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Exploring the Influence of Safety Perception and Safety Control on Clinical Performance Ability and Self Confidence in Patient Safety in Korean Nursing Students

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ABSTRACT

Background/Objectives: This study aims to explore the effect of increased awareness of safety perception and safety control in providing self confidence in patient safety and clinical trials for Korean nursing students.

Method/Statistical Analysis: The data were gathered using several questionnaires that were surveyed by 309 students located in C,I,J cities who gaved their permission to participate in this study. To identify the correlations among clinical performance ability, self confidence in patient safety, safety perception and safety control, SPSS 20.0 correlation program was used. We applied descriptive statistics, which include t-test, analysis of variance(ANOVA_Scheffe), Pearson's correlation coefficient analysis, and multiple-regression analysis.

Findings: There was a statistically significant positive correlation among safety perception, safety control, self confidence in patient safety and clinical performance ability. The regression model explained approximately 54.0% of self confidence in patient safety. Meanwhile, safety perception($p<.001$), safety control($p<.001$), experience of incident($p<.001$), academic record(Less 3.0)($p=.008$), clinical performance ability($p=.008$), and major satisfaction(Satisfaction)($p=.045$) were determined to influence factors on self confidence in patient safety. The multiple-regression analysis model explained approximately 53.0% of clinical performance ability. Furthermore,safety control($p<.001$), major satisfaction(Moderate)($p<.001$), safety perception($p=.012$), self confidence in patient safety ($p=.012$), and academic record(3.0-3.5)($p=.019$) were determined to be influencing factors on clinical performance ability.

Improvements/Applications: The results are anticipated to be utilized as a reference basis for devising strategy for self confidence in patient safety and clinical performance ability for prospective nursing students.

Keywords: *Clinical Performance Ability, Self Confidence in Patient Safety, Safety Perception, Safety Control, Nursing Students*

Introduction

Recently more patients expect to receive high-quality medical services in a safe environment[1]. These changes in the hospital require nursing students to possess the ability to quickly identify and resolve complex problems that are inherent in clinical trials[2]. Nowadays, patient safety is an important part of nursing, and medical practitioners should consider patient safety first. The focus on patient safety prevents unexpected injuries or accidents from happening to patients while receiving medical services[3]. In order to provide patient safety, improvement of awareness through education is important, and the number of safety education a nursing student participates is an important factor[4]. Furthermore, the efforts to increase awareness of safety in an organization are necessary to create an environment that nurtures patient safety[5].In particular, as a nurse after graduation nursing students will be in charge of practical affairs in hospital. Nursing students are a group that

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can directly affect patient safety because they received systematic education from the undergraduate courses to maximize patient safety capability to contribute to patient safety[6]. Therefore, this study examines the relationship between the patient's safety capability and the degree of care performance among nursing students by examining the degree of safety awareness, safety control, and patient safety.

This study aims to accomplish the following goals: first, to identify the level of nursing students' safety perception, safety control, self-confidence in patient safety and clinical performance ability; second, to identify differences in nursing college students' safety perception, safety control, self-confidence in patient safety and clinical performance ability according to their general characteristics; third, to identify the correlation between safety perception, safety control, self-confidence in patient safety and clinical performance ability as perceived by nursing students; fourth, to identify the influence of the safety perception, safety control and clinical performance ability on self-confidence in patient safety and clinical performance ability; fifth, to identify the influence of the safety perception, safety control and self-confidence in patient safety on clinical performance ability.

Materials and Method

Study Design: This study is on a descriptive correlation model that examines the factors affecting clinical performance ability and self confidence in patient safety among nursing students.

Participants and Data Collection: The data were gathered using several questionnaires that were surveyed by 309 nursing students located in C,I,J cities who gave their permission to participate in this study. The all participators were comprised of Juniors and Seniors in nursing college who already had extensive experience involving in clinical trials, so it was not too difficult to make them understand the research goals. As it is a customary practice, we obtained approval from department chairs and student representatives for participators. The data were collected for a period of 60 days, from September 2016 to October 2016. The sample size calculation was performed using G*Power 3.1.3 program, which was 267 with an effect size of 15%, a significance level of 5%, and a power of 95% [7]. The calculations yielded a total minimum sample size of 267 participants, which proved that our sample size was sufficient for data analysis.

Ethical Concerns: The data used for this study(IRB No: SMU-2015-06-003; SMU-2018-05-003) were collected following the approved IRB guidelines and screening procedures of"S" university located in J city. We described the purpose of the study to participants and informed they could choose to not participate. For those who participated gave their written consent, and the process was directed in accordance with the Helsinki Declaration. All participants were given some small token of gratitude.

Research Variables: All instruments used in this study were validated in previously published works. Among those published works, Korean-translated versions continue to possess acceptable validity and reliability.

Safety Perception: The safety perception questionnaire was developed by Ramanujam, Abrahamson and Anderson[8,9]. For the safety perception questionnaire, there were 5questions and the responses follow a five-point scale. The sum of response scores can be between 5 to 25, in which higher the score, higher the safety perception for patients. Cronbach's α was 0.74 in the original scale and 0.71 in the present study.

Safety Control: The safety control questionnaire was developed by Anderson. For the safety control questionnaire, there were 7 questions and the responses follow a five-point scale. The sum of response scores can be between 5 to 35, in which higher the score, higher the safety control for patients. Cronbach's α was 0.84 in the original scale and 0.84 in the present study.

Self Confidence in Patient Safety: The self confidence in patient safety questionnaire was developed by Park. For the self confidence in patient safety questionnaire, there were 10questions and the responses follow a five-point scale. The sum of response scores can be between 10 to 50, in which higher the score, higher the self confidence in patient safety. Cronbach's α was 0.86 in Park's research conducted by this measure and 0.85 in the present study.

Clinical Performance Ability: The clinical performance ability questionnaire was developed by Choi. For the clinical performance ability questionnaire, there were 45 question and the responses follow a five-point scale. The sum of responses can be between 45 to 225, in which higher the score, higher the clinical performance ability. Cronbach's α was 0.92 in the original scale and 0.97 in the present study.

Method of Data Analysis

The PASW (Predictive Analytic SoftWare) 20.0 was used to analyze the data. The general characteristics of the participants were identified using descriptive statistics, which include average, standard deviations, frequency distribution, and percentages. The characteristics of participants can be categorized into safety perception, safety control, clinical performance ability and self confidence in patient safety, and the characteristics were analyzed with t-test, ANOVA, and post hoc analysis was guided with Scheffe's. Pearson's correlation coefficient analysis was used to identify the effect of clinical performance ability with regard to safety perception, safety control and self confidence in patient safety. The multiple-regression analysis was used to determine the influence of clinical performance ability and to determine its correlation with safety perception, safety control and self confidence in patient safety.

Results

General Characteristics: In regards to general characteristics, 211 people (68.3 percent) have received training on patient safety, and 200 people (64.7 percent) have experienced patient safety related campaigns (poster, patient safety events, videos, etc.).180 people (58.3 percent) have witnessed medical errors during clinical practice, 62 people (20.1 percent) were reported to the professor after witnessing medical errors, 33 people (10.7 percent) reported medical errors during clinical practice[Table 1].

Table 1: Socio-demographic Characteristics of Subjects

Characteristics	Categories	n (%)
Experience of Safety education	Yes	211(68.3)
	No	98(31.7)
Experience of Safety campaign	Yes	200(64.7)
	No	109(35.3)
Experience of Incident	Yes	129(41.7)
	No	180(58.3)
Experience of Reporting Incident (academic adviser)	Yes	62(20.1)
	No	247(79.9)
Experience of Reporting Incident (medical team)	Yes	33(10.7)
	No	276(89.3)

Differences of Self Confidence in Patient Safety and Clinical Performance Ability according to Socio-demographic Factor: No significant difference was detected in the self confidence in patient safety of clinical performance satisfaction, experience of safety campaign, experience of reporting incident(academic adviser), or experience of reporting incident(medical team). On the contrary, there was a significant difference by major satisfaction(F=12.65, p=<.001), academic record(F=5.60, p=.001), experience of safety education(t=2.58, p=.010), and experience of incident(t=-3.16, p=.002).

No significant difference was found in the clinical performance ability in regards to experience of incident, experience of reporting incident(academic adviser) or experience of reporting incident(medical team). However, a significant difference was demonstrated by major satisfaction(F=18.71, p=<.001), clinical performance satisfaction(F=11.71, p=<.001), academic record(F=10.11, p=<.001), experience of safety education(t=2.66, p=.008) and experience of safety campaign(t=1.99, p=.047)[Table 2].

Table 2: Differences of self confidence in patient safety and Clinical Performance Ability according to Socio-demographic Factor

Characteristics	Categories	self confidence in patient safety		Clinical Performance Ability	
		Mean ± SD	t or F (p)	Mean ± SD	t or F (p)
Major Satisfaction	Very Satisfaction	4.43 ± 0.12	12.65 (.000)*	3.31 ± 0.69	18.71 (.000)*
	Satisfaction	4.12 ± 0.33		3.56 ± 0.47	
	Moderate	3.90 ± 0.42		3.49 ± 0.44	
	Dissatisfaction	4.20 ± 0.47		3.90 ± 0.48	
	Very Dissatisfaction	4.15 ± 0.48		4.13 ± 0.48	

Conted…

Clinical Performance Satisfaction	Very Satisfaction	4.16 ± 0.24	2.38 (0.52)	3.53 ± 0.60	11.71 (.000)*
	Satisfaction	3.93 ± 0.49		3.34 ± 0.57	
	Moderate	4.11 ± 0.44		3.71 ± 0.48	
	Dissatisfaction	4.20 ± 0.46		3.91 ± 0.47	
	Very Dissatisfaction	4.25 ± 0.63		4.07 ± 0.52	
Academic Record	Over 4.0	4.27 ± 0.53	5.60 (.001)*	4.02 ± 0.42	10.11 (.000)*
	3.5-4.0	4.23 ± 0.47		3.93 ± 0.51	
	3.0-3.5	4.14 ± 0.43		3.67 ± 0.55	
	Less than 3.0	3.93 ± 0.48		3.59 ± 0.39	
Experience of Safety Education	Yes	4.20 ± 0.49	2.58 (.010)*	3.86 ± 0.54	2.66 (.008)*
	No	4.05 ± 0.42		3.68 ± 0.45	
Experience of Safety Campaign	Yes	4.16 ± 0.49	.48 (.630)	3.85 ± 0.54	2.00 (.047)*
	No	4.14 ± 0.45		3.72 ± 0.48	
Experience of Incident	Yes	4.06 ± 0.48	-3.16 (.002)*	3.79 ± 0.52	-.47 (.638)
	No	4.23 ± 0.46		3.81 ± 0.52	
Experience of Reporting Incident (academic adviser)	Yes	4.11 ± 0.48	-.86 (.392)	3.90 ± 0.49	1.62 (.108)
	No	4.17 ± 0.47		3.78 ± 0.52	
Experience of Reporting Incident (medical team)	Yes	4.15 ± 0.53	-.08 (.940)	3.73 ± 0.58	-.84 (.400)
	No	4.16 ± 0.47		3.81 ± 0.51	

Correlations between Safety Perception, Safety Control, Self Confidence in Patient Safety and Clinical Performance Ability: The correlations between variables are displayed in Table 3. There was a statistically significant positive correlation among self confidence in patient safety, safety perception(r=.61, p<.001), and safety control(r=.63, p<.001). Also, there was a statistically significant positive correlation among clinical performance ability, safety perception(r=.56, p<.001), safety control (r=.69, p<.001), and self confidence in patient safety (r=.56, p<.001) [Table 3].

Table 3: Correlations between variables

Variables	Safety Perception	Safety Control	Self Confidence in Patient Safety	Clinical Performance Ability
	r(p)	r(p)	r(p)	r(p)
Safety Perception	1			
Safety Control	.63(.000)	1		
Self Confidence in Patient Safety	.61(.000)	.65(.000)	1	
Clinical Performance Ability	.56(.000)	.69(.000)	.56(.000)	1

Influencing factors on Self Confidence in Patient Safety: The regression analysis for self confidence in patient safety model is displayed in Table 4. To determine the influence of safety perception, safety control and clinical performance ability on self confidence in patient safety, a multiple-regression model was used. The presence of auto-correlation and multicollinearity for the regression model were analyzed using Durbin–Watson's statistic (1.95), and the variance inflation factor (1.012-1.724), which indicated that the base requirements of regression analysis were satisfied. The explanatory power was a statistically significant 54.0% (Adj $R^{2=}$=.530; F=15.90, p<.045). Among these factors, safety perception(p<.001), safety control(p<.001), and experience of incident(p<.001) were proved to exert a significant influence on self confidence in patient safety (β=.32). And academic record(Less 3.0)

(p = .008), clinical performance ability(p=.008), and major satisfaction(Satisfaction) (p = .045) were presented as the influential factors. It proved to have the greatest influence on self confidence in patient safety[Table 4].

Table 4: Regression Analysis for Self Confidence in Patient Safety

Variables	B	SE	β	t	p
(Constant)	1.28	0.17	-	7.57	.000
Safety Control	0.30	0.05	.32	5.43	.000
Safety Perception	0.32	0.05	.32	6.20	.000
Experience of Incident (reference=yes)	0.14	0.04	.15	3.67	.000
Academic Record_Less 3.0 (reference=over 4.0)	-.14	0.05	-.11	-2.67	.008
Clinical Performance Ability	0.14	0.05	.15	2.67	.008
Major Satisfaction_ Satisfaction (reference= Very Satisfaction)	0.17	0.09	.08	2.02	.045
R^2=.54, Adj R^2=.53 F=15.90, p<.045					

Influencing factors on Clinical Performance Ability: The regression analysis for clinical performance ability model is displayed in Table 5. To determine the influence of safety perception, safety control and clinical performance ability on self confidence in patient safety, a multiple-regression model was used. The presence of auto-correlation and multicollinearity for the regression model were analyzed using Durbin–Watson's statistic (1.83), and the variance inflation factor (1.030-2.048), which indicated that the base requirements of regression analysis were satisfied. The explanatory power was a statistically significant 53.0% (Adj R^2=.520; F=5.57, p<.019). Among these factors, safety control(p<.001), and major satisfaction(Moderate)(p<.001) were proved to exert a significant influence on clinical performance ability. And, safety perception (p=.012), self confidence in patient safety (p=.012), and academic record(3.0-3.5) (p = .019) were presented as the influential factors.; it was shown to have the greatest influence on clinical performance ability[Table 5].

Table 5: Regression Analysis for Clinical Performance Ability

Variables	B	SE	β	t	p
(Constant)	1.02	0.21	-	4.78	.000
Safety Control	0.47	0.06	.47	8.29	.000
Major Satisfaction_ Moderate (reference= Very Satisfaction)	-0.16	0.05	-.14	-3.24	.001
Safety Perception	0.13	0.06	.12	2.20	.028
Self Confidence in Patient Safety	0.15	0.06	.14	2.52	.012
Academic Record_3.0-3.5 (reference=over 4.0)	-0.10	0.04	-.09	-2.36	.019
R^2=.53 Adj R^2=.52 F=5.57, p<.019					

Discussion

This study presents the outcome of questionnaires surveyed to identify safety perception, safety control and self confidence in patient safety and to determine the effects of these factors on clinical performance ability among nursing students. The difference in clinical performance ability according to general characteristics showed that the higher the clinical performance ability, major satisfaction, clinical performance satisfaction and academic record the more confident students experienced in performing the patient safety education. This should be done in a way to improve students' major and practical satisfaction, and education on patient safety should be linked with school classes and working environment[10].

This study indicates that there was a positive correlation among clinical performance ability, safety perception, safety control, and self confidence in patient safety, which matches the results of Park's study[11]. Park's study was a significant positive correlation between knowledge and confidence on patient safety. The current study shows that confidence on patient safety is directly linked with safety perception and that nursing

students have greater knowledge if they have high-level tendencies to form self confidence in patient safety[11].

The more safety perception and safety control increased, the greater its influence was on self confidence in patient safety. The more experience of incident decreased, the greater its influence was on self confidence in patient safety. Students should be aware of the potential to witness medical errors during clinical practice. It also needs education based on accurate guidance on how to identify and deal with the situation[12]. The more safety control increased, the greater its influence was on clinical performance ability. These outcomes support the postulation that nursing students who possess high safety perception and safety control demandsocial connection by developing self confidence in patient safety and that they want to improve clinical performance ability[13].

This study has some limitations. First, we considered only Juniors and Seniors in nursing college in 3 areas. Therefore, a longitudinal research design is recommended for tracking the progress of students' patient safety competence over time. Second, since the data analysis was performed on a small number of participants, it will be infeasible to infer the findings of this research to other analysis. In order to expand the outcomes of this study to other areas, follow-up studies must be conducted. Third, the self-reporting of structural questionnaires introduces the risk of recall bias, as well as potential situation of actual safety perception, safety control, self confidence in patient safety and clinical performance ability. Additional studies in a number of cultures and contexts should be conducted to recognize various aspects of patient safety and improve knowledge of factors influencing patient safety in nursing curriculum.

Conclusion

There was a statistically significant positive correlation among safety perception, safety control, self confidence in patient safety and clinical performance ability and there were positive correlations between these factors. The regression model explained approximately 54.0% of self confidence in patient safety. Meanwhile, safety perception(p<.001), safety control(p<.001), experience of incident(p<.001), academic record(Less 3.0)(p=.008), clinical performance ability(p=.008), and major satisfaction(Satisfaction)(p=.045) were responsible for influencing factors on self confidence in patient safety. The regression analysis model showed approximately 53.0% of clinical performance ability. Meanwhile, safety control(p<.001), major satisfaction(Moderate)(p<.001), safety perception (p=.012), self confidence in patient safety (p=.012), and academic record(3.0-3.5)(p=.019) were responsible for influencing factors on clinical performance ability. This study found that clinical performance ability could be managed by safety perception, safety control and self confidence in patient safety. Specifically, clinical performance ability can be controlled by safety perception, safety control and self confidence in patient safety. This requires an understanding that self confidence in patient safety is not result associated with individual skills, but result associated with safety perception and safety control.

Based on this study results, additional studies are suggested to seek strategy and devise measurements for the improvement of safety perception, safety control, self confidence in patient safety and clinical performance ability. Also acurriculum should be established that will increase nursing students' self confidence in patient safety and clinical performance ability. By participating such a program, nursing students should be mindful of the self confidence in patient safety, and design and suggest a clinical performance ability to reduce its occurrence. Moreover, methodological studies are suggested to verify factors that have effects on the self confidence in patient safety and clinical performance ability of nursing students and to develop a valuation scale for measuring nursing students' patient safety that is appositely divided to reflect current trends.

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