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Nurses' Perception of Patient Safety Culture and Safety Control in Patient Safety Management Activities

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Purpose: There have been global initiatives and efforts over the last decade to manage patient safety. Thus aims of this study were to examine university hospital nurses' perceptions of patient safety culture and levels of safety control, and to identify factors that affect patient safety management activities. **Methods:** Participants were 222 nurses who had worked as nurses for more than one year and who conducted patient safety management activities at a university hospital. Data were collected using structured questionnaires and were analyzed using descriptive statistics, t-test, one-way ANOVA, Pearson correlation coefficient, and multiple regression analysis with SPSS/WIN 20.0 computer program. **Results:** General factors which positively impacted nurses' patient safety management were total length of work in nursing, total length of work in present hospital, and experience of a patient safety accident along with safety factors of perception of communication about accident related events and frequency of reporting accident events. These variables explained 45% of the variance in patient safety management activities. **Conclusion:** The findings from this study suggest solutions to promote patient safety management activities in hospitals and provide basic background for nursing education intervention strategies to promote safety control and patient safety management activities intended for nurses.

Key Words: Patient safety, Safety control, Safety management, Nurses

INTRODUCTION

Patient safety is a cornerstone to high-quality healthcare. 'Adverse events' are defined as injures due to medical care. Adverse events represent a major source of morbidity and mortality throughout the world. It is important to identify and understand adverse events in order to develop policies to reduce harm from medical care [1].A dedication to continuous improvement of patient care should be a top priority of healthcare institutions. The longstanding principle, 'First do no harm' should serve as a foundation of nursing and medical care, as most injuries are preventable [2].

Patient safety is defined as the avoidance, prevention, and amelioration of adverse outcomes or injuries stemming from health care processes. A patient safety incident is an event or circumstance that could have resulted, or did result, in unnecessary harm to a patient [3].There has been global initiatives and efforts over the last decade to manage patient safety by development of centers for patient safety [4-6].

In Korea, a recent study analyzed the annual health insurance data provided by the National Health Insurance Service [7]. Through which, it reported that, on average, 9.2% of the 5,744,566 inpatients in Korea experienced an adverse event was hospitalized in 2010, among whom, 39,109 (7.4%) died from medical errors. Furthermore, the

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study also emphasized the need for a national patient safety task force to enhance a nationwide monitoring and reporting system in order to achieve a patient safety-oriented system [7].

A patient safety culture can be defined as an integrated pattern of individual and organizational behavior based on shared beliefs and values that continuously seeks to minimize patient harm resulting from the processes of care delivery [8].A culture of safety influences the attitudes and behaviors of its members with regard to safety regulation adherence within the organization [9]. The perception of safety control stems from an individual's cognitive ability, which can impact the tasks related to achieving safe results while working and is a meaningful factor for estimating safety performance [10]. A high level of safety control benefits physical and psychological health directly and positively [11]. Furthermore, if the perception of safety control is high, negative consequences or reprisals for reporting safety issues will be reduced [12].

Experts with sensitive perceptions about patient safety problems have demonstrated in that nurses who have an interest in and perception of patient safety can play important roles in improving the healthcare climate [4,13,14]. Because nurses are the frontline risk managers caring for patients 24 hours a day, investigating and analyzing their patient safety culture, perception of safety control, and patient safety management activities are necessary to prevent medical errors and improve patient safety.

Previous studies regarding patient safety have been conducted in Korea on topics such as healthcare providers' levels of perception of patient safety culture and studies on patient safety management. Based on a review of these studies, the factors that impact patient safety management activities can be distinguished as individual (age, work experience, position, education level, working hours per week, experience of patient safety education, etc.) and organizational (patient safety culture, safety climate, type of leadership, organization communication, cooperation between doctors and nurses, etc.).Most variations in individual factors are general characteristics of the nurses themselves; however, and it is difficult to find studies on the factors that affect patient safety management activities, including individual factors such as safety control and nurses' perceptions of patient safety culture.

The aims of this study were to examine university hospital nurses' perceptions of patient safety culture, levels of safety control, and patient safety management activities; to identify factors that affect patient safety management activities; and to provide a basic background on nursing intervention for patient safety management. The goal is to add to nurse-focused dimension to the discussion of safety improvement in healthcare settings.

METHODS

1. Study Design

A cross-sectional study design was used to identify factors that affect the patient safety management activities of nurses at a university hospital in G city, South Korea. A descriptive study was chosen in order to more thoroughly explore the nursing dynamics related to a safety climate while considering the impact of demographic factors.

2. Setting and Samples

Data were collected from the nurses at a university hospital from April 25 to May 2, 2014. The participants in this study were nurses working at a 700-bed university hospital. The inclusion criteria for this study were the following: having more than one year of work experience and actively conducting patient safety management activities. The exclusion criterion was working in departments where there was little physical contact with patients.

The sample size was calculated using the G*power 3.1.2 program [15] which indicated that 189 subjects would be sufficient to attain adequate predictive power based on a significance level (α) of .05, a medium effect size of .15, a statistical power (1-β) of .95, and the 13 independent variables used for regression analysis. A total of 233 questionnaires were distributed with 226 returned, yielding a response rate of 97%. Of these questionnaires, a total of 222 were used in the final data analysis (4 were incomplete and discarded).

3. Measurements

Three instruments were used to collect data from the nurses in this study regarding issues related to safety in the healthcare environment. In addition, a 14-question general survey containing demographic and task-related characteristics was administered. The safety instruments measured perception of patient safety culture, safety control, and patient safety management activities.

1) Perception of patient safety culture

This instrument contained 44 items [16].It was based on a pilot survey of 1,437 people working at 21 hospitals in 6 states in the US. Items were selected from 69 items in the Hospital Survey on Patient Safety Culture from Agency for Healthcare Research and Quality [17]translated into

Korean by Kim et al. (2004) [18]. Each item was scored from 1 to 5 (1=strongly disagree, 5=strongly agree). A higher score indicated that the respondents' perceptions of patient safety culture was more positive. Negative items were analyzed using reverse coding. When the survey was developed, its reliability, i.e. Cronbach's α, was .77, and Cronbach's α in this study was .87.

2) Safety control

The researchers in this study translated the safety control survey [19] into Korean after receiving approval from the tool's developer, and back translation was conducted by two bilingual individuals. Two items were modified to reflect feedback from the pilot study. The final tool consisted of seven items, each of which was scored from 1 to 6 (1=strongly disagree, 6=strongly agree). Higher scores indicated better levels of control with regard to safety. When this survey was developed, its reliability (Cronbach's α) was .85, and Cronbach's α in this study was .86.

3) Patient safety management activities

To apply the items to general wards as well as intensive care units, the researcher revised and improved the 64 items that Cho [20] had developed based on the hospital accreditation evaluation categories developed by the Korea Institute for Healthcare Accreditation [21] and on 6 categories of the International Patient Safety Goal. The questionnaire consisted of 10 categories with a total of 56 items. Each item was scored from 1 to 5 (1=never, 5=always). Higher scores indicated higher levels of patient safety management activities. When the survey was developed, its reliability Cronbach's α was .96, and Cronbach's α for this study using the modified version was .97.

4. Ethical consideration

This study was approved by the institutional review board at C university hospital (C***** 2013-01-007-004). The author explained to participants the purpose and process of this study, and participation in the study was voluntary and anonymous. Additionally, they could withdraw from the study at any time. I encrypted the participants' files with passwords to prevent their information from being exposed and deleted all unnecessary identifying information. The participants were given gifts in return for completing the questionnaire.

5. Data analysis

The data were analyzed using SPSS/WIN 20.0. The following analyses were conducted: descriptive statistics, independent t-test, one-way ANOVA, Pearson's correlation coefficients, and multiple linear regression using the enter method.

RESULTS

1. General Characteristics of the Participants

Of the participants who completed this survey, 213 were female (95.9%), and the average age was 32.93±8.13 years. Educational preparation was also solicited showing that 94 individuals (42.3%) had graduated from 3-year colleges. Most of the participants were unmarried. With regard to total clinical work experience, 79 (35.6%) nurses, the highest proportion, had worked less than 2~5 years (Table 1).

2. Perception of Patient Safety Culture, Safety Control, and Patient Safety Management Activities

Participants' perceptions of patient safety culture scored a mean average of 3.08±0.30 out of a possible score of 5. Safety control scored an average of 4.07±0.79 of a range of 1~6, and patient safety management activities scored a mean average of 4.02±0.45 of a possible 5 (Table 2).

There were significant differences in the participants' levels of patient safety management activities depending on age ($F=7.03$, $p<.001$) with those nurses over 40 engaging in more safety management activities (4.26±0.35) than any of the other groups. The youngest group engaged in the least number of activities (3.64±0.33). Regarding education level, nurses with a bachelor's degree engaged in more patient safety management activities than those with an associate degree ($F=4.15$, $p=.017$).Married nurses used more safety management activities than their unmarried counterparts ($t=-2.59$, $p=.010$), There was a significant difference in total work experience at the present hospital related to safety activities with those who had longest tenure engaging in the most activities ($F=9.89$, $p<.001$). Nurses who had experience with patient safety education were significantly more likely to engage in a higher number of safety management activities ($t=2.31$, $p=.022$). Finally, nurses who had experience with patient safety accidents were significantly more likely to engage in a higher number of safety management activities ($t=3.15$, $p=.002$). Job satisfaction, number of patients usually assigned, work unit and shift, years on current unit, and working hours per week did not show any relationship to number of patient safety management activities among nurses in this sample (Table 3).

Table 1. General Characteristics of Participants (*N*=222)

Variables	Categories	n (%) or M±SD
Gender	Female	213 (95.9)
	Male	9 (4.1)
Age (year)	<25	11 (5.0)
	25~29	97 (43.7)
	30~34	45 (20.3)
	35~39	19 (8.5)
	≥40	50 (22.5)
		32.93±8.13
Education level*	Associated degree	94 (42.5)
	Bachelor	82 (37.1)
	≥Master	45 (20.4)
Marital status	Not married	149 (67.1)
	Married	73 (32.9)
Total length of work in present hospital (year)*	<2	13 (5.9)
	2~<5	79 (35.8)
	5~<10	55 (24.9)
	10~<15	18 (8.1)
	≥15	56 (25.3)
		9.38±8.48
Length of work in present unit (year)	<2	73 (32.9)
	2~<5	116 (52.2)
	≥5	33 (14.9)
		2.48±1.88
Work hours per week (hour)*	<40	67 (30.3)
	40~59	148 (67.0)
	≥60	6 (2.7)
Position	Staff nurse	186 (83.8)
	≥Charge nurse	36 (16.2)
Shift type	Shiftwork	207 (93.2)
	Days only	15 (6.8)
Work unit	Medical unit	67 (30.2)
	Surgical unit	71 (32.0)
	Intensive care unit	47 (21.2)
	Emergency room	26 (11.7)
	Others	11 (4.9)
Number of assigned patients	<10	48 (21.6)
	10~<20	22 (9.9)
	≥20	152 (68.5)
		25.90±17.89
Received patient safety education	Yes	198 (90.0)
	No	22 (10.0)
Experienced a patient safety accident	Yes	165 (75.0)
	No	55 (25.0)
Job satisfaction	Satisfaction	138 (62.2)
	Dissatisfaction	84 (37.8)

*Non- responses excluded.

3. Correlation between Perception of Patient Safety Culture, Safety Control, and Patient Safety Management Activities

The participants' safety control scores were 4.07 of a possible mean of 6. Patient safety culture subcategories were compared with each other and with safety control scores and patient safety management activities. Participants' patient safety management activities had significant positive correlations with the following all six of the subcategories of patient safety culture: working environment in unit (r=.23, p=.001), attitude of supervisor/manager (r=.32, p<.001), communication (r=.42, p<.001), frequency of events reported (r=.20, p=.003), hospital environment (r=.33, p<.001), patient safety grade (r=.13, p=.049). Safety control scores were positively related to patient safety management activities (r=.54, p<.001). Participants' safety control also had significant positive correlations with the following five of the subcategories of patient safety culture: working environment in unit (r=.28, p<.001), attitude of supervisor/manager (r=.27, p<.001), communication (r=.37, p<.001), hospital environment (r=.35, p<.001) and patient safety grade (r=.18, p=.009)(Table 4).

4. Factors Influencing Patient Safety Management Activities

The predictive regression model of participants' patient safety management activities showed significant results (F=9.48, p<.001), and the R^2 was 0.45. The factor that affected patient safety management activities the most was total working experience at the present hospital; nurses with more than 15 years of experience (β=.60) conducted more management activities than nurses with less than 2 years of experience. Additionally, safety control (β=.34), communication (β=.20), frequency of events reported (β=.16), and experience with patient safety accidents (β=.14) were the positive factors influencing patient safety management activities (Table 5).

DISCUSSION

Nurses tended to score above the midpoint on the safety control scores. The category that scored the lowest was "I am able to modify work conditions to make them safer". These results suggest that while nurses may want to change the working environment, they perceived they were unable to do so and did not have control of that aspect of their employment. As environmental constraints in the workplace are for the most part unchangeable; attempting

Table 2. Descriptive Statistics for Study Variables (*N*=222)

Variables (number of item)		n (%) or M±SD	Min	Max	Range
Patient safety culture (44)		3.08±0.30	2.1	4.2	1~5
Work environment on unit (18)		3.14±0.36	2.2	4.9	
Attitude of supervisor/manager (4)		3.58±0.47	2.5	4.8	
Communications (6)		3.40±0.45	2.0	4.7	
Frequency of events reported (3)		3.17±0.76	1.0	5.0	
Hospital environment (11)		2.59±0.35	1.4	4.1	
Patient safety grade (1)		3.06±0.61	1.0	5.0	
Number of events reported (1)	None	82 (36.9)			
	1~2	86 (38.7)			
	3~5	41 (18.5)			
	≥6	13 (5.9)			
Safety control (7)		4.07±0.79	2.0	6.0	1~6
I am able to change unsafe nursing practices on my unit.		3.58±1.04	2.0	6.0	
I am able to modify work conditions in order to make them safer.		3.49±1.13	1.0	6.0	
I am capable of taking action to prevent injuries or accidents to myself at work.		4.39±0.98	2.0	6.0	
I am able to change the unsafe behavior of other nurses at work.		4.26±1.04	2.0	6.0	
My nursing job allows me to control whether I am safe at work.		4.55±0.90	2.0	6.0	
I have control over whether I use safety equipment (e.g., protective eyewear).		3.88±1.14	1.0	6.0	
I have control over whether or not I engage in safe work behaviors.		4.33±0.99	2.0	6.0	
Patient safety management activities (56)		4.02±0.45	2.7	4.8	1~5
Medication (9)		3.97±0.48	2.7	5.0	
Transfusion (9)		4.40±0.57	2.8	5.0	
Patient care during transfers (8)		4.28±0.54	2.6	5.0	
Management of infection (12)		4.30±0.51	2.8	5.0	
Identification of patients (5)		4.23±0.54	2.6	5.0	
Communication (4)		3.47±0.80	1.0	5.0	
Management of pain (2)		4.24±0.92	2.0	5.0	
Management of bedsores (2)		4.20±0.71	2.0	5.0	
Management of falls (2)		4.25±0.69	2.0	5.0	
Management of the environment (3)		3.99±0.74	2.0	5.0	

to improve the perception of safety control by placing employees on safety committees where they can make suggestions and have input into safety issues can encourage staff to feel ownership of safety and participate in improving the environment [19].

The level of patient safety management activities scored an average of 4.02 of 5. The lowest-scored category, communication, includes the verbal orders that enable medical staff to share accurate and complete information about their patients during the process of treatment. Joint Commission Resources announced that nearly 70% of the root causes of the 3,548 sentinel events they reviewed that had occurred from 1995~2005 were communication-based [22]. Because communication problems can lead to serious patient safety accidents, it is necessary to identify the root causes of poor communication and improve hospital systems. With regard to patient safety management activities according to participants' general characteristics, subcategories, the higher the age, position, and amount of total work experience in the present hospital, the greater the level of patient safety management activities. This result is similar to the result of Park et al.[23], it can be considered that this result stemmed from the fact that those who had a more advanced age, higher positions, and more work experience had richer clinical work experience and knowledge of patient safety and that this was the reason why these staff members had developed a strong sense of responsibility for safety control as their management duties expanded.

After verifying the correlation between perception of patient safety culture, safety control, and patient safety management activities, it became clear that participants conducted their management activities better when they had more safety control, with significant correlations between the 6 subcategories of patient safety culture.

In this study, significant predictive factors affecting par-

Table 3. Patient Safety Management Activities by General Characteristics (*N*=222)

Variables	Categories	n (%)	M±SD	t or F	*p*
Gender	Female	213 (95.9)	4.02±0.45	0.22	.830
	Male	9 (4.1)	3.99±0.40		
Age (year)	< 25[a]	11 (5.0)	3.64±0.33	7.03	< .001
	25~29[b]	97 (43.7)	3.95±0.39		a < c
	30~34[c]	45 (20.3)	4.01±0.44		a, b, c < e†
	35~39[d]	19 (8.5)	4.01±0.71		
	≥ 40[e]	50 (22.5)	4.26±0.35		
Education level	Associate degree[a]	94 (42.5)	3.92±0.40	4.15	.017
	Bachelor[b]	82 (37.1)	4.09±0.42		a < b†
	≥ Master	45 (20.4)	4.10±0.53		
Marital status	Not married	149 (67.1)	3.97±0.45	-2.59	.010
	Married	73 (32.9)	4.13±0.42		
Total length of work in present hospital (year)	< 2[a]	13 (5.9)	3.64±0.37	9.89	< .001
	2~ < 5[b]	79 (35.8)	3.90±0.36		a < c
	5~ < 10[c]	55 (24.9)	4.02±0.49		a, b, c < e*
	10~ < 15[d]	18 (8.1)	4.06±0.55		
	≥ 15[e]	56 (25.3)	4.28±0.35		
Total length of work in present unit (year)	< 2	73 (32.9)	4.02±0.47	0.67	.514
	2~ < 5	116 (52.2)	4.00±0.40		
	≥ 5	33 (14.9)	4.10±0.55		
Work hours per week (hour)	< 40	67 (30.3)	4.07±0.50	0.81	.445
	40~59	148 (67.0)	4.00±0.42		
	≥ 60	6 (2.7)	4.16±0.41		
Position	Staff nurse	186 (83.8)	3.98±0.45	-3.23	.001
	≥ Charge nurse	36 (16.2)	4.24±0.34		
Shift type	Shiftwork	207 (93.2)	4.01±0.45	-1.58	.116
	Day shift	15 (6.8)	4.20±0.35		
Work unit	Medical unit	67 (30.2)	4.06±0.40	1.86	.118
	Surgical unit	71 (32.0)	4.06±0.40		
	ICU	47 (21.2)	4.04±0.51		
	Emergency room	26 (11.7)	3.82±0.50		
	Others	11 (4.9)	3.92±0.47		
Number of assigned patients	< 10	48 (21.6)	4.01±0.51	0.18	.837
	10~ < 20	22 (9.9)	4.07±0.52		
	≥ 20	152 (68.5)	4.02±0.41		
Received patient safety education	Yes	198 (90.0)	4.05±0.43	2.31	.022
	No	22 (10.0)	3.83±0.48		
Experienced a patient safety accident	Yes	165 (75.0)	4.07±0.43	3.15	.002
	No	55 (25.0)	3.86±0.45		
Job satisfaction	Satisfaction	138 (62.2)	4.30±0.44	0.39	.695
	Dissatisfaction	84 (37.8)	4.01±0.46		

*Post hoc comparison=Scheffé; † Post hoc comparison=Dunnett's T3.

ticipants' patient safety management activities were total work experience in present unit and having had an experience of patient safety accident out of the subcategories in general characteristics of participants and the perception of communication, frequency of events reported out of the subcategories in patient safety culture and safety control. Out of them, total work experience in present unit was the most influential factor, nurses who had worked for more

Table 4. Correlation between Study Variables (*N*=222)

Variables	1	1-1	1-2	1-3	1-4	1-5	1-6	2	3
	r (*p*)	r (*p*)	r (*p*)	r (*p*)	r (*p*)	r (*p*)	r (*p*)	r (*p*)	r (*p*)
1. Patient safety culture	1								
1-1. Work environment in unit		1							
1-2. Attitude of supervisor/manager		.34 (<.001)	1						
1-3. Communications		.47 (<.001)	.44 (<.001)	1					
1-4. Frequency of events reported		.36 (<.001)	.12 (.071)	.26 (<.001)	1				
1-5. Hospital environment		.54 (<.001)	.33 (<.001)	.49 (<.001)	.34 (<.001)	1			
1-6. Patient safety grade		.44 (<.001)	.26 (<.001)	.22 (.001)	.13 (.048)	.42 (<.001)	1		
2. Safety control		.28 (<.001)	.27 (<.001)	.37 (<.001)	.07 (.289)	.35 (<.001)	.18 (.009)	1	
3. Patient safety management activities		.23 (.001)	.32 (<.001)	.42 (<.001)	.20 (.003)	.33 (<.001)	.13 (.049)	.54 (<.001)	1

Table 5. Factors Influencing Patient Safety Management Activities (*N*=214)

Variables	Categories	B	SE	β	t	*p*
(Constant)		1.70	0.29		5.93	<.001
Marital status (ref: not married)	Married	-0.09	0.09	-.07	-1.01	.314
Education level (ref: associated degree)	Bachelor	0.08	0.06	.09	1.38	.170
	Master	-0.09	0.08	-.08	-1.02	.308
TLW† in present hospital (ref: <2 yrs)	2~<5	0.27	0.10	.30	2.72	.007
	5~<10	0.43	0.11	.43	4.08	<.001
	10~<15	0.29	0.14	.19	2.16	.032
	≥15	0.60	0.14	.60	4.17	<.001
Position (ref: staff nurse)	≥Charge nurse	-0.17	0.10	-.14	-1.63	.104
Received PSE (ref: no)	Yes	-0.10	0.09	-.06	-1.12	.264
Experienced PSA (ref: no)	Yes	0.14	0.06	.14	2.43	.016
Patient safety culture	Work environment in unit	-0.09	0.09	-.07	-1.01	.314
	Attitude of supervisor/manager	0.08	0.06	.09	1.38	.170
	Communications	0.19	0.07	.20	2.96	.003
	Frequency of events reported	0.09	0.04	.16	2.60	.010
	Hospital environment	0.10	0.09	.08	1.12	.264
	Patient safety grade	0.01	0.05	.01	0.12	.909
Safety control		0.19	0.04	.34	4.93	<.001
		R^2=.45, Adjusted R^2=.40, F=9.48, p<.001				

*The number of participants was changed from 222 to 214 in the regression analysis; TLW=Total work experience; PSE=Patient safety education; PSA=Patient safety accident; ref=Reference group.

than 15 years conducted more patient safety management activities than nurses who had worked less than 2 years. Since experience seems to be a factor in engaging in safety actions, using seasoned nurses to mentor young nurses with an emphasis on safe practice may be a way to influence positive safety practices. Among the participants in this study who had worked fewer than 2 years, the rate of temporary workers was high, and they spent most of their time caring for patients. The reason why nurses with less than 2 years of experience conducted fewer safety management activities than other nurses is probably related to factors such as job insecurity, limited skills, and the stress from the trial and error of communication which can negatively affect patient safety management activities.

Patient safety culture reflects shared beliefs and values which contribute to preventing harm to patients and was reflected in six subscales. This study showed that the subscales of communication and perception of frequency of events reported positively affected patient safety management activities. Because the process of communication in organizations, the structure of decision-making, and reporting systems are leading factors that affect perceptions of safety and actions [24], effective cooperation and communication increase the morale of medical staff and increase work satisfaction, efficiency, and safety [16, 25]. Most nurses believe that they only need to report errors that actually occur, and they do not realize that it is also important to report potential errors [26].

In this study, safety control was a positive factor that impacted patient safety management activities. Ninety-six percent of nurses and 90% of doctors, pharmacists, and administrators believe that nurses have the primary responsibility for preventing patient safety accidents [27]. When responding to immediate demands, nurses must initially solve problems when they face overwhelming demand or conflicts that subvert the safety system [28]. In this situation, nurses' safety control enables them to provide correct judgment about actions that conflict with patient safety. A study by Kim et al.[29] predicted that preventive education on nursing errors related to patient safety which incorporated examples would improve safety control and contribute to safety performance. A previous study [30] suggested how the personal perception of control was associated with nursing performance and improved the ability to promote patient safety by emphasizing the importance of the perception of control for outcomes such as achievement, stress, and satisfaction. This is because the level of personal control over tasks has a direct impact on the nurses' perception of their ability to assure the patient's well-being.

All of the patient safety culture subcategories were significantly related to the number of patient safety management activities in which nurses engaged. Creating a culture of safety appears to promote an environment where safety activities seem to fit. According to the results of this study, total work experience, safety control, communication, frequency of events reported, and previous experience with patient safety accidents explained 40% of the variance in participants' patient safety management activities.

Because this study had the regional limitation of only surveying nurses from one university hospital, it is necessary to be cautious in extending its results or applying them by making generalizations. Moreover, it is possible that this study's results are not consistent with real-life actions because patient safety management activities were measured by nurses' subjective standards. Finally, the extraordinary high response rate might reflect some bias toward providing information that the researcher wants to hear.

CONCLUSION

There has been global initiatives and efforts over the last decade to manage patient safety. The purposes of this study were to examine university hospital nurses' perceptions of patient safety culture, levels of safety control and to identify factors that affect patient safety management activities. General factors which positively impacted nurses' patient safety management were total work experience in present hospital, and experiencing a patient safety accident along with safety factors of perception of communication and frequency of events reported. Also, it is identified that safety control is a positive factor which affects patient safety management activities of nurses. These variables explained 45% of the variance in patient safety management activities.

This study suggested solutions to promote patient safety management activities in hospitals. Findings provided the basic background for nursing education intervention strategies to promote safety control and patient safety management activities intended for nurses.

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