.2)
	From nurse during clinical training	54(22.4)
	From professor's mention	17(7.1)
	Except	1(0.4)
Satisfaction with nursing as major	Unsatisfaction	27(11.2)
	Moderate	113(46.9)
	Satisfaction	101(41.9)
Satisfaction with clinical training(3 rd -4 th)	Unsatisfaction	25(21.2)
	Moderate	49(41.5)
	Satisfaction	44(37.3)
Personality	Positive	214(88.8)
	Negative	27(11.2)
Interpersonal relationship	Introvert	31(12.9)
	Moderate	117(48.5)
	Outgoing	83(34.4)
	Very outgoing	10(4.1)

3.2. Comparison of nurse image, leadership, problem solving skills according to general characteristics

As for the nurse image according to general characteristics, the group of 'average or above' to 'satisfied' in the 'major program's satisfaction level' was higher than that of 'average or below' to 'dissatisfied'(F=5.45, $p<.01$), and the same went true for 'satisfaction level for clinical practice'(F=5.51, $p<.01$). Leadership was higher in the 'motivation for application' than

'interest and aptitude', 'service' group than 'grades', 'family recommendation', and 'easiness to secure employment' group(F=3.43, $p<.01$), and those who answered 'positive' in 'personality' were higher than those in 'negative'(F=3.13, $p<.01$). Problem solving skills were than higher than the aforesaid group in 'motivation for application'(F=3.23, $p<.01$), and the group of 'average or above' to 'satisfied' in the 'school grades' was higher than that of 'average or below' to 'dissatisfied'(F=4.58, $p<.01$) <Table 2>.

Table 2. Differences of nurses' image, readership, problem solving skills by general characteristics.

Variables		Nurses' image	t/F (Scheffe)	Readership	t/F (Scheffe)	Problem solving skills	t/F (Scheffe)
		M±SD		M±SD		M±SD	
Grade	1 st	3.85±0.43	2.62	3.67±0.39	2.14	3.36±0.37	0.58
	2 nd	3.73±0.45		3.60±0.35		3.34±0.46	
	3 rd	3.64±0.44		3.65±0.45		3.32±0.48	
	4 th	3.68±0.43		3.78±0.44		3.43±0.62	
Application motivation	Aptitude and interest	3.79±0.39	1.26	3.82±0.37	3.43**	3.51±0.41	3.23**
	According to record	3.71±0.65		3.55±0.39		3.13±0.54	
	Persuaded by family	3.65±0.40		3.57±0.42		3.23±0.46	
	Get a job	3.70±0.48		3.65±0.41		3.35±0.52	
	To serve	3.93±0.27		3.89±0.39		3.58±0.44	
	Except	3.88±0.43		3.76±0.56		3.40±0.49	
Having relation nurse	Yes	3.78±0.44	1.74	3.68±0.37	-0.02	3.33±0.44	-1.10
	No	3.68±0.44		3.68±0.44		3.39±0.52	
Health status	Poor	3.75±0.49	0.37	3.45±0.48	2.44	3.39±0.55	0.04
	Moderate	3.69±0.43		3.67±0.39		3.36±0.42	
	Healthy	3.75±0.45		3.71±0.41		3.36±0.53	
A school record	Low(below3.0)	3.82±0.43	0.94	3.52±0.36	2.52	3.07±0.49	4.58* a<b,c
	Middle (3.0~below4.0)	3.70±0.43		3.69±0.40		3.38±0.50	
	High(over 4.0)	3.77±0.51		3.76±0.45		3.43±0.41	
Religion	None	3.74±0.43	1.65	3.65±0.43	0.68	3.37±0.46	0.09
	Christian	3.75±0.47		3.75±0.42		3.34±0.52	
	Buddhism	3.62±0.33		3.71±0.33		3.40±0.42	
	Catholic	3.56±0.45		3.69±0.22		3.33±0.62	
	Except	4.15±0.74		3.59±0.12		3.39±0.53	
Satisfaction with nursing as major	Unsatisfactory	3.52±0.43	5.45** a,b<b,c	3.50±0.39	6.09**	3.32±0.61	0.91
	Moderate	3.70±0.44		3.64±0.43		3.33±0.46	
	Satisfaction	3.82±0.43		3.78±0.38		3.41±0.49	
Satisfaction with clinical training (3 rd -4 th)	Unsatisfactory	3.44±0.38	6.44*	3.26±0.64	0.67	3.75±0.45	1.22
	Moderate	3.64±0.41		3.40±0.51		3.64±0.47	
	Satisfaction	3.81±0.44		3.40±0.56		3.79±0.41	
Personality	Positive	3.73±0.43	-0.19	3.71±0.40	3.13**	3.37±0.48	0.62
	Negative	3.74±0.55		3.45±0.43		3.31±0.55	

Note: * $p<0.05$, ** $p<0.01$, *** $p<0.001$.

3.3. Relationship between nurse image, leadership, and problem solving skills

The subjects' problem solving skills were positively correlated with nurse image ($r = .255, p < .001$) and leadership ($r = .485, p < .001$).

There was a positive correlation between nurse image and leadership ($r = .353, p < .001$). That is, the higher the nurse image and leadership, the higher the problem solving skills, and the higher the nurse image, the higher the leadership <Table 3>.

Table 3. Correlation of nurses' image, readership, problem solving skills (n=241).

Characteristic	Nurses' image	Readership	Problem solving skills
Nurses' image	-		
Readership	.353***	-	
Problem solving skills	.255***	.485***	-

Note:*** $p < .001$.

4. Discussion

The factors that influenced the nurse image formation were in the order of nurse appearance during hospital visit, nurse appearance during clinical practice, and mass media. This was similar to the study in which 75.5% claimed the nurse appearance within hospital. The nurse image scores turned out to be high for the group of 'average or above' to 'satisfied' in the 'major programs satisfaction level' representing identical results as in Gu & Lee's study[18], and the higher the satisfaction level of clinical practice, the higher the nurse image scores representing the identical results as in Lee & Kim & Kim's(2005) study.

Leadership was different according to nursing application motivation, major program's satisfaction level, and personality. In the nursing application motivation, the student who answered 'aptitude and interest' had the highest leadership, and 'aptitude consideration' was higher than 'other people's recommendation'[19]. The results of the self-leadership research for major programs satisfaction level were identical to the results of the study that the higher the major programs satisfaction level, the higher the self-leadership[20].

This suggests that students who are satisfied with their major are more likely to participate in school life involving classmates and participate actively in leadership activities. In terms of personality, sincerity, extroversion, and openness have a great influence on self-leadership[21], and in this study also, the students who answered their personality as 'positive' showed high leadership.

Problem solving skills demonstrated differences in the nursing program application motivation and grades, and so in the study of Yang & Sim[22] who studied problem solving skills and nursing application motivation for nursing students, 'consideration of aptitude' had higher problem solving skills than 'consideration of aptitude' or 'other peoples recommendation', and grades were influential[23][9] showed similar results to the study.

In this study, problem solving skills showed a positive correlation with leadership and nurse image. This is in support of the research results of Kim & Kang[24], and Kim & Kim & Lee[23], and Lee & Kim & Choi[25], who reported a positive correlation between problem solving skills and self-leadership in nursing students. The nurse image and problem solving skills were also found to have a positive correlation, however, it was difficult to find the studies on the relationship between nurse image and problem solving skills, and so in view of the studies that the higher the satisfaction of the major, the higher the problem solving skills, along with the studies that higher the nurse image, the higher the major program's satisfaction level[18][26], it seems that the nurse image and problem solving skills are not unrelated to nursing students.

In this study, nurse image and leadership were positively correlated, however, it was difficult to find the studies on the relationship between nurse image and leadership, and so in view of the studies that the higher the satisfaction of the major, the higher the problem solving skills[18][26], along with the study that higher the higher the major program's satisfaction level, the higher the self-leadership[20], it seems that it would be significant

to repeatedly study the relationship between the nurse image and leadership for the nursing students.

As problem solving skills most influence the patient safety competency[4], and as result of this study, they are positively correlated to the nurse image and leadership, a method to educate nurse image and leadership to enhance the nursing students' problem solving skills, along with a program linked to the clinical practice competency and patient safety.

5. Conclusion and Suggestions

The purpose of this study was to investigate the problem solving skills, nurse image and leadership of nursing students and to clarify the relationship between them. The nurse image of nursing students differed according to the presence of nurses' relatives and satisfaction of nursing major. Leadership was varied according to nursing department's application motivation, satisfaction of nursing major and personality, and problem solving skills was different according to whether they had nurse relatives. The problem solving skills, nurse image, and leadership were positively correlated.

This study was conducted in a nursing department and requires caution for generalizing the results of this study, and the results of this study must be used to develop a program considering the factors related to the improvement of problem solving skills, and repeat studies to expand the subjects.

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