Influence of the Nursing Practice Environment on Job Satisfaction and Turnover Intention

Sang-Yi Lee[1], Chul-Woung Kim[2,3], Jeong-Hee Kang[4*], Tae-Ho Yoon[5], Cheoul Sin Kim[6]

[1]*Department of Health Policy and Management, Jeju National University School of Medicine, Jeju;* [2]*Department of Preventive Medicine, Chungnam National University School of Medicine, Daejeon;* [3]*Research Institute for Medical Sciences, Chungnam National University School of Medicine, Daejeon;* [4]*Department of Nursing Science, Gyeongju University, Gyeongju;* [5]*Department of Preventive Medicine & Occupational Medicine, Yangsan Campus of Pusan National University School of Medicine, Yangsan;* [6]*Research Institute for Dental Care, Korean Dental Association, Seoul, Korea*

Objectives: To examine whether the nursing practice environment at the hospital-level affects the job satisfaction and turnover intention of hospital nurses.

Methods: Among the 11 731 nurses who participated in the Korea Health and Medical Workers' Union's educational program, 5654 responded to our survey. Data from 3096 nurses working in 185 general inpatient wards at 60 hospitals were analyzed using multilevel logistic regression modeling.

Results: Having a standardized nursing process (odds ratio [OR], 4.21; $p < 0.001$), adequate nurse staffing (OR, 4.21; $p < 0.01$), and good doctor-nurse relationship (OR, 4.15; $p < 0.01$), which are hospital-level variables based on the Korean General Inpatients Unit Nursing Work Index (KGU-NWI), were significantly related to nurses' job satisfaction. However, no hospital-level variable from the KGU-NWI was significantly related to nurses' turnover intention.

Conclusions: Favorable nursing practice environments are associated with job satisfaction among nurses. In particular, having a standardized nursing process, adequate nurse staffing, and good doctor-nurse relationship were found to positively influence nurses' job satisfaction. However, the nursing practice environment was not related to nurses' turnover intention.

Key words: Multilevel analysis, Nursing practice environment, Job satisfaction, Turnover intention, Hierarchical generalized linear model

INTRODUCTION

Currently, the chronic shortage of nurses in South Korea

(hereafter Korea) is not only a domestic issue but also an international one in countries including the United States, Canada, and throughout Europe [1]. The average number of nurses in Korea is 9.1 per 1000 people, which is much fewer than that among the Organization for Economic Cooperation and Development (OECD) countries (4.7 per 1000 people). Furthermore, the average number of nurses in acute care hospitals in Korea was approximately 0.32 to 0.33 per 1000 people between 2001 and 2007, which is also fewer than that in many other OECD countries [2]. In fact, hospitals in Korea often struggle to hire nurses. According to a survey of 239 medical institutions in Korea conducted in 2008, 94.8% of the hospitals with 300 beds or fewer suffered from nurse shortages [3].

In response to this shortage, the Korean government has increased the number of nursing schools to expand the supply of nurses. These efforts have increased the number of licensed nurses, but unfortunately failed to increase the number of practicing nurses. According to the Yearbook of health and welfare statistics [4], while the total number of licensed nurses in 2008 was 225 405, only 102 799, 40.3% of the total number of licensed nurses, were actually employed by medical institutions. Because various factors affect the level of nurse staffing in hospitals, including the nursing practice environment, overall environment, and regional characteristics [5], multifaceted efforts are required to identify the potential causes of nurse shortages, especially those surrounding the nursing practice environment.

The nursing work index (NWI) is a tool that was developed to measure the nursing practice environment of magnet hospitals that were able to secure and retain nurses despite the overall nurse shortages. After its development, Aiken and Patrician [6] revised the 65-item NWI and published the revised nursing work index (NWI-R), which consisted of 57 items.

Studies using the NWI-R have concluded that the nursing practice environment is related to nurses' job satisfaction and turnover intention [6]. Specifically, they found that improvements in the nursing practice environment might enhance nurses' job satisfaction and lower their turnover intention, thus potentially ending the nurse shortage [7]. The NWI-R is composed of various factors, and many studies have found correlated factors with nurses' job satisfaction and turnover intention. The meta-analysis by Zangaro and Soeken [8] found that a good doctor-nurse relationship and autonomy were related to nurses' job satisfaction. Another study reported that a partnership between a supervising nurse and staff nurse had a positive impact on nurses' job satisfaction and turnover intention [9].

As stated above, western countries have provided various sources of empirical evidence on the importance of favorable nursing practice environments. Several recent studies have described correlation between nurses' perceptions of their practice environment and nurse outcomes such as burnout, job satisfaction, intention to leave, and nurse perception quality of care [7,10,11].

However, in Korea, few studies have investigated the relationship between the nursing practice environment and nurses' job satisfaction and turnover intention. In a survey by Kwak et al. [12] on 496 nurses from 23 hospitals, organizational management and hospital support significantly impacted nurses'

job satisfaction. In addition, a survey by Seo et al. [13] on 353 nurses from two hospitals found that the support of a supervising nurse, workload, and compensation were correlated with nurses' job satisfaction. However, these two studies did not use the NWI-R. Kang et al. [14] examined the relationship between the environment of the nursing organization and the level of morale among nurses using part of the NWI-R.

One main limitation of previous studies that have dealt with the nursing practice environment and nurses' performance in Korean hospitals is that hospital data was not divided into nurse-level and hospital-level variables, rather these variables were analyzed at a single level. In addition, the relationship between the hospital-level nursing practice environment with nurses' job satisfaction and turnover intention has not been investigated.

The purpose of this study was to investigate whether the hospital-level nursing practice environment affects nurses' job satisfaction and turnover intention.

METHODS

Participants

Among the 22 520 nurses registered in the Korea Health and Medical Workers' Union, 11 731 participated in the union's educational program, and 5654 (48.2%) of them responded to the survey. The target study sample was to include 3096 nurses working in general inpatient wards (internal medicine, surgery, pediatrics, obstetrics, and gyniatrics) of the 60 available hospitals. There were five hospitals with less than 10 respondents, thus data from these hospitals were excluded. In addition, 1666 nurses working in special wards and 584 nurses working in outpatient departments and as supervising nurses were excluded.

Data

A self-administered questionnaire consisting of multiple sections, which was approved by the institutional review board of Chungnam National University, was used for data collection on May 2010. Dependent variables were the nurses' job satisfaction and turnover intention. Job satisfaction was rated on a five-point scale as very dissatisfied (1), somewhat dissatisfied (2), fair (3) somewhat satisfied (4), and very satisfied (5), by asking if participants were satisfied with their current work. Turnover intention was collected as either yes (1) or no in response to the question, "Are you planning to leave your current job within the next year?"

All dependent variables were inserted as dichotomous vari-

ables for multilevel logistics analysis; the job satisfaction survey responses very dissatisfied, somewhat dissatisfied, and fair were coded as "0", and very satisfied and somewhat satisfied were coded as "1".

Hospital-level variables that explained and classified each hospital included the type of hospital, ownership of hospital, and bed-to-nurse ratio as well as data from the hospital-level Korean General Inpatients Unit Nursing Work Index (KGU-NWI). The number of beds and bed-to-nurse ratio in the general wards, hospital type, and hospital ownership, were obtained from publicly available data through the Korea Health Insurance Review and Assessment database [15]. The bed-to-nurse ratio was stratified into four categories as <3.0, 3.0 to 3.4, 3.5 to 3.9, ≥ 4.0. Moreover, the type and ownership of each hospital were classified as either a tertiary general hospital or non-tertiary general hospital and private or public hospital, respectively.

Nurse-level variables that explained and categorized the participants included variables such as the nurses' gender, age, education, position, years of clinical experience, and department as well as data from the KGU-NWI. Educational background was categorized as attending a 3-year college, 4-year university, or graduate school. In addition, the department where each nurse was currently employed was collected as internal medicine, surgery, pediatrics, obstetrics, and gynecology. Moreover, nurses' positions were either charge nurses or staff nurses.

The KGU-NWI consists of 26 items categorized under 6 sub-factors; participation in the decision-making process, nurse-staffing adequacy, education to improve the quality of care, organizational support and management of the hospital, the doctor-nurse relationship, and the nursing process [16]. In particular, seven items, including "the leadership of nursing service consults with staff nurses to resolve ordinary nursing issues," are intended to measure the "participation in decision-making process." Five items, including "nursing diagnosis is utilized," are for "nursing process." Three items, including "nurse staffing is adequate," are related to "adequate nurse staffing." Four times, including "there is an active and continuous training program for nurses," are intended to measure "education for quality of care." Four times, including "supervising nurses (chief nurse and above) are great managers and leaders," are for "organizational support and management of hospital." And three items, including "doctors and nurses maintain good relations about work," are related to "doctor-nurse relationship" [16].

The mean scores from all subheadings in KGU-NWI for the nurse-level and hospital-level variables were calculated from the sum of scores from all participating nurses.

Statistical Analysis

Descriptive statistical analyses were used to describe the nurses' general characteristics, job satisfaction, turnover intention, and general characteristics of the included hospitals. Multilevel logistic regression analysis, a hierarchical linear model, was used to create three models for each type of explanatory variable. Model 1 did not include any explanatory variables. Model 2 included general characteristics at the nurse-level and the hospital-level. Model 3 included all explanatory variables including the nurse-and hospital-level KGU-NWI variables as well as those included in model 2. Multicollinearity was suspected for age, so it was removed from the final model. Model 3, with nurses' job satisfaction as a dependent variable, was computed as follows.

Nurse-level

Logit $(ST\text{-}JOB_{ij}) = \beta_{0j} + \beta_{1j}Gender_{ij} + \beta_{2j}Education_{ij} + \beta_{3j}Position_{ij} + \beta_{4j}Pediatrics_{ij} + \beta_{5j}Surgery_{ij} + \beta_{6j}Obstetrics\ and\ gynecology_{ij} + \beta_{7j}Clinical\ experience_{ij} + \beta_{8j}NWPDM\text{-}nurse_{ij} + \beta_{9j}NWNP\text{-}nurse_{ij} + \beta_{10j}NWSTF\text{-}nurse_{ij} + \beta_{11j}NWEDU\text{-}nurse_{ij} + \beta_{12j}NWOSM\text{-}nurse_{ij} + \beta_{13j}NWDNR\text{-}nurse_{ij}$

Hospital-level

$\beta_{0j} = \gamma_{00} + \gamma_{01}Type_j + \gamma_{02}Ownership_j + \gamma_{03}Bed\ to\ nurse\ ratio_j + \gamma_{04}NWPDM\text{-}hospital_j + \gamma_{05}NWNP\text{-}hospital_j + \gamma_{06}NWSTF\text{-}hospital_j + \gamma_{07}NNWEDU\text{-}hospital_j + \gamma_{08}NWOSM\text{-}hospital_j + \gamma_{09}NWDNR\text{-}hospital_j + u_{0j}$

Job satisfaction (ST-JOB) was included as a dichotomous variable, and the following six KGU-NWI variables were considered the main explanatory variables: participation in the decision-making process (NWPDM), nursing process (NWNP), nurse-staffing adequacy (NWSTF), education for improved quality of care (NWEDU), organizational support and management of the hospital (NWOSM), and the doctor-nurse relationship (NWDNR). Each of the six KGU-NWI variables was marked as either nurse or hospital to indicate whether it was a nurse-level or the hospital-level variable. Additionally analyzed hospital-level variables were the hospital type, hospital ownership, and bed-to-nurse ratio. Nurse-level variables included gender, age, education, position, clinical experience, and department.

RESULTS

Distribution of Nurses' Job Satisfaction and Turnover Intention by General Characteristics

Nurses in public hospitals were more satisfied with their job than those in private hospitals were ($p < 0.05$), and hospitals with a bed-to-nurse ratio of 3.0 to 3.4 had the highest level of job satisfaction followed by those with ≥ 4.0, < 3.0, and 3.5 to 3.9 ($p < 0.05$).

Nurses aged 45 or older had the highest level of satisfaction followed those 35 to 44, younger than 25, and 25 to 34 ($p < 0.001$). In addition, nurses with a high level of education were more likely to be satisfied with their job ($p < 0.05$), and supervising nurses were more satisfied than staff nurses were ($p < 0.001$). By clinical experience, nurses with at least 10 years of experience were the most satisfied followed by those with 7 to 9 years, less than 3 years, and 3 to 6 years of experience ($p < 0.001$). By department,

nurses working in obstetrics and gynecology had the highest job satisfaction followed by those working in pediatrics, surgery, and internal medicine ($p < 0.001$).

Nurses in private hospitals were more likely to report turnover intention than those in public hospitals were ($p < 0.001$). In addition, hospitals with a bed-to-nurse ratio of 3.5 to 3.9 had the highest turnover intention followed by those with < 3.0, 3.0 to 3.4, and ≥ 4.0 ($p < 0.001$).

Furthermore, nurses aged 45 or older were most likely to leave their jobs followed those aged 35 to 44, younger than 25, and 25 to 34 ($p < 0.001$). Nurses with a high education level had a lower turnover intention ($p < 0.05$), and staff nurses had a relatively high turnover intention compared to supervising nurses ($p < 0.001$). By clinical experience, nurses with 3 to 6 years of experience had the highest turnover intention followed those with < 3 years, 7 to 9 years, and ≥ 10 years ($p < 0.001$) (Table 1).

Table 1. General characteristics of study subjects by the level

Variables			n	%	Job satisfaction (satisfy)		Turnover intention (yes)	
					%	*p*-value	%	*p*-value
Hospital-level	Type of hospital (no. of bed)	Non-tertiary general hospital	37	61.7	31.8	0.63	66.9	0.87
		Tertiary general hospital	23	38.3	32.7		66.6	
	Ownership	Private	34	56.7	30.9	0.01	64.3	<0.001
		Public	26	43.3	35.5		72.0	
	Bed to nurse ratio	<3.0 beds	10	16.7	32.5	0.02	64.9	
		3.0-3.4 beds	20	33.3	33.7		69.2	0.001
		3.5-3.9 beds	10	16.7	25.9		60.0	
		≥4.0 beds	20	33.3	33.5		70.9	
	Total		60	100.0	100.0			
Nurse-level	Gender	Male	14	0.5	30.8	0.91	75.0	0.76
		Female	3082	99.6	32.3		67.0	
	Age (yr)	<25	728	23.5	33.8	<0.001	67.0	<0.001
		25-34	1904	61.5	29.7		64.1	
		35-44	368	11.9	39.9		80.9	
		≥45	49	1.6	54.2		83.3	
		Missing	47	1.5	-		-	
	Education	College	1715	55.4	30.3	0.02	65.2	0.02
		University	1202	38.8	33.5		68.4	
		Graduate	141	4.6	46.1		75.0	
		Missing	38	1.2	-		-	
	Position	Staff nurse	2873	92.8	31.1	<0.001	66.0	<0.001
		Charge nurse	223	7.2	47.3		80.1	
	Clinical experience (yr)	<3	702	22.7	29.8	<0.001	60.1	<0.001
		3-6	981	31.7	26.1		59.3	
		7-9	451	14.6	30.2		67.7	
		≥10	650	21.0	42.1		80.4	
		Missing	312	10.1	-		-	
	Work department (no. of department)	Medicine	1340 (59)	43.3 (31.9)	28.2	<0.001	66.9	0.45
		Pediatrics	224 (41)	7.2 (22.2)	36.2		66.4	
		Surgery	1377 (58)	44.5 (31.4)	34.9		66.6	
		Obstetrics and gynecology	155 (27)	5.0 (14.6)	38.7		73.0	
	Total		3096 (185)	100.0	100.0			

Table 2. Multilevel logistic regression analysis: KGU-NWI and general characteristics (nurse and hospital) are associated with job satisfaction and turnover intention

Fixed effect	Job satisfaction						Turnover intention					
	Model 2 (without KGU-NWI subscale variables)			Model 3 (full model)			Model 2 (without KGU-NWI subscale variables)			Model 3 (full model)		
	Coefficient	*p*-value	ORs	Coefficient	*p*-value	ORs	Coefficient	*p*-value	ORs	Coefficient	*p*-value	ORs
Intercept (r_{00})	-1.26	<0.001	0.28	-1.38	<0.001	0.25	0.50	0.01	1.64	0.44	0.04	1.56
Hospital level												
Type[1]	0.05	0.78	1.05	-0.04	0.78	0.97	-0.05	0.77	0.95	0.13	0.51	1.14
Ownership[2]	0.18	0.31	1.20	0.12	0.40	1.13	0.40	0.05	1.49	0.39	0.13	1.47
Bed to nurse ratio	-0.05	0.49	0.95	0.13	0.05	1.14	-0.10	0.29	0.91	-0.11	0.42	0.90
NWPDM-hospital				-0.96	0.11	0.38				0.73	0.37	2.08
NWNP-hospital				1.44	0.004	4.21				-0.18	0.81	0.84
NWSTF-hospital				1.41	<0.001	4.09				0.09	0.90	1.09
NWEDU-hospital				0.31	0.41	1.36				-0.32	0.60	0.72
NWOSM-hospital				0.43	0.18	1.54				0.68	0.18	1.97
NWDNR-hospital				1.42	0.03	4.15				0.91	0.35	2.47
Nurse level												
Gender[3]	0.29	0.63	1.34	0.32	0.57	1.37	0.56	0.38	1.75	0.75	0.23	2.12
Education[4]	0.05	0.49	1.05	0.10	0.19	1.11	0.00	0.96	1.00	0.09	0.36	1.09
Position[5]	0.56	0.003	1.75	0.57	0.009	1.77	0.21	0.39	1.23	0.28	0.18	1.32
Clinical experience	0.03	0.007	1.03	0.05	<0.001	1.06	0.07	<0.001	1.07	0.08	<0.001	1.09
Work department (reference medicine)												
Pediatrics	0.60	0.001	1.82	0.49	0.005	1.63	0.12	0.48	1.13	0.05	0.79	1.05
Surgery	0.37	<0.001	1.45	0.29	0.006	1.34	-0.01	0.94	0.99	-0.06	0.60	0.94
Gynecology	0.38	0.09	1.47	0.17	0.46	1.19	0.24	0.19	1.27	0.29	0.17	1.34
NWPDM-nurse				0.16	0.23	1.18				-0.09	0.61	0.92
NWNP-nurse				0.83	<0.001	2.30				0.21	0.03	1.24
NWSTF-nurse				0.45	<0.001	1.57				0.11	0.33	1.12
NWEDU-nurse				0.14	0.34	1.15				0.10	0.47	1.10
NWOSM-nurse				0.39	0.003	1.47				0.57	<0.001	1.77
NWDNR-nurse				0.71	<0.001	2.04				0.35	0.002	1.42
Model 1: empty model (fully unconditioned) Y_{00}	-0.78	<0.001	0.46				0.76	<0.001	2.14			

Random effect	Job satisfaction[6]			Turnover intention[7]		
	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3
t_{00}=var(u_{0j}) intercept variance	0.18*	0.22*	0.03**	0.34*	0.29*	0.33*
Intraclass correlation coefficient	0.05	0.06	0.01	0.09	0.08	0.09
Deviance	8741.05	7787.45	7305.94	8531.58	7615.57	7225.66
No. of parameters	2	12	22	2	12	22

KGU-NWI, Korean General Unit Nursing Work Index; OR, odds ratio; NWPDM, participation in decision-making; NWNP, nursing process; NWSTF, nurse staffing adequacy; NWEDU, education for quality of care; NWOSM, organizational support and management of hospital; NWDNR, doctor-nurse relationship.
[1]Type: tertiary general hospital=0, non-tertiary general hospital=1.
[2]Ownership: private=0, public=1.
[3]Sex: male=0, female=1.
[4]Education: college=0, university=1, graduate=2.
[5]Position: staff nurse=1, charge nurse=0.
[6]Job satisfaction: very dissatisfy/somewhat dissatisfy=0, very satisfy/somewhat satisfy=1.
[7]Turnover intention: yes=0, no=1.
*$p<0.05$, **$p<0.001$.

Job Satisfaction and Nursing Practice Environment

Three of the six Korean General Inpatients Unit Nursing Work Index (KGU-NWI) variables at the hospital-level were significantly correlated with nurses' job satisfaction. The nursing process (odds ratio [OR], 4.21; $p<0.01$) showed the strongest correlation of the three variables followed by the doctor-nurse relationship (OR, 4.15; $p<0.05$) and nurse-staffing adequacy (OR, 4.09; $p<0.001$). No correlation was found between the general characteristics of the hospitals and the bed-to-nurse ra-

tio ($p=0.054$).

At the nurse-level, four of the KGU-NWI variables were significantly related in the job satisfaction model. The nursing process had the highest OR of 2.30 ($p<0.001$) followed by the doctor-nurse relationship (OR, 2.04; $p<0.001$), nurse-staffing adequacy (OR, 1.57; $p<0.001$), and organizational support and management of hospital (OR, 1.47; $p<0.01$).

Among the general characteristics of the nurses, position, clinical experience, and department were significant variables. The more clinical experience a nurse had, the higher their job satisfaction was (OR, 1.06; $p<0.001$). Those working in the pediatric department (OR, 1.63; $p<0.01$) and surgery department (OR, 1.34; $p<0.01$) had higher job satisfaction than those working in the internal medicine department did (Table 2).

Turnover Intention and Nursing Practice Environment

Hospital-level variables were not related to turnover intention. However, at the nurse-level, three of the KGU-NWI variables were correlated with turnover intention: organizational support and management of the hospital (OR, 1.77; $p<0.001$), the doctor-nurse relationship (OR, 1.42; $p<0.01$), and the nursing process (OR, 1.24; $p<0.05$). Among the general characteristics of the nurses, clinical experience (OR, 1.09; $p<0.001$) was the only significant variable related to turnover intention (Table 2).

Adequacy of the Multilevel Model

The models designed to evaluate job satisfaction and turnover intention were adequate in the multilevel analysis because the null hypotheses were rejected for all three models used to evaluate job satisfaction and turnover intention. Thus, differences in job satisfaction and turnover intention among the 60 hospitals exist, and our collected data are adequate for this multilevel analysis. Deviance is defined as the difference from twice the natural logarithm of the likelihood and measures how much the model and data do not fit [17]. Deviance cannot be interpreted directly; rather, it is compared between the models that are fit to the same dataset. Compared to model 2, model 3 fits better with the data with a D_0-D_1 of 481.51 and m_1-m_0 of 10 ($p<0.001$). The deviance statistic of model 3 is very close to that of model 2 with an insignificant chi-squared test. This result may suggest that nursing practice environments are not good predictors to explain the variations in the level of nurses' job satisfaction among these hospitals (Table 2).

DISCUSSION

The KGU-NWI variables in the job satisfaction model effectively explain nurses' overall job satisfaction. Specifically, the nursing process, doctor-nurse relationship, and nurse-staffing adequacy measurements were significant variables at both hospital and nurse-level models. However, organizational support and management of the hospital was significant only in the nurse-level model. The doctor-nurse relationship, nurse-staffing adequacy, and organizational support and management of the hospital have been researched numerous times in previous studies; thus, these variables explain reasons for job satisfaction and turnover intention more effectively than others do.

The nursing process affected nurses' job satisfaction the most in the hospital-level KGU-NWI analysis with an OR of 4.21 ($p<0.01$). In addition, the nursing process was significantly related at the nurse-level with the largest OR of 2.30. These findings suggest that hospitals with standardized policies and methods where each ward has autonomous authority to determine its own policies and procedures tend to have higher job satisfaction rates among nurses than other hospitals that lack these policies do. Since the nursing process related to the nursing practice environment has not been thoroughly investigated in the literature, additional studies should be conducted to further investigate this relationship.

The doctor-nurse relationship had an OR of 4.15 and was the second most significant explanatory variable at the hospital-level that affected nurses' job satisfaction; this finding is consistent with those of previous studies. For example, in the Finnish nurses' job satisfaction model based on 664 nurses from 34 hospitals, the doctor-nurse relationship was also the second most significant variable [18]. In addition, one meta-analysis that summarized the findings of 31 previous studies found the doctor-nurse relationship the most significant variable that positively influenced a nurses' job satisfaction [11]. In a multilevel model investigating the job satisfaction of 546 Belgian nurses, the doctor-nurse relationship was also one of the significant variables [11]. The doctor-nurse relationship is an important factor for patient care since it requires close cooperation between doctors and nurses [19]. Moreover, a cooperative relationship between doctors and nurses facilitates the efficiency and quality of patient care [19]. Further analysis at the hospital-level, not at the individual nurse-level, is necessary to assess the doctor-nurse relationship properly.

In the turnover intention model, the doctor-nurse relation-

ship at the hospital-level was not a significant variable, but it was at the nurse-level with an OR of 1.42. In a previous study, a good relationship between doctors and nurses was positively correlated with that hospital's retention of nurses [20].

Nurse staffing adequacy had an OR of 4.09 and was the third most significant variable at the hospital-level that affected nurses' job satisfaction. This variable was also significant at the nurse-level with an OR of 1.57. However, it was not a significant variable in the turnover intention model. In addition to the nurse-staffing adequacy, the bed-to-nurse ratio, an objective hospital-level variable, also had no correlation with job satisfaction and turnover intention. Our findings are inconsistent with those of a British study on the relationship between the patient-nurse ratio and nurses' perceived dissatisfaction with the working environment [21], but consistent with those of a previous Korean study [19]. In the Korean study, nurse-staffing adequacy, which was subjectively perceived by nurses from 65 intensive care wards, was a significant explanatory variable in the job satisfaction model, but the objective nurse-staffing variable was not [22]. In fact, both of these subjective and objective variables failed to explain these nurses' turnover intention. However, the objective nurse-staffing variable used by Cho et al. [22] was not the bed-to-nurse ratio, rather the patient-to-nurse ratio calculated by asking nurses how many patients they have to care for in one shift. These findings suggest that the bed-to-nurse ratio, which represents hospital-level staffing status, does not properly reflect the actual staffing conditions in general wards. Nevertheless, nurse-staffing adequacy, a subjective measure, may effectively reflect various factors such as the nursing care delivery system of the hospital or ward, patient's severity, and nurses' characteristics [22]. Therefore, nurse-staffing adequacy might be one of the best variables to explain nurses' job satisfaction.

Organizational support and management of the hospital was found to be related to a staff nurses' perception of their supervisors, including the head of the nursing department and the chief nurses. This variable was categorized as a factor related to autonomy in previous studies [9]. In the job satisfaction model, organizational support and management of the hospital was not a significant explanatory variable at the hospital-level, but it was at the nurse-level with an OR of 1.47. In the turnover intention model, it was significantly correlated at the nurse-level with the highest OR of 1.77.

Autonomy related with nurses' job satisfaction and turnover intention has continuously been studied and is considered the most significant variable to explain nurses' job satisfaction [11]. A lack of autonomy lowers a nurses' job satisfaction and consequently increases their turnover rate [23] and affects the quality of patient care [24]. A positive relationship between autonomy and job satisfaction was found with the correlation coefficient range of 0.18 to 0.86 [11].

Education for improved quality of care, which is related to continuous educational programs or career development opportunities, was not correlated with job satisfaction or turnover intention. However, a study by Chen and Johantgen [19] found professional development to be negatively correlated with nurses' job satisfaction at the hospital-level. One of the reasons for the lack of correlation with job satisfaction or turnover intention might be that educational opportunities that are provided without sufficient support can be perceived as an additional duty or burden [11].

In this study, participation in the decision-making process was not a significant variable in either the job satisfaction or turnover intention model. However, it was significantly correlated with these outcomes in previous studies. For example, in a Finnish study, participation in the decision-making process was significantly related to nurses' job satisfaction [18]. Reasons for these differences cannot be determined within the scope of this study. Further studies are necessary to observe how participation in the decision-making process is conducted at the ward-level, not the hospital-level.

The limitations of this study are as follows. First, the data used were divided into nurse- and hospital-level models only, and data on the ward and departments were not available, thus could not be included in our analysis. Because many of the variables associated with the nursing practice environment are effective at the ward-level, future studies are necessary to find variables associated with the nursing environment at the ward-level. Second, nurses from general wards of acute care hospitals working in tertiary general hospitals or non-tertiary general hospitals were included in this study; thus; our study does not reflect conditions in small- and medium-sized hospitals and specialized wards.

In conclusion, a favorable nursing practice environment was associated with higher job satisfaction among nurses from general wards or acute care hospitals. Among the variables investigated, a standardized nursing process, adequate nurse staffing, and good doctor-nurse relationship were positively associated with nurses' job satisfaction. However, the nursing practice environment was not found to be related with nurses' turnover intention.

ACKNOWLEDGEMENTS

CONFLICT OF INTEREST

The authors have no conflicts of interest with the material presented in this paper.

REFERENCES

1. Estryn-Behar M, Van der Heijden BI, Oginska H, Camerino D, Le Nezet O, Conway PM, et al. The impact of social work environment, teamwork characteristics, burnout, and personal factors upon intent to leave among European nurses. Med Care 2007; 45(10):939-950.

2. Ministry of Health and Welfare. OECD health data 2013. Seoul: Ministry of Health and Welfare; 2013, p. 45-57 (Korean).

3. Lee YT, Kim JD, Kang DW, Park JE. The nursing workforce and nursing management fee survey. Seoul: Korea Health Industry Development Institute; 2008, p. 8-10 (Korean).

4. Ministry of Health and Welfare. 2009 Year book of health, welfare and family statistics. Seoul: Ministry of Health and Welfare; 2009, p. 123 (Korean).

5. Seago JA, Ash M, Spetz J, Coffman J, Grumbach K. Hospital registered nurse shortages: environmental, patient, and institutional predictors. Health Serv Res 2001;36(5):831-852.

6. Aiken LH, Patrician PA. Measuring organizational traits of hospitals: the Revised Nursing Work Index. Nurs Res 2000;49(3): 146-153.

7. Aiken LH, Clarke SP, Sloane DM, Lake ET, Cheney T. Effects of hospital care environment on patient mortality and nurse outcomes. J Nurs Adm 2008;38(5):223-229.

8. Zangaro GA, Soeken KL. A meta-analysis of studies of nurses' job satisfaction. Res Nurs Health 2007;30(4):445-458.

9. Porter CA, Kolcaba K, McNulty SR, Fitzpatrick JJ. The effect of a nursing labor management partnership on nurse turnover and satisfaction. J Nurs Adm 2010;40(5):205-210.

10. Friese CR, Lake ET, Aiken LH, Silber JH, Sochalski J. Hospital nurse practice environments and outcomes for surgical oncology patients. Health Serv Res 2008;43(4):1145-1163.

11. Van Bogaert P, Clarke S, Roelant E, Meulemans H, Van de Heyning P. Impacts of unit-level nurse practice environment and burnout on nurse-reported outcomes: a multilevel modelling

approach. J Clin Nurs 2010;19(11-12):1664-1674.

12. Kwak C, Chung BY, Xu Y, Eun-Jung C. Relationship of job satisfaction with perceived organizational support and quality of care among South Korean nurses: a questionnaire survey. Int J Nurs Stud 2010;47(10):1292-1298.

13. Seo Y, Ko J, Price JL. The determinants of job satisfaction among hospital nurses: a model estimation in Korea. Int J Nurs Stud 2004;41(4):437-446.

14. Kang SY, Um YR, Han SS. A professional nursing practice environment and its impact on nurses' task motivation. Taehan Kanho Hakhoe Chi 2005;35(2):353-361 (Korean).

15. Health Insurance Review & Assessment Service. Hospital details information [cited 2014 Sep 25]. Available from: http://www.hira. or.kr/rd/hosp/getHospList.do?pgmid=HIRAA030002000000 (Korean).

16. Kim CW, Lee SY, Kang JH, Park BH, Park SC, Park HK, et al. Application of revised nursing work index to hospital nurses of South Korea. Asian Nurs Res (Korean Soc Nurs Sci) 2013;7(3): 128-135.

17. Snijders TA, Bosker RJ. Multilevel analysis: an introduction to basic and advanced multilevel modeling. London: Sage Publications; 1999, p. 97-98.

18. Tervo-Heikkinen T, Partanen P, Aalto P, Vehvilainen-Julkunen K. Nurses' work environment and nursing outcomes: a survey study among Finnish university hospital registered nurses. Int J Nurs Pract 2008;14(5):357-365.

19. Chen YM, Johantgen ME. Magnet Hospital attributes in European hospitals: a multilevel model of job satisfaction. Int J Nurs Stud 2010;47(8):1001-1012.

20. Kramer M, Schmalenberg C. Securing "good" nurse/physician relationships. Nurs Manage 2003;34(7):34-38.

21. Rafferty AM, Clarke SP, Coles J, Ball J, James P, McKee M, et al. Outcomes of variation in hospital nurse staffing in English hospitals: cross-sectional analysis of survey data and discharge records. Int J Nurs Stud 2007;44(2):175-182.

22. Cho SH, June KJ, Kim YM, Cho YA, Yoo CS, Yun SC, et al. Nurse staffing, quality of nursing care and nurse job outcomes in intensive care units. J Clin Nurs 2009;18(12):1729-1737.

23. Larrabee JH, Janney MA, Ostrow CL, Withrow ML, Hobbs GR Jr, Burant C. Predicting registered nurse job satisfaction and intent to leave. J Nurs Adm 2003;33(5):271-283.

24. Aiken LH, Clarke SP, Sloane DM; International Hospital Outcomes Research Consortium. Hospital staffing, organization, and quality of care: cross-national findings. Int J Qual Health Care 2002;14(1):5-13.