

Effect of the Nursing Work Environment on Turnover Intention: Serial Mediation Effects of Career Motivation and Job Satisfaction

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Purpose: This study investigated whether the work environment affects nurses' turnover intention with career motivation and job satisfaction acting as mediating factors. **Methods:** Data were collected from January 6-25, 2022, using a cross-sectional design. The participants were 205 nurses who had worked for more than six months at four small-to-medium-sized general hospitals in South Korea. Data analysis consisted of descriptive statistics, Pearson's correlation coefficients, independent t-tests, one-way ANOVAs, Scheffé test, and mediation analysis using Hayes' PROCESS Macro Model 6. **Results:** The nursing work environment had a significant positive association with career motivation and job satisfaction and negative effects on nurses' turnover intention. The single mediating effect of job satisfaction and the serial mediation effects of career motivation and job satisfaction on the relationship between the nursing work environment and turnover intention were significant. Thus, nurses' positive perceptions of the work environment strengthened career motivation, which in turn increased job satisfaction and reduced turnover intention. **Conclusion:** Providing a healthy work environment to nurses can help reduce their turnover intention. Therefore, the government and hospitals should implement human resource strategies to improve nursing work environments and take steps to enhance career motivation and job satisfaction to strengthen nurse retention.

Key Words: Nurses; Work environment; Turnover; Career; Job satisfaction

INTRODUCTION

1. Rationale for the Study

The coronavirus disease 2019 (COVID-19) pandemic has been a significant turning point highlighting the need for adequate nurse staffing in healthcare services. As of 2019, the number of clinical nurses per 1,000 population in South Korea was 4.2, approximately half of the OECD average of 7.9, and the proportion of clinical nurses to licensed nurses was 51.8%, lower than the OECD average of 66.3% [1]. With increased admission quotas and transfer students in nursing schools, the supply of nurses has continuously risen, with an annual growth rate of clinical nursing staff, including nurse aides, being 3.7 times higher than the OECD average between 2000 and 2019 [1]. During this period,

secondary hospitals had the highest number of nurses hired [1] and highest turnover rate [2] among healthcare facilities. In contrast to the decreasing trend in annual turnover rate from 18.5% in 2010 to 15.4% in 2019, the turnover rate of nurses in secondary hospitals was higher than the average, increasing from 19.9% in 2010 to 20.2% in 2019[2]. By number of beds, the turnover rate in healthcare facilities with 400~599 beds increased the most, from 16.3% in 2010 to 30.7% in 2019[2]. Among nurses at healthcare facilities with a history of seeking new jobs, the most common reason for leaving mentioned was low pay (41.4%), followed by heavy workload (40.8%) [1]. According to a healthcare personnel survey, the average wage of secondary hospital nurses in 2020 was KRW 48.761 million, slightly higher than that among the total working population (KRW 47.449 million), but only 81% of the highest

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wage in tertiary hospitals (KRW 60.468 million) [1]. Regional disparities were also present, with Seoul having the highest average wage at KRW 54.352 million, while the lowest three regions (i.e., Sejong, Gyeongbuk, and Jeonnam) had wages 68~76% of that in Seoul [1]. Lower wages and nurse staffing issues have led to lower ratings for the nursing work environment in local and small hospitals, significantly affecting turnover intention [3,4]. With data showing the gap in wages and other factors between the Seoul metropolitan area and large hospitals with local and small hospitals, improving the nursing work environment and ensuring professional development opportunities have been identified as key to securing more nurses [5].

The top reason secondary hospital nurses gave for quitting in 2019 was moving to another hospital (21.8%) [2], and most moved to tertiary hospitals [1]. To reduce nurse turnover, multifaceted approaches must be explored through research on the relationships among variables affecting nurses' turnover intention. In South Korea, research on turnover and turnover intention has primarily focused on personal and job characteristics [6,7]. A meta-analysis on factors associated with nurses' turnover intention revealed that family; job-related factors such as job satisfaction, organizational commitment, emotional labor, role conflict, work-family conflict, and professional nursing values; and unit-related factors such as work environment, organizational culture, and leadership, were significant, with a medium or larger effect size [6]. However, research is lacking that considers career-related variables as precursors to turnover intention, highlighting the need for further investigations in this area [7].

The nursing work environment is a significant predictor of nurse turnover [6], and ongoing research and policy approaches aim to determine related factors and reduce turnover. Even during the COVID-19 pandemic, turnover intention was markedly higher when nurses faced chronic shortages and poor nursing work environments, with differences in turnover rates depending on the quality of the work environment [8,9].

Career motivation refers to an attitude of commitment and continuous development towards achieving career goals [10] and comprises three components: career identity, career insight, and career resilience [11]. Career identity refers to the degree to which individuals define themselves through their work and is related to the desire for career growth. Career insight is the ability to set realistic and clear career goals and recognize strengths and weaknesses and is associated with career development activities [11,12]. Career resilience is the ability to adapt to environmental changes and includes traits such as belief in

one's self, willingness to take risks, and a desire for achievement [11,12]. Variables associated with career motivation include individual factors such as job stress, identity, self-efficacy, member perception, and satisfaction, as well as environmental factors such as turnover intention and commitment [10]. In South Korea, studies have primarily investigated the predictors of career motivation in office workers [10]. In nursing, the focus has been on the development and validation of systems at the organizational level in relation to implementing nursing career development systems in tertiary hospitals [13]. Previous studies have shown that perceptions of career development systems are higher with increasing desires for growth among nurses and that turnover intention can decrease with higher perceptions of these systems [14] and higher satisfaction with career development opportunities [15].

Job satisfaction has been a focal point of research for several years due to its direct relationship with nurses' quality of life and satisfaction, organizational characteristics, turnover intention, and nursing care quality [16]. Job satisfaction reportedly has a significant negative correlation with turnover intention [6,16] and a significant positive correlation with the nursing work environment [4] and career motivation [17]. However, research on the causal relationships among these variables remains scarce. Previous studies suggest that job satisfaction can be a key nurse retention strategy [18] and propose enhancing job satisfaction by focusing on professional development and relationships with leaders and peers and improving the nursing work environment, wages, and promotion opportunities [16].

Previous studies on the nursing work environment, career motivation, job satisfaction, and turnover intention reveal that the nursing work environment [8,9] and job satisfaction [6,16] significantly impact turnover intention, while the nursing work environment [4] and career motivation [17] significantly affect job satisfaction. However, the stream of research explaining and verifying how these variables causally influence one another is insufficient. Mediation analysis can be used to explain how the effect of the nursing work environment (as an independent variable [X]) on turnover intention (as a dependent variable [Y]) can be mediated by other variables and the specific mechanism of the effect. The presence of a mediation effect indicates a significant indirect effect, in which the independent variable significantly affects the mediating variable, and in turn, the mediating variable significantly affects the dependent variable [19]. Therefore, the mediator should be causally situated between the independent and dependent variables, being influenced by the independent variable and

subsequently affecting the dependent variables [19].

Although some studies have reported the mediating effects of burnout [20] or work-life balance [21] on the relationship between the nursing work environment and turnover intention, studies comprehensively examining the serial effects of career motivation and job satisfaction in this relationship are lacking. Understanding and verifying the mediating effects in the relationship between the nursing work environment and turnover intention can aid in comprehending the existing relationships and mechanisms between these variables. Based on previous findings outlining the direction of impact among various variables, such as nursing work environment→turnover intention, nursing work environment→job satisfaction, career motivation→job satisfaction, and job satisfaction→turnover intention, the mediating effects of career motivation and job satisfaction can be confirmed.

Against this backdrop, this study aims to investigate the effects of the nursing work environment, career motivation, and job satisfaction on turnover intention among nurses in secondary hospitals. Based on the results, we will investigate the effects of nurses' perceived nursing work environment on turnover intention through the mediating effects of career motivation and job satisfaction, ultimately presenting foundational data for human resources management to lower turnover intention among nurses in secondary hospitals.

2. Aims

This study aims to investigate the levels of nursing work environment, career motivation, job satisfaction, and turnover intention and their relationships among nurses of a secondary hospital and to determine the serial multiple mediation effects of career motivation and job satisfaction on the impact of nurses' perceived nursing work environment on turnover intention. The specific objectives are as follows:

- To examine the differences in the nursing work environment, career motivation, job satisfaction, and turnover intention according to the general characteristics of nurses working at secondary hospitals.
- To analyze the correlations among the nursing work environment, career motivation, job satisfaction, and turnover intention in nurses working at secondary hospitals.
- To discern the impact of the nursing work environment, career motivation, and job satisfaction on turnover intention in nurses working at secondary hospitals.
- To determine the serial multiple mediation effects of motivation and job satisfaction on the impact of the nursing work environment on turnover intention among nurses working at secondary hospitals.

METHODS

1. Study Design

This descriptive survey study aims to examine the levels of perceived nursing work environment, career motivation, job satisfaction, and turnover intention and analyze the serial multiple mediation effects of career motivation and job satisfaction on the impact of the nursing work environment on turnover intention among nurses of a secondary hospital.

2. Study Participants

Nurses who had worked a minimum of six months at one of four secondary hospitals in M, South Jeolla Province were recruited. Nurse managers or those in higher positions were excluded, as they may have different perceptions of the nursing work environment from nurses who provide direct patient care [22]. Sample size was determined using G-Power 3.1. The minimum sample size was calculated to be 194 for multiple regression with a significance level of 0.05, medium effect size of 0.15, power of 95%, and 14 predictor variables. Accounting for a 10% dropout rate, the questionnaire was distributed to 212 participants. A total of 209 (98.6%) responded; however, after excluding four questionnaires with careless responses, a total of 205 questionnaires (96.7%) were included in the final analysis.

3. Study Instruments

1) Nursing work environment

We used the Korean version of the Practice Environment of Scale of Nursing Work Index (K-PES-NWI). The original tool was developed by Lake [23] and then adapted into Korean and validated by Cho, Choi, Kim, Yoo, and Lee [24]. It contains 29 items across five subscales: staffing and resourcing adequacy (4 items), nursing foundations for quality care (9 items), nurse participation in hospital affairs (9 items), collegial nurse-physician relationships (3 items), and nurse manager ability, leadership, and support of nurses (4 items). Each item is rated on a four-point Likert scale: 1='strongly disagree', 2='disagree', 3='agree', and 4='strongly agree'. A higher score indicates better

perceptions of the nursing work environment among nurses. Lake and Friese [25] considered a score of 2.5 or higher as the cutoff for nurses' agreement their working environment is good. In Cho et al. [24], Cronbach's α was .93, with values ranging from .80~.84 for the subscales. In this study, Cronbach's α was .93, with values ranging from .67~.86 for the subscales.

2) Turnover intention

Turnover intention was assessed using a five-item tool developed by Mobley [26] and adapted and modified by Moon and Han [27]. Each item is rated on a five-point Likert scale: 1='strongly disagree', 2='disagree', 3='neutral', 4='agree', and 5='strongly agree'. A higher score indicates higher turnover intention. Cronbach's α was .85 in Moon and Han [27] and .89 in this study.

3) Career motivation

Career motivation was assessed using a tool developed by Day and Allen [11] and adapted into Korean and validated by Kang [12]. It includes 19 items across three domains: career identity (6 items), career insight (7 items), and career resilience (6 items). Each item is rated on a five-point Likert scale ranging from 1~4, and higher scores indicate higher career motivation. In Kang [12], Cronbach's α was .91, with values ranging from .81~.86 for the subscales. In this study, Cronbach's α was .92, with values ranging from .81~.87 for the subscales.

4) Job satisfaction

Job satisfaction was assessed using the Job Satisfaction Scale for Clinical Nurses (JSS-CN) developed by Lee, Eo, and Lee [28]. It comprises 33 items across six domains: recognition and professional achievement (9 items), personal growth through the nursing profession (6 items), respectful and appreciative human relationships (8 items), fulfillment of responsibilities as a nurse (4 items), job stability and rewarding nature (3 items), and demonstration of professional competence (3 items). Each item is rated on a five-point Likert scale ranging from 1='strongly disagree' to 5='strongly agree'. Total scores range from 33~165, and higher scores indicate higher job satisfaction. Cronbach's α was .95 with .74~.88 for the subscales at the time of development. In this study, Cronbach's α was .95 with .68~.90 for the subscales.

4. Data Collection

We visited the nursing departments at four secondary hospitals in M city in December 2021 to explain the study's

rationale and method to the director of nursing and obtain permission from the organization. Data were collected from January 6~25, 2023. Prior to the survey, we visited the nursing units, including patient floors, outpatient clinics, intensive care units, and emergency departments, to explain the purpose, method, and benefits and risks of participating in the study. Prior to starting data collection, for those who voluntarily agreed to participate, we obtained written informed consent specifying the guarantee of anonymity throughout the entire research process, confidentiality, and freedom to withdraw from the study at any time. Participants answered the questionnaires in pen, and they took approximately 20 minutes to complete. We offered a gift as a token of appreciation to the participants.

5. Data Analysis

The collected data were analyzed using SPSS 24.0 (SPSS; IBM, Armonk, NY, USA). The nursing work environment, career motivation, job satisfaction, and turnover intention in relation to participants' general characteristics were presented using frequencies, percentages, means, and standard deviations. Differences in the nursing work environment, career motivation, job satisfaction, and turnover intention were analyzed using t-tests and ANOVAs, followed by the Scheffé test for post-hoc comparison. The correlations among the nursing work environment, career motivation, job satisfaction, and turnover intention were analyzed using Pearson's correlation coefficients.

Before analyzing the mediating effects of career motivation and job satisfaction on the relationship between the nursing work environment on turnover intention, we checked for multicollinearity of the independent variables and autocorrelation of the dependent variable. A serial multiple mediation model for career motivation and job satisfaction in the relationship between the nursing work environment and turnover intention was analyzed using SPSS PROCESS macro Version 4.0 Model 6 by Hayes [29]. The purpose of a serial multiple mediation model is to establish a mediation model in which the independent variable (X) affects M1, and M1 affects M2 to establish a serial causal relationship between the mediators (M1→M2) and a mediation model in which they affect the dependent variable (Y) to examine the direct and indirect effects [29].

The serial multiple mediating effect (indirect effect) was analyzed by including career motivation (M1) and job satisfaction (M2) as mediators (M) in the relationship between the independent variable nursing work environment (X) and dependent variable turnover intention (Y). Age and prior turnover experience, which were factors

that significantly differed in relation to turnover intention, were set as control variables for the analysis. The total effect of the nursing work environment on turnover intention was calculated as the sum of the direct effect ($X \rightarrow Y$) and three indirect effects ($X \rightarrow M1 \rightarrow Y$, $X \rightarrow M2 \rightarrow Y$, $X \rightarrow M1 \rightarrow M2 \rightarrow Y$). The total indirect effects of the nursing work environment (X) were calculated as the sum of all the indirect effects. To calculate the indirect effects, bootstrapping was performed with 10,000 samples, and the indirect effect was considered significant if the 95% confidence interval (CI) did not include 0.

6. Ethical Considerations

This study was approved by the Institutional Review Board at M University to ensure ethical protection of the participants (IRB No: MNUIRB-211228-SB-020-01).

RESULTS

1. Participants' General Characteristics and Differences in the Study Variables

Table 1 shows the participants' general characteristics and the related differences in the nursing work environment, career motivation, job satisfaction, and turnover intention. The mean age was 30.0 ± 6.8 years, with 61.5% under 30 years old. Most participants were women (92.2%), and 71.2% were single. A total of 82.0% had a bachelor's degree or higher, and 54.1% worked on a medical-surgical floor. Most worked shifts (82.4%), and 91.2% were staff nurses. The most common monthly salary was KRW 2.5~2.9 million (45.9%); however, 38.5% had a monthly income of <KRW 2.5 million, indicating that 84.4% have a monthly income of less than KRW 3 million. Of the nurses, 51.2% reported the length of their clinical

Table 1. Differences in Nursing Work Environment, Career Motivation, Job Satisfaction, and Turnover Intention according to General Characteristics ($N=205$)

Variables	Categories	n (%)	Nursing work environment		Career motivation		Job satisfaction		Turnover intention	
			M $\pm$ SD	t or F (p)	M $\pm$ SD	t or F (p)	M $\pm$ SD	t or F (p)	M $\pm$ SD	t or F (p)
Gender	M	16 (7.8)	2.72 $\pm$ 0.29	0.72	3.41 $\pm$ 0.34	1.41	3.64 $\pm$ 0.30	1.37	2.91 $\pm$ 0.91	-1.48
	F	189 (92.2)	2.65 $\pm$ 0.40	(.474)	3.22 $\pm$ 0.53	(.162)	3.47 $\pm$ 0.50	(.173)	3.26 $\pm$ 0.91	(.142)
Age (yr)	< 30	126 (61.5)	2.70 $\pm$ 0.39	1.82	3.23 $\pm$ 0.52	0.06	3.44 $\pm$ 0.50	2.56	3.33 $\pm$ 0.87	4.96
	30~39	55 (26.8)	2.58 $\pm$ 0.34	(.164)	3.25 $\pm$ 0.45	(.939)	3.48 $\pm$ 0.43	(.080)	3.23 $\pm$ 0.93	(.008)
	$\geq$ 40	24 (11.7)	2.62 $\pm$ 0.49		3.22 $\pm$ 0.68		3.69 $\pm$ 0.54		2.71 $\pm$ 0.90	a, b > c*
Marital status	Unmarried	146 (71.2)	2.66 $\pm$ 0.39	0.22	3.24 $\pm$ 0.51	0.38	3.45 $\pm$ 0.49	-1.53	3.30 $\pm$ 0.89	1.77
	Married	59 (28.8)	2.65 $\pm$ 0.40	(.826)	3.21 $\pm$ 0.55	(.704)	3.56 $\pm$ 0.48	(.128)	3.06 $\pm$ 0.93	(.079)
Education level	Diploma	37 (18.0)	2.68 $\pm$ 0.34	0.36	3.13 $\pm$ 0.41	-1.29	3.43 $\pm$ 0.41	-0.69	3.12 $\pm$ 0.83	-0.85
	$\geq$ Bachelor	168 (82.0)	2.65 $\pm$ 0.40	(.717)	3.25 $\pm$ 0.54	(.198)	3.49 $\pm$ 0.51	(.492)	3.26 $\pm$ 0.92	(.399)
Work unit	General ward	111 (54.1)	2.66 $\pm$ 0.40	0.04	3.24 $\pm$ 0.53	0.40	3.46 $\pm$ 0.51	1.01	3.29 $\pm$ 0.94	1.59
	Special unit	58 (28.3)	2.65 $\pm$ 0.40	(.959)	3.18 $\pm$ 0.55	(.671)	3.45 $\pm$ 0.46	(.366)	3.28 $\pm$ 0.84	(.207)
	Others	36 (17.6)	2.65 $\pm$ 0.38		3.27 $\pm$ 0.48		3.59 $\pm$ 0.47		2.99 $\pm$ 0.89	
Working pattern	Non-shift work	36 (17.6)	2.61 $\pm$ 0.36	-0.73	3.33 $\pm$ 0.43	1.26	3.59 $\pm$ 0.45	1.42	3.03 $\pm$ 0.94	-1.46
	Shift work	169 (82.4)	2.67 $\pm$ 0.40	(.466)	3.21 $\pm$ 0.54	(.208)	3.46 $\pm$ 0.50	(.157)	3.28 $\pm$ 0.90	(.146)
Job position	Staff nurse	187 (91.2)	2.66 $\pm$ 0.39	0.07	3.24 $\pm$ 0.52	0.82	3.47 $\pm$ 0.48	-1.40	3.27 $\pm$ 0.90	1.75
	Charge nurse	18 (8.8)	2.65 $\pm$ 0.46	(.943)	3.14 $\pm$ 0.55	(.412)	3.64 $\pm$ 0.55	(.163)	2.88 $\pm$ 0.96	(.082)
Monthly salary (10,000 won)	< 250	79 (38.5)	2.72 $\pm$ 0.40	1.57	3.23 $\pm$ 0.53	0.19	3.44 $\pm$ 0.54	1.99	3.28 $\pm$ 0.88	1.00
	250~< 300	94 (45.9)	2.62 $\pm$ 0.34	(.211)	3.25 $\pm$ 0.49	(.824)	3.46 $\pm$ 0.42	(.139)	3.26 $\pm$ 0.84	(.368)
	$\geq$ 300	32 (15.6)	2.60 $\pm$ 0.49		3.18 $\pm$ 0.61		3.64 $\pm$ 0.56		3.03 $\pm$ 1.14	
Nursing experience at the current facility	< 3 years	100 (48.8)	2.69 $\pm$ 0.38	1.27	3.26 $\pm$ 0.48	0.86	3.45 $\pm$ 0.50	-1.03	3.31 $\pm$ 0.85	1.25
	$\geq$ 3 years	105 (51.2)	2.62 $\pm$ 0.40	(.207)	3.20 $\pm$ 0.57	(.389)	3.52 $\pm$ 0.48	(.305)	3.16 $\pm$ 0.96	(.215)
Turnover experience	No	141 (68.8)	2.63 $\pm$ 0.38	-1.32	3.17 $\pm$ 0.49	-2.72	3.44 $\pm$ 0.49	-1.99	3.33 $\pm$ 0.91	2.20
	Yes	64 (31.2)	2.71 $\pm$ 0.41	(.188)	3.38 $\pm$ 0.57	(.007)	3.58 $\pm$ 0.48	(.048)	3.03 $\pm$ 0.87	(.029)

*Scheffé test; M=Mean; SD=Standard deviation.

career at their current hospital was ≥ 3 years, which was a higher percentage than that of those with < 3 years of career experience at their current hospital. A total of 31.2% had prior turnover experience.

No significant differences were found in the nursing work environment according to participants' general characteristics. Career motivation ($t = -2.72, p = .007$) and job satisfaction ($t = -1.99, p = .048$) were significantly higher among nurses with prior turnover experience than those without. Turnover intention significantly differed according to age ($F = 4.96, p = .008$) and prior turnover experience ($t = -2.20, p = .029$), and was significantly higher among nurses under age 40 than ≥ 40 and among nurses with prior turnover experience than those without.

2. Descriptive Statistics and Correlations of Nursing Work Environment, Career Motivation, Job Satisfaction, and Turnover Intention

Table 2 shows the levels of nursing work environment, career motivation, job satisfaction, and turnover intention and the correlations among them. The mean nursing work environment score was 2.66 ± 0.39 out of 4, and the mean career motivation score was 3.23 ± 0.52 out of 5. The mean job satisfaction score was 3.48 ± 0.49 out of 5, and the mean turnover intention score was 3.19 ± 0.94 out of 4. The nursing work environment was significantly positively correlated with career motivation ($r = .45, p < .001$) and job satisfaction ($r = .41, p < .001$), while career motivation was significantly positively correlated with job satisfaction ($r = .58, p < .001$). Turnover intention was significantly negatively correlated with the nursing work environment ($r = -.52, p < .001$), career motivation ($r = -.35, p < .001$), and job satisfaction ($r = -.41, p < .001$).

3. Serial Multiple Mediation Effect of Career Motivation and Job Satisfaction in the Relationship between the Nursing Work Environment and Turnover Intention

Prior to analyzing the serial mediation effect of career motivation and job satisfaction, we checked for multicollinearity of the independent variables. Tolerance was above 0.1, at 0.59~0.84, and the variance inflation factor was below 10, at 1.16~1.70, confirming the absence of multicollinearity. The Durbin-Watson statistic was close to 2.00, at 1.72, confirming the lack of autocorrelation of the dependent variable.

Table 3 shows the results of the serial multiple mediation effect of career motivation and job satisfaction in the relationship between the nursing work environment and turnover intention using Model 6 of the PROCESS macro. In Step 1, the nursing work environment had a significant positive effect on career motivation ($\beta = .44, p < .001$), and explained 23% of the variance in career motivation. In Step 2, the nursing work environment ($\beta = .20, p = .002$) and career motivation ($\beta = .50, p < .001$) had a significant positive effect on job satisfaction, and the nursing work environment and career motivation explained 40% of the variance in job satisfaction. In Step 3, the nursing work environment ($\beta = -.45, p < .001$) and job satisfaction ($\beta = -.16, p = .026$) had a significant negative effect on turnover intention, and the nursing work environment and job satisfaction explained 37% of the variance in turnover intention.

In the relationship between the nursing work environment and turnover intention, the simple mediating effect of career motivation ($X \rightarrow M1 \rightarrow Y$) was $-.02$ (-0.21 to 0.11), calculated as the product of the effect of the nursing work environment on career motivation ($X \rightarrow M1$) and effect of career on turnover intention ($M1 \rightarrow Y$). However, this mediating effect was not statistically significant, as the 95% bootstrap CI included 0. However, the simple mediating effect of job satisfaction in the relationship between the nursing work environment and turnover intention ($X \rightarrow M2 \rightarrow Y$) was $-.03$ (-0.18 to -0.00), which was a statistically significant negative effect, as the 95% bootstrap CI did not include 0. Therefore, the nursing work environment has a positive effect on job satisfaction ($\beta = .20, p = .002$) independently from career motivation, and job satisfaction has a

Table 2. Descriptive Statistics and Correlational Relationships among the Variables

($N = 205$)

Variables	M $\pm$ SD	Nursing work environment	Career motivation	Job satisfaction
		r (p)	r (p)	r (p)
Nursing work environment	2.66 ± 0.39			
Career motivation	3.23 ± 0.52	.45 ($< .001$)		
Job satisfaction	3.48 ± 0.49	.41 ($< .001$)	.58 ($< .001$)	
Turnover intention	3.19 ± 0.94	-.52 ($< .001$)	-.35 ($< .001$)	-.41 ($< .001$)

M=Mean; SD=Standard deviation.

Table 3. Total, Direct, and Indirect Effects of Career Motivation and Job Satisfaction between Nursing Work Environment and Turnover Intention

Path		B	β	SE/ Boot SE	t	p	LLCL /Boot LLCL	ULCL /Boot ULCL	F	p	R ²
Direct effect	Step 1 X→M1	0.58	.44	.08	6.97	< .001	0.41	0.75	19.45	< .001	.23
	Step 2 X→M2	0.25	.20	.08	3.19	.002	0.09	0.40	33.33	< .001	.40
	M1→M2	0.47	.50	.06	8.01	< .001	0.35	0.58			
	Step 3 X→Y	-1.03	-.45	.15	-6.84	< .001	-1.33	-0.74	22.98	< .001	.37
	M1→Y	-0.09	-.05	.13	-0.69	.492	-0.34	0.16			
	M2→Y	-0.30	-.16	.13	-2.25	.026	-0.57	-0.04			
Indirect effect	Total	-0.21	-.09	.08			-0.37	-0.07			
	X→M1→Y	-0.05	-.02	.08			-0.21	0.11			
	X→M2→Y	-0.08	-.03	.05			-0.18	-0.00			
	X→M1→M2→Y	-0.08	-.04	.05			-0.19	-0.01			
Total effect	X→Y	-1.24	-.54	.13	-9.23	< .001	-1.51	-0.98	33.97	< .001	.34

Control variable: Age, Experience of turnover; B=Coefficient; SE=Standard error; LLCL=Lower limit confidence interval; UL=Upper limit confidence interval; M1=Career motivation; M2=Job satisfaction; X=Nursing work environment; Y=Turnover intention.

negative effect on turnover intention ($\beta = -.16, p = .026$), ultimately reducing turnover intention by 0.03 units. The indirect effect of the nursing work environment on turnover intention sequentially through career motivation and job satisfaction ($X \rightarrow M1 \rightarrow M2 \rightarrow Y$) was -0.04, indicating a significant negative effect, as the 95% bootstrap CI (-0.19 to -0.01) did not include 0. Thus, the nursing work environment significantly positively affects career motivation ($\beta = .44, p < .001$), which in turn positively affects job satisfaction ($\beta = .50, p < .001$), and job satisfaction significantly negatively affects turnover intention ($\beta = -.16, p = .026$), reducing turnover intention by 0.04 units. The total effect of career motivation and job satisfaction in the relationship between the nursing work environment and turnover intention ($\beta = -.54, p < .001$) is the sum of the direct effect and the three specific indirect effects mediated by the two variables, and it was greater than the direct effect of the nursing work environment on turnover intention ($\beta = -.45, p < .001$). The causal relationships among the nursing work environment, career motivation, job satisfaction, and turnover intention are illustrated in Figure 1.

DISCUSSION

In this study, we examined the effects of nursing work environment, career motivation, and job satisfaction on turnover intention among nurses working in secondary hospitals, along with the mediating effects of career motivation and job satisfaction in the relationship between the nursing work environment and turnover intention. The variables that directly affected nurses' turnover intention

were the nursing work environment and job satisfaction. The nursing work environment directly influenced career motivation and job satisfaction, and career motivation directly affected job satisfaction. Although career motivation did not directly influence turnover intention, it did affect it indirectly through the mediation of job satisfaction. The nursing work environment and job satisfaction together explained 37% of the variance in turnover intention.

In this study, the mean turnover intention score was 3.19 out of 5, with significant differences according to age and prior turnover experience. Nurses under 30 years of age and those aged 31~39 years showed higher turnover intention than those aged ≥ 40 years. This aligns with previous studies indicating that nurses under 30 years had significantly higher turnover intention than nurses aged ≥ 30 [3] and ≥ 40 years [4].

The higher turnover intention among nurses under 40 might be due to the absence of family and childcare responsibilities in their 20s and the likelihood of actively pursuing jobs with better working conditions to ensure work-family balance, including pregnancy and childcare, in their 30s.

The turnover intention scores for our participants, which were obtained during the COVID-19 pandemic, were lower than those reported among secondary hospital nurses (3.43) [4] and those among nurses from small-to-medium-sized hospitals [3] before the COVID-19 pandemic, despite similar study populations and hospital types. These results contradict previous reports that turnover intention is higher among nurses on COVID-19 floors than those on regular medical-surgical floors [30], and that nurses' turn-

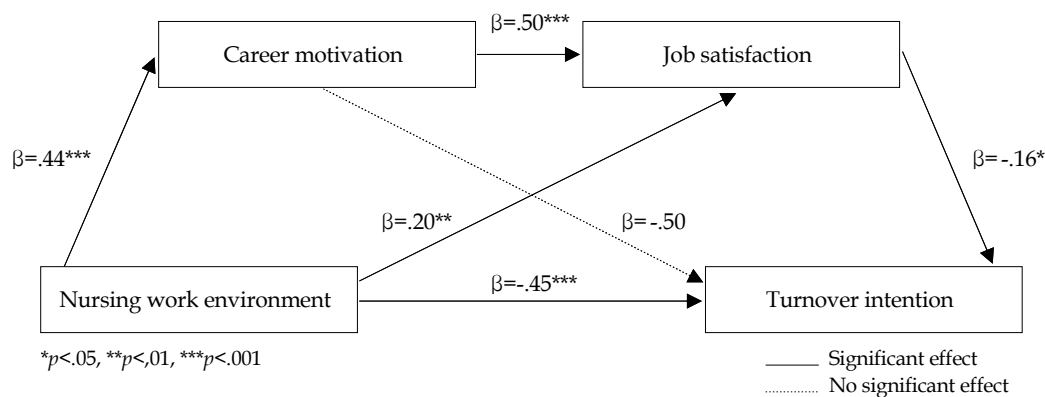


Figure 1. Causal relationship between variables determined using PROCESS macro.

over intention increased due to the adverse impact of the COVID-19 pandemic, including additional workloads [9,31]. However, studies conducted in other countries during the pandemic showed that, despite an overall increase in turnover intention, nurses in the top 25% nursing work environments had significantly lower turnover intention compared to those in the bottom 25% [9]. These findings can be understood in the same context as ours, where the nursing work environment was generally good.

The mean perceived nursing work environment score was 2.66 out of 4. This was slightly higher than the score of 2.60 reported among secondary hospital nurses in 2020 [21] and the score of 2.54 among nurses from a tertiary hospital [32] and above the cutoff of 2.5 indicating nurses perceive their work environment as good, as proposed by Lake and Friese [25]. The notably higher score than scores reported in smaller hospitals in 2011 (2.39) [3] and secondary hospitals in 2018 (2.43) [4] could be partly attributed to the government's active endeavors to improve the nursing work environment since 2018, although differences in the timing and participant samples of the surveys hinder a direct comparison [33]. Since the work environment within nursing units affects turnover intention more than hospital-wide characteristics [3], it is essential to develop and continuously manage strategies for improving the nursing work environment by nursing unit, focusing on areas with frequent issues such as adequate staffing and material support [3,24].

Career motivation refers to people's attitudes towards committing to and continuously developing their careers to achieve their career goals [10]. The mean career motivation score was 3.23 out of 5, similar to that of 3.29 reported among nurses at tertiary hospitals [32] and higher than that of 2.94 reported among office workers at Korean manufacturing companies [12]. Compared to office workers, nurses have limited opportunities for promotion. However,

the slight increase in nurses transitioning to other hospitals or different professions [2], as well as the higher career motivation scores among nurses with prior turnover experience, suggest that nurses take a proactive approach to career development to attain better working conditions and promotion opportunities. Career motivation research focused on nurses remains limited, with relevant studies conducted from 2008 to 2017 mainly concentrating on organizational-level policy development and career development outcomes [13]. With the increase in turnover rates among secondary hospital nurses and the primary reason for leaving being accepting an offer at another hospital [2], organizations that lose experienced nurses may reduce additional career development support and be less eager to foster career motivation. However, research shows that turnover intention is lower among operating room nurses with higher perceptions of career development systems and anticipated effectiveness of these systems [14], while career motivation among office workers has a positive effect on employability [12]. Therefore, instead of being passive in career development support due to concerns about competent members leaving the organization, organizations should encourage members to maintain their careers and generate performance within the organization [12]. Accordingly, hospital organizations and nursing managers should support nurses' career development, establish training plans to foster career motivation, and create an environment that supports nurses' individual efforts.

The mean job satisfaction score was 3.48 out of 5, similar to that of 3.30 reported among secondary hospital nurses [28] and that of 3.32 reported among hospital nurses [34]. The significantly higher job satisfaction among nurses with prior turnover experience in our study appears to reflect the reality of frequent turnover and reemployment within the community, and that nurses have chosen their current jobs based on the employment conditions they

prioritize. Job satisfaction is directly linked to one's quality of life, satisfaction, turnover intention, and quality of care; therefore, it is important to improve the nursing work environment, including compensation issues related to salary and promotions, while focusing on enhancing professional expertise and fostering good relationships with leaders and colleagues [16].

In this study, we observed a simple mediating effect of job satisfaction in the relationship between the perceived nursing work environment and turnover intention among nurses in secondary hospitals and found that career motivation and job satisfaction have a serial multiple mediating effect on that relationship. Consequently, the total effect of the mediating variables (i.e., career motivation and job satisfaction), which combines their direct and indirect effects, was greater than the direct effect of the nursing work environment on turnover intention. This indicates that, although improving the nursing work environment can reduce turnover intention, boosting career motivation and job satisfaction may be important as well, as having high job satisfaction and a proactive attitude towards continuous development and commitment to achieving career goals can lower turnover intention even if an individual perceives the nursing work environment as less than as ideal. Conversely, even if the nursing work environment is perceived as good, low job satisfaction or low career motivation that leads to low job satisfaction can increase turnover intention.

Previous studies investigating the mediators of the relationship between the nursing work environment and job satisfaction [6], which are the major factors related to turnover intention, reported a partial mediating effect of work-life balance on the relationship between the nursing work environment and turnover intention [21], complete mediating effect of job satisfaction on the relationship between career identity and turnover intention [18], and partial mediating effect of job satisfaction on the relationship between work-family balance, work-growth balance, and turnover intention [35]. Thus, these findings demonstrate the need to take an integrative approach to addressing the factors related to the nursing work environment, as opposed to simply improving the nursing work environment, to reduce turnover intention.

Few studies are available on the effects of career motivation on turnover intention, particularly those examining career motivation in nurses. However, previous findings showing that career motivation is positively correlated [17] with job satisfaction and organizational commitment [6] as factors lowering turnover intention are similar to our results indicating that career motivation is significantly

negatively correlated with the nursing work environment and job satisfaction, both of which are significantly positively correlated with turnover intention. Career motivation had a serial mediation effect along with job satisfaction in the relationship between the nursing work environment and turnover intention, which is similar to previous findings that career motivation and job esteem have a dual mediation effect on the relationship between the nursing work environment and retention intention among tertiary hospital nurses [32]. Furthermore, this can be understood in a similar context as that in which career motivation completely mediates the relationship between career learning and employability in office workers at large corporations, thus indicating that career motivation must be established during career learning for employability to be enhanced [12]. As nurses are professionals trained through extensive specialized education, reducing their turnover intention is crucial to maintaining competent staff and providing quality nursing services [20]. Previous studies have shown that job satisfaction does not significantly mediate the relationship between career development and turnover intention in the general working population, and workers still show high turnover intention if presented with a better opportunity, even when their job satisfaction increases with desirable career development programs [36]. However, at the organizational level, organizations should strive to implement career development support and adequate compensation to lower turnover and generate outcomes, rather than worrying about whether nurses who have developed their competencies through career development will leave the organization. Therefore, organizations and nursing managers need to conduct multifaceted reviews of factors related to nurse turnover, establish priority measures focusing on the weak areas of the nursing work environment, actively support systematic career development for nurses, and strive to enhance job satisfaction.

This study has some limitations. First, this study was conducted with nurses working at secondary hospitals in a single region; thus, the findings have limited generalizability. Second, our analysis could not account for various other factors that affect turnover in nurses of secondary hospitals. Third, our analysis of mediators of the relationship between the nursing work environment and turnover intention was limited to career motivation and job satisfaction, without exploring other potential mediators, such as organizational commitment. However, this study's findings will be useful as foundational data for developing strategies to lower turnover intention among nurses working at secondary hospitals.

CONCLUSION

This study found that the perceived nursing work environment, an organizational factor, directly affects turnover intention, and that career motivation and job satisfaction, both of which are individual factors, have indirect effects on turnover intention through dual mediation among nurses at secondary hospitals. Thus, executives and nurse managers at secondary hospitals should implement human resources management strategies that prioritize improving the aspects of the nursing work environment that nurses perceive as poor, such as by ensuring adequate nurse staffing to provide quality nursing care and lower nurses' turnover intention, and by offering opportunities for career development and advancement, such as professional development training and education programs, to foster career motivation and enhance job satisfaction.

Based on these findings, we provide the following recommendations. First, replication studies should be performed to identify the predictors of nurses' turnover intention considering diverse variables and regions and examine their effects. Second, policies outlining health insurance fees that contribute to enhancing the nursing work environment, such as integrated nursing and caregiving services and differential nursing management fee systems, need to be developed and expanded. Third, there is an active need to utilize policy options, such as monitoring compliance with different nursing management systems and disclosing lists of non-compliance with guidelines for using additional revenue from nursing management fees to improve nurses' welfare. Fourth, approaches need to be implemented during the accreditation of healthcare facilities to encourage these facilities to actively provide support, including identifying professional development needs and verifying the implementation of relevant training, to foster nurses' career motivation and increase their job satisfaction.

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