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The Effect of Positive Psychological Capital, Job Stress, and Burnout on Infection Control Fatigue in Emergency Room Nurses

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Abstract: *This study aimed to identify the degree of infection control fatigue, positive psychological capital, job stress, and burnout in emergency room nurses, and to identify the relationship between these factors and the factors that affect infection control fatigue.*

An online Google survey through mobile devices was used to explain the purpose, research methodology, procedures, data protection measures, anonymity, and confidentiality to the research participants. Informed consent was obtained before the data collection. Participants were nurses with a minimum working experience of six months in emergency rooms in Seoul, Gyeonggi, and Incheon. The participants volunteered to participate in the study. The calculated sample size was 143 participants. However, to account for potential dropouts during data collection, the target sample size was set at 170 participants. The data collection period lasted for 21 days, from September 19, 2022, to October 9, 2022. A total of 170 completed survey questionnaires were collected and analyzed.

The results showed significant differences in positive psychological capital based on the general characteristics of the study participants. Age (F=4.893, p=.003) and workplace (F=3.748, p=.026) showed significant differences. Post-hoc analysis revealed that the 30-39 age group had higher levels of positive psychological capital than the 40-49 age group. Additionally, when the workplace was a tertiary upper general hospital, it exhibited higher levels of positive psychological capital compared to a secondary general hospital. Regarding infection control fatigue, there were significant differences based on age (F=6.503, p=.000) as a general characteristic. Post-hoc analysis showed that the group between 00 and 39 years old had higher levels of infection control fatigue compared to the group between 20 and 29 years old, the group between 40 and 49 years old exhibited higher levels of infection control fatigue than the 20-29 age group. For burnout, there were significant differences based on institutional type (F=4.868, p=.009) as a general characteristic. Post-hoc analysis revealed that the burnout level was higher in the local emergency medical center than in the local emergency medical institution, and it was higher in the regional emergency medical center than in the local emergency center. However, there were no significant differences in job stress based on the general characteristics of the study participants.

The study demonstrated a positive correlation between job stress, burnout, and infection control fatigue. The correlation between infection control fatigue and the main variables showed a positive correlation with job stress (r=.750, p<.001) and burnout (r=.428, p<.001), with job stress exhibiting the highest degree of correlation. Finally, through regression analysis, the explanatory power of independent variables was examined. The factors influencing infection control fatigue were found to be job stress, burnout, and positive psychological capital, in that order, with an adjusted coefficient of determination (R-squared) of 0.589. This indicates that the model can explain 58.9% of the variance in infection control fatigue.

This study emphasizes that job stress, burnout, and positive psychological capital are significant factors influencing infection control fatigue among emergency room nurses. By implementing interventions and supportive strategies to address these factors, it is possible to alleviate job stress, reduce burnout, and foster a positive work environment, thereby promoting effective infection control practices among emergency room nurses. This, in turn, enables healthcare institutions to ensure effective infection control and support the well-being of emergency room nurses

Keywords: *Emergency Room Nurse, Infection Control Fatigue, Positive Psychological Capital, Job Stress, Burnout*

1. Introduction

1.1 The necessity of research

The increased job stress among emergency room nurses can be attributed to several factors. Emergency room nurses play a crucial role in managing critical situations and providing immediate care to patients. They face unique challenges and risks, particularly in infection control. Compared to other healthcare professionals or the general population, emergency room nurses are at a significantly higher risk of exposure to infectious diseases[1]. They must consider all patients in the emergency room as potential carriers of infection, which can lead to physical and mental exhaustion[2]. The ongoing emergence of new infectious diseases and variants since the COVID-19 pandemic has further worsened the difficulties faced by emergency room nurses. Nurses caring for infectious disease patients experience challenges in wearing protective equipment and adhering to infection control measures[1]. While wearing protective equipment and following strict infection control procedures have become essential aspects of their daily work, they have also led to increased nursing workload, physical and mental stress, and concerns about disease transmission[3]. The constant need to acquire new infection control guidelines, adapt to protocol and policy changes, and adjust work processes adds to the ongoing changes and expansion of their responsibilities, which can increase job stress and infection control fatigue among emergency room nurses. Fatigued nurses are more vulnerable to decreased accuracy in nursing tasks, increased risk of infection-related incidents such as blood and body fluid exposures, and higher potential for disease transmission[4]. The anxiety associated with these ongoing risks can lead to mental stress among emergency room nurses and contribute to infection control fatigue.

As the paradigm in healthcare shifts towards a patient-centered approach, emergency rooms have become settings for managing urgent situations and severe illnesses, where emergency room nurses play a vital role in saving lives. As a result, nurses may feel the pressure of handling critical conditions and urgent interventions for patients. They handle immediate emergency care and act as intermediaries in communication with patients, their families, and other healthcare professionals, which adds to the pressure they face[5]. Emergency rooms require collaboration among various healthcare professionals, including doctors, technicians, nurses, and emergency medical personnel. This collaboration can lead to communication difficulties and increase the complexity of the work environment, contributing to stress among nurses. The job stress experienced by emergency room nurses has been reported to be more severe compared to nurses working in general wards due to these changes[6].

The high level of job stress encountered by emergency room nurses can contribute to burnout. Emergency room nurses are constantly in a state of mental and physical tension as they perform emergency interventions for patients, obtain consent for tests and procedures from patients' families, and interact with other healthcare professionals and hospital staff during patient examination and transfer[7]. The unpredictable nature of the emergency room environment exposes nurses to various stressors, such as the need for rapid decision-making, excessive workload, inefficient work systems, and relationships with patients and families, which contribute to nursing fatigue and burnout[8].

Infection control fatigue and job stress have significant implications for emergency room nurses. Fatigued nurses are prone to decreased accuracy in nursing tasks, increased risk of infection-related incidents, and higher potential for disease transmission. Furthermore, nursing fatigue can lead to reduced motivation, decreased job engagement, and compromised nursing performance, including medication errors. These outcomes carry significant consequences for patient safety and the overall quality of nursing care[9]. AI is increasingly being leveraged in the realm of physiological well-being to enhance healthcare outcomes and support individuals in managing their health more effectively [10].

While existing studies have primarily focused on turnover intention, job satisfaction, sleep, and compassion fatigue among emergency room nurses, there is still a lack of understanding regarding the connection between positive psychological capital, job stress, burnout, and infection control fatigue. Exploring and analyzing these relationships can provide valuable insights for developing interventions that can effectively mitigate the effects of infection control fatigue and improve the well-being and performance of emergency room nurses. Additionally, practical data is needed to develop and implement appropriate interventions for emergency room nurses. This study aims to contribute to the field by analyzing the relationships between positive psychological capital, job stress, burnout, and infection control fatigue, providing insights for the development of interventions to alleviate fatigue and improve infection control quality among emergency room nurses. This research aims to enhance the will enhance understanding of infection control fatigue among emergency room nurses and make important scholarly contributions that can contribute to future intervention studies and policy development, ultimately improving patient safety and nursing quality in emergency room settings.

1.2 Research objectives and research questions

The objective of this study was to identify the degree of infection control fatigue, positive psychological capital, job stress, and burnout in emergency room nurses, and to identify the relationship between these factors and the factors influencing fatigue related to infection control. The specific research objectives and research questions are as follows:

Research Objectives:

1) To investigate the levels of positive psychological capital, job stress, burnout, and infection control fatiguee among the research participants based on their general characteristics.
2) To investigate the association between positive psychological capital and infection control fatigue among emergency room nurses.
3) To explore the relationship between job stress and infection control fatigue among emergency room nurses.
4) To investigate the relationship between burnout and infection control fatigue among emergency room nurses.
5) To derive intervention strategies to alleviate fatigue and enhance infection control quality among emergency room nurses.

Research Questions:

1) What are the levels of positive psychological capital, job stress, burnout, and infection control fatigue among the research participants based on their general characteristics?
2) How dose positive psychological capital relate to infection control fatigue among emergency room nurses?
3) How does job stress contribute to infection control fatigue among emergency room nurses?
4) How does burnout contribute to infection control fatigue among emergency room nurses?
5. What intervention strategies can be implemented to alleviate fatigue and improve the well-being of emergency room nurses while enhancing infection control quality?

Through these research objectives and questions, this study further aimed to comprehensively understand and alleviate infection control fatigue among emergency room nurses and propose strategies to enhance the quality of patient care in the emergency room setting.

2. Research method

2.1 Research Design and Research Tools

The current study employed an empirical research design known as a cross-sectional design, which is an empirical the chosen research design. It is a descriptive survey study that collects and analyzes data at a specific point in time. The participants of the study, which were emergency room nurses, provided information regarding positive psychological capital, job stress, burnout, and factors related to infection control fatigue. Through this design, the researcher identified the correlations and influences of factors related to infection control fatigue. The cross-sectional design is suitable for exploring relationships among various variables through data collected at a single time point. It provided valuable insights into the factors associated with infection control fatigue among emergency room nurses.

2.1.1 Infection Control Fatigue

Infection control fatigue refers to the degree of physical and mental exhaustion while systematically managing healthcare-related infections, subjective feelings of exhaustion related to infection control, changes in vital functions, and decreased work efficiency[9]. In addition, it has been reported that the occurrence of unexpected infectious diseases or frequent changes in infection control guidelines for which there are no response procedures in place to deal with them increases the psychological burden of quickly adapting to new infection control guidelines and policies, and the complicated procedures and physical burden of wearing protective gear increase nurse fatigue[18]. The infection control fatigue measurement tool was developed by Koo Hyo-hun[3] and modified and supplemented by Jang Hye-min [19] for emergency rooms and used with the author's approval. The five subdomains of the tool consist of 38 questions, whereas, 7 questions were on deterioration of patient condition and lack of knowledge, 12 questions on complex procedures, and lack of manpower, 11 questions on conflict and lack of support due to uncertain situations, 3 questions on burden factors due to infection concerns and excessive attention, and 5 questions on difficulties due to new roles and demands. The five subdomains of the tool consist of 38 questions: deterioration of patient condition and lack of knowledge, 7 questions, complex procedures and lack of manpower, 11 questions on conflict and lack of support due to uncertain situations, 3 questions on burden factors due to infection concerns and excessive attention, and 5 questions on difficulties due to new roles and demands. The Likert scale for each question ranges

from 1 point for "not at all" to 5 points for "very much so", with higher scores indicating higher levels of fatigue. Cronbach's α=.94 in the study of emergency room nurses by Jang Hye-min[18], and Cronbach's α=.97 in this study.

2.1.2 Positive psychological capital

Positive psychological capital refers to factors such as self-efficacy, optimism, hope, and resilience[19]. The self-efficacy of positive psychological capital induces internal motivation and becomes the driving force of positive performance[21]. Optimism is linked to positive thinking in cognitive terms, and hope becomes a process of searching for goals and thinking passion[22]. Internal resilience is expressed as an active willingness to overcome stressful situations[23]. The higher the positive psychological capital, the lower the correlation of job stress[24]. The Positive Psychological Capital Scale of Luthans et al.[21], which owns the copyright of the Positive Psychological Capital tool, was translated into Korean and a tool was used to test its validity. Permission has been obtained from Mind Garden, Inc., the copyright holder of the tool, and the publisher for the use of the tool. The higher the number of points, the higher the degree of positive psychological capital. The reliability of the tools developed was Cronbach's α=.90, and the study was Cronbach's α=.94.

2.1.3 Job stress

Due to nurses' unique occupational characteristics, such as shift work, professional mission, complex relationships, and emotional labor, the job stress of clinical nurses is reported to be relatively high compared to other occupations[25]. Nurses employed in the care of patients with emerging infectious diseases are isolated for more than one and a half hours in a closed one-person negative pressure isolation ward or cohort isolation ward after wearing heavy and complex protective gear[26], and nursing difficulties and stresses are increasing due to new roles and patient demands, such as wearing protective equipment and infectious disease control procedures in the case of nursing isolated patients compared to nursing care in the usual clinical setting[3], and nurses who participate in the treatment of infectious disease patients are infected by patients, experiencing the pain of death, fear of transmitting infection, and this perception acts as negative stressors[27]. The job stress of nurses caring for infectious disease patients needs to be managed. Based on the 'job stress of infection control nurses' measurement tool developed by Heo Seon [28], the degree of job stress was measured with a tool modified and supplemented by Jang Hye-min [19] according to the emergency room situation. There were a total of 32 questions in 4 subsections: The survey included 9 questions pertaining to quantitative workload, 11 questions addressing qualitative workload, 6 questions focusing on interpersonal conflict, and an additional set of questions concerning organizational factors. Using a 5-point Likert scale, the scores in the study ranged from "Not at all" (1 point) to "feel very bad" (5 points), with higher scores indicating higher levels of job stress. The reliability of the study conducted by Jang Hye-min [19] was reported as Cronbach's α = .94, while in this current study, it was found to be Cronbach's α = .97.

2.1.4 Burnout

The concept of burnout refers to a specific type of work stress response that arises when stress becomes unmanageable. It is characterized as a syndrome involving physical and emotional exhaustion, leading to negative self-concept, negative work attitudes, and a diminished interest in patients[28]. Burnout is a negative consequence that arises from prolonged exposure to emotional pressure

and stress that individuals are unable to cope with. It manifests in various detrimental outcomes, including decreased job satisfaction and reduced organizational engagement. If left unaddressed, burnout can lead to severe fatigue, feelings of frustration, anger, and even depression among nurses [30]. When nurses experience severe burnout, the nursing satisfaction of patients and caregivers decreases, errors in nursing performance increase, and organizational productivity decreases productivity decreases, organizational performance is negatively affected, such as organizational performance is negatively affected, such as increased turnover intentions and absenteeism, and low job enthusiasm. Nurses in hospitals experience burnout in connection with a variety of stressful situations they face in the course of their work, such as over workload, inefficient work systems, lack of emotional support between top and bottom, relationships with patients and caregivers, and interpersonal conflicts with fellow medical staff [7]. It was stated that an increase in the degree of burnout makes it difficult to perform the role of nursing as a profession, and if burnout is not resolved, it damages the well-being of individuals and organizations, reduces job satisfaction and the quality of nursing work, and affects others, so it is necessary to prevent and reduce burnout [31] [35] [36]. In this study, burnout was measured using the adapted instrument developed by Pines, Aronson & Kafry [32] which was translated, modified, and supplemented by Peek Eun-hee[33]. It consists of 20 questions in 3 subsections: 6 questions for physical exhaustion, 7 questions for emotional exhaustion, and 7 questions for mental exhaustion. Of these, 7 questions (Nos. 3, 6, 12, 14, 17, 18, and 19) consisted of positive questions and were treated as reverse conversions. Each item is on a 5-point Likert scale, that ranges from not at all (1 point) to very yes (5 points), and a higher score means higher burnout. In the study of Peek Eun-hee[33], Cronbach′ α=.86, and this study was Cronbach's α=.88.

2.2 Research subjects, data collection, and ethical considerations

This study was conducted at Kyungdong University in accordance with the procedures after obtaining IRB approval (IRB number: 1041455-202208-HR-013-01) for ethical considerations. The primary researcher used an online Google survey through mobile devices to explain the purpose, research methodology, procedures, data protection measures, anonymity, and confidentiality to the research participants. Prior informed consent was obtained before data collection. The study targeted nurses with a minimum of six months of experience working in emergency rooms in Seoul, Gyeonggi, and Incheon. The participants voluntarily chose to participate in the study. The sample size was determined using G*Power 3.1 software, considering a significance level of 0.05, a power (1-β) of 0.95, and a medium effect size of 0.30 for regression analysis. The calculated sample size was 143 participants. However, to account for potential dropouts during data collection, the target sample size was set at 170 participants. The data collection period lasted for 21 days, from September 19, 2022, to October 9, 2022. A total of 170 completed survey questionnaires were collected and analyzed.

Strict health protocols were followed during data collection to ensure the safety and well-being of both the researchers and participants. All researchers strictly adhered to guidelines provided by relevant health authorities, including wearing personal protective equipment (PPE) such as masks and gloves. Hand sanitizers and disinfectants were regularly used to maintain a clean and hygienic environment.

The survey was conducted through an online Google survey platform, accessible through mobile devices. Participants were provided with the survey link and given instructions on how to complete it. The survey consisted of a series of questions related to positive psychological capital, job stress, burnout, and infection control fatigue.

The anonymity and confidentiality of the participants were strictly maintained throughout

the entire data collection process. The collected data was securely stored, and only authorized researchers involved in the study had access to it. All of the participants' information were personal information was kept confidential and used solely for research purposes.

By implementing these health protocols and ensuring the confidentiality of the data, the research team made efforts to minimize potential risks and protect the well-being of the participating researchers and participants.

2.3 Data Analysis

The collected data were encrypted to ensure the protection of personal information. The data analysis for this study was conducted using the SPSS/WIN 21.0 program.

1) The study subjects' general characteristics were analyzed by utilizing numerical data, percentages, means, and standard deviations.
2) The levels of positive psychological capital, job stress, burnout, and infection control fatigue among the study subjects were analyzed by categorizing them based on means and standard deviations.
3) To analyze the differences in positive psychological capital, job stress, burnout, and infection control fatigue according to the characteristics of the study subjects, t-tests, and one-way ANOVA were used, and post-hoc verification was conducted using the Scheffe test.
4) The relationship between positive psychological capital, job stress, burnout, and infection control fatigue among the study subjects was examined using Pearson's correlation coefficient.
5) Multiple regression analysis was performed to identify the factors that influence infection control fatigue among the study subjects.

3. Research Results

3.1 Differences in positive psychological capital, job stress, burnout, and infection fatigue according to the general characteristics of the study subjects

The positive psychological capital according to the general characteristics of the subject, age (F=4.893, p=.003), and workplace (F=3.748, p=.026) showed a significant difference. The post-hoc analysis revealed that the 30-39 age group exhibited higher levels of positive psychological capital compared to the 40-49 age group. Additionally, when the workplace was a tertiary upper general hospital, it showed higher levels of positive psychological capital compared to a secondary general hospital. As a result of seat verification, the burnout level was higher in the local emergency medical center than in the local emergency medical institution, and the burnout level was higher in the regional emergency medical center than in the local emergency center. Age (F=6.503, p=.000) and infection control fatigue also showed a significant difference. As a result of the sheet verification, the group aged 30 to 39 had higher infection control fatigue than the group aged 20 to 29, and the group aged 40 to 49 had higher infection control fatigue than the group aged 20 to 29. Burnout and institutional type (F=4.868, p=.009) also showed a significant difference. As a result of seat verification, the burnout level was higher in the local emergency medical center than in the local emergency medical institution, and the burnout level was higher in the regional emergency medical center than in the local emergency center. Job stress showed no significant difference in all items according to the general characteristics of the subject [Table 1].

[Table 1] Differences in positive psychological capital, job stress, burnout, and infection fatigue according to the general characteristics of the study subjects

(n = 170)

Characteristics	Categories	Positive psychological capital		Job stress		Burnout		Infection fatigue	
		M±SD	t/F(*p*)	M±SD	t/F(*p*)	M±SD	t/F(*p*)	M±SD	t/F(*p*)
Sex	Male	3.25±.50	0.188 (0.852)	3.41±.69	-2.473 (0.014)	3.06±.43	-0.291 (0.773)	3.45±.79	-2.352 (0.028)
	Female	3.23±.56		3.77±.15		3.09±.59		3.89±.70	
Emergency room career(year)	< 6month - 1year	3.25±.52	1.946 (0.105)	3.59±.64	2.539 (0.042)	3.11±.47	0.319 (0.865)	3.67±.80	1.845 (0.123)
	1-3 year	3.13±.56		3.69±.71		3.09±.56		3.82±.72	
	3-5 year	3.30±.51		3.54±.65		2.95±.62		3.66±.61	
	5-10 year	3.12±.55		3.95±.50		3.12±.46		3.93±.62	
	≥10year	3.45±.54		3.91±.50		3.07±.69		4.09±.72	
Health condition	Very unhealthy	3.10±.54	-5.431 (0.000)	3.79±.63	2.012 (0.46)	3.20±.49	5.4 (0.000)	3.91±.70	2.407 (0.017)
	Healthy	3.59±.40		3.57±.61		2.72±.54		3.61±.74	
Age	20-29 a	3.22±.51	4.893 (0.003) b>c	3.48±.70	6.503 (0.000) a<b a<c	3.03±.50	3.737 (0.012)	3.62±.81	3.106 (0.028)
	30-39 b	3.07±.53		3.83±.54		3.25±.58		3.95±.66	
	40-49 c	3.49±.60		4.00±.54		2.93±.54		3.99±.62	
	50-59 d	3.36±.27		3.72±.46		2.80±.42		3.82±.48	
Marital state	Married	3.25±.58	0.478 (0.633)	3.95±.47	4.059 (0.000)	3.06±.51	-0.482 (0.631)	4.03±.59	3.273 (0.001)
	Unmarried	3.21±.52		3.59±.68		3.10±.57		3.69±.77	
Religion	Yes	3.16±.55	-1.005 (0.316)	3.83±.56	1.361 (0.175)	3.07±.54	-0.217 (0.828)	3.87±.57	0.521 (0.604)
	No	3.26±.55		3.69±.65		3.09±.55		3.81±.77	
Place of work	Secondary general hospital a	3.19±.54	3.748 (0.026) c>a	3.72±.65	0.505 (0.604)	3.84±.56	0.254 (0.776)	3.08±.72	0.056 (0.946)
	A university hospital among secondary general hospitals b	3.13±.50		3.64±.55		3.84±.52		3.18±.65	
	Tertiary general hospital c	3.54±.52		3.85±.56		3.78±.49		3.04±.79	

Type of emergency medical institution	Local emergency medical institution a	3.18±.51	0.635 (0.531)	3.79±.51	2.445 (0.089)	3.09±.55	4.868 -0.009 c>a c>b	3.92±.61	3.602 (0.029)
	Local emergency medical center b	3.24±.57		3.66±.69		3.02±.54		3.73±.76	
	Regional emergency medical center c	3.38±.49		4.09±.45		3.55±.40		4.27±.71	
Type of wrok	A 24-hour shift	3.24±.48	0.191 (0.826)	4.07±.62	1.609 (0.203)	3.23±.63	0.353 (0.703)	4.21±.50	1.416 (0.246)
	A 12-hour shift	3.22±.52		3.70±.63		3.07±.54		3.80±.71	
	A 8-hour shift	3.31±.80		3.89±.57		3.05±.59		3.89±.89	
Education level	University graduation	3.24±.48	0.191 (0.826)	4.01±.62	1.609 (0.203)	3.23±.63	0.353 (0.703)	4.21±.50	1.416 (0.246)
	Master's degree	3.22±.52		3.70±.63		3.07±54		3.80±.71	
	Ph.D. graduation	3.31±.80		3.89±.57		3.05±59		3.89±.89	
The form of labor	Permanent employee	3.23±.54	0.319 (0.573)	3.73±.62	0.277 (0.6)	3.07±.55	0.589 (0.444)	3.82±.72	0.598 (0.44)
	Non-regular worker	3.12±.60		3.85±.77		3.23±.45		4.02±.76	

3.2 The level of positive psychological capital, job stress, burnout, and infection control fatigue of emergency room nurses

The participants in this study reported an average infection control fatigue level of 3.73±0.63 points, indicating a certain level of fatigue related to infection control. There was variation in the scores among the participants, with some experiencing higher levels of fatigue compared to others. The average positive psychological capital of the subjects was 3.23±0.55 points, suggesting a moderate level of positive psychological resources. The participants demonstrated varying levels of positive psychological capital, encompassing factors such as self-efficacy, optimism, hope, and resilience.

In terms of job stress, the participants reported an average score of 3.83±0.72 points, indicating a moderate level of job stress. The scores varied among participants, with some reporting higher levels of stress than others. The average burnout score was 3.06±0.55 points, indicating a moderate level of burnout experienced by the participants. Similarly, the average job stress level was 3.83±0.72 points, suggesting a moderate level of job stress. The scores varied among participants, with some reporting higher levels of stress compared to others[Table 2].

[Table 2] The level of positive psychological capital, job stress, burnout, and infection fatigue of emergency room nurse

(n = 170)

Categories	M±SD	Min	Max
Infection Control Fatigue Level	3.73±.63	1.84	5
Positive psychological capital	3.23±.55	1.83	4.67
Job stress	3.83±.72	1.84	5
Burnout	3.06±.55	1.75	4.55

3.3 Correlation between positive psychological capital, job stress, burnout, and infection control fatigue level of emergency room nurses

Infectious fatigue, a dependent variable in this study, showed a correlation with job stress and burnout. The correlation between infection fatigue job stress is r=.750, p<.001. For exhaustion the correlation is r=.428, p<.001. Both results showed positive degree of correlation, of which job stress (r=.750, p<.001) had the highest degree of correlation, followed by exhaustion (r=.428, p<.001) in order [Table 3].

[Table 3] Correlation between positive psychological capital, job stress, burnout, and infection control fatigue level of emergency room nurses

(n = 170)

Variable	Infection control fatigue	Positive Psychological Capital	Job stress	Burnout
Infection control fatigue	1			
Positive Psychological Capital	-0.085 (-0.136)	1		
Job stress	0.75** (.000)	-0.144* (-0.031)	1	
Burnout	0.428** (.000)	-0.48** (.000)	0.385** (.000)	1

*p<0.01, **p<0.001

3.4 Factors affecting the level of this infection control fatigue are positive psychological capital and burnout of emergency room nurses

As a result of analyzing the correlation between ANOVA and the variables that appeared significantly in the correlation analysis, the tolerance limit (Tolerance) was 0.1 or higher at .929, and the variance inflation factor (VIF) value was 1.177-1.303, so there was no multicollinearity between independent variables, and the Dubin-Watson correlation coefficient showed a residual of 1.923 independence. In addition, a step-by-step multiple

regression analysis was conducted to satisfy the assumption of normal distribution and equal variance of the residuals. As a result, as shown in Table 4, the regression model for the subject's infection escape was significant (F=81.827, p=).000), and the modified coefficient of determination was .589 (Adjusted R Square). The factors affecting the infection evacuation of emergency room nurses were in the order of job stress, exhaustion, and positive psychological capital, and the explanatory power was 58.9% [Table 4].

[Table 4] Factors affecting the level of this infection control fatigue are positive psychological capital, job stress, and burnout of emergency room nurses

(n = 170)

Variable	B	S.E	*β*	t	p	Adjusted R^2	F
Constant	0.205	0.07		0.564	0.573	0.589	81.827**
Job stress	0.597	0.047	0.681	12.74	**		
Burnout	0.257	0.069	0.224	3.712	**		
Positive psychological capital	0.139	0.065	0.121	2.146	*		

*p<0.01, **p<0.001

4. Discussion

This study aimed to identify the effects of positive psychological capital, job stress, and burnout on infection control fatigue of emergency room nurses and to provide basic data to solve them.

Based on the results, factors affecting infection control fatigue among emergency room nurses were job stress, burnout, and positive psychological capital

In this study, positive psychological capital according to general characteristics was higher in the group aged between 30 and 39 years than the group aged between 40 and 49 years, and working in a tertiary general hospital had a higher positive psychological capital. Positive psychological capital is a resource that an individual has and includes a positive attitude toward one's life, self-confidence, and social support. Accordingly, various factors such as age and occupation can affect the level of positive psychological capital. In this study, the reason why the group aged between 30 and 39 years had higher positive psychological capital than the group aged between 40 and 49 years could be due to several factors, but in general, 30-39-year-olds found new challenges and opportunities while their careers and experiences reached an appropriate level. It is considered a time for growth and the group aged between 30 and 39 years is usually a time to form a family, raise children, or strive for a family. When these familial responsibilities are combined with social support, a more positive attitude can be maintained. It is concluded the group aged between 30 and 39 years is physically healthier and more energetic, and it is still a period when expectations for the future are relatively high, so these expectations can affect positive attitudes and confidence. Nurses working in tertiary general hospitals work closely with fellow nurses and medical staff. This collaboration can help them gain confidence and support for their work, and support each other even in difficult situations. In addition, because they care for patients with severe conditions, they have a high degree of professionalism and performance work ability. If they take pride in being recognized for their professionalism and work capabilities, they can have a positive attitude

and confidence in their work. On the other hand, the reason why nurses working in small and medium-sized general hospitals have lower positive psychological capital than than in tertiary general hospitals can be due to various factors. Nurses working in small and medium-sized general hospitals may have fewer patients and less workload than in general hospitals, but some nurses may feel work stress because they have to deal with their work with limited manpower and resources. Such stress can be a factor that lowers positive attitude and reduces positive psychological capital. Nurses working in small and medium-sized general hospitals may have limited expertise and resources compared to tertiary general hospitals. In this situation, nurses may have less direct interaction with patients, and their confidence in their work abilities may decrease. However, this is a general trend and may vary from person to person. In this study, the positive psychological capital score of emergency room nurses was 3.23±.55 points. In a study by Lee Se-young[32] on nurses caring for patients with respiratory infections using the same tool, the average score of positive psychological capital was similar to 3.99 ± .6 points. It supports the findings that people have low positive psychological capital due to negative emotions such as stress, being infected, or being a source of infection. Therefore, it is very important to strengthen the ability of nurses to maintain a positive psychological state in situations where they have to face infectious diseases such as emergency situations and COVID-19. In addition, it is necessary to consider measures such as establishing a psychological support system required by emergency room nurses, maintaining a balance between break time and work time, and preparing a space for rest during work hours. Through positive feedback and recognition, it is also important to increase nurses' confidence, support nurses' career development, and equip them with the necessary equipment and facilities to perform their duties.

In this study, job stress levels did not show any statistically significant variations based on participants' general characteristics. This can be interpreted that the degree of job stress does not differ significantly depending on specific personal characteristics or backgrounds because nurses can be exposed to various job stress factors. In a study by Jang Hye-min[18] using the tool, the average score was 3.54±.87 points, which was higher than the average score of 3.60±.38 points in a study by Yoon-Hee Choi[33] using the same tool for nurses in the emergency room in the emergency room during an epidemic of infectious disease. This is consistent with the results of Yoon-Hee Choi[33], who reported that job stress is higher due to the nature of the job. Therefore, it is important to reduce the job stress of emergency room nurses and provide appropriate coping methods and support. This can greatly benefit the well-being and professional effectiveness of emergency room nurses.

In this study, the degree of burnout displayed a significant variation based on the general characteristics of the subjects. The degree of burnout was found to be higher in regional emergency medical centers compared to local emergency medical institutions, as well as higher in regional emergency medical centers when compared to other regional emergency medical centers. Since regional emergency medical centers target all emergency patients in the region, they are in charge of treatment for patients with various diseases and injuries. For this reason, nurses working in regional emergency medical centers are caring for patients with higher severity levels, and thus experience more pressure and stress. Therefore, it is believed that the degree of burnout may appear higher. The burnout of emergency room nurses in this study averaged 3.06±.55 points, which is higher than the average score of 2.676 in the study by Peek Eun-hee[31]. As shown in the research results of Ha Do-kyung[14], emergency room nurses have a high degree of burnout due to interpersonal relationships and work burdens in emergency situations. In general, emergency room patients often have a high degree of severity, so nurses working in emergency rooms experience high stress and a heavy workload.

Therefore, in order to address these issues, it is essential to enhance the working environment for emergency room nurses and implement diverse measures to alleviate their workload.

In this study, there was a significant difference in infection control fatigue based on the general characteristics of the subjects, specifically in relation to age. The group aged between 30 and 39 years exhibited higher levels of infection control fatigue compared to the group aged between 20 and 29 years. The age difference may be due to several factors. For example, health concerns may increase with age, which may place a greater burden on carrying out infection control tasks. In addition, as age increases, more family responsibilities and social obligations are required, which can increase the stress and burden of infection control tasks. In addition, since the older group may have been working for a long time or may be engaged in more complex or dangerous occupations, anxiety about infection control work may increase when working in these occupations. Based on the general characteristics of the study, the infection control fatigue among emergency room nurses was recorded as 3.73±0.63 points. In a study conducted by Gu Hyo-hun [3], the original developer of the research tool, the measurement result for nurses assigned to care for patients with new infectious diseases was 3.49 points. Jang Hye-min [18], who modified and adapted the tool to suit the emergency room setting, specifically targeted emergency room nurses. 3.49 points in the study, and 3.41 points in the study by Choi Yoon-Hee[33] using the same tool for emergency room nurses, which was higher than the results of this study. As such, it shows that infection control fatigue is a highly prevalent problem for emergency room nurses who directly or indirectly participate in responding to infectious diseases. It is necessary to find a way to reduce the fatigue of infection control.

Taken together, these findings suggest that infection control fatigue among emergency room nurses is related to job stress and burnout. Emergency room nurses perform an important and responsible infection prevention job, but it is also a difficult job. As positive psychological capital is strengthened, infection control fatigue tends to decrease, and these nurses can perform their tasks more effectively and reduce job stress and burnout. You should also consider adequate rest and working time adjustments, adequate rest and nutrition, and the equipment and facilities you need to do your work to reduce job stress and burnout. Emergency room nurses have very busy jobs and can be nervous under the circumstances, so it's important to adjust your schedule to get enough rest and sleep. It is also important to help nurses do their jobs more efficiently by improving the work environment. Therefore, strengthening positive psychological capital and reducing job stress and burnout are important measures to reduce infection control fatigue among emergency room nurses.

5. Conclusions and Suggestions

This study has revealed factors that influence infection control fatigue among emergency room nurses. The results indicate that job stress, burnout, and positive psychological capital are associated with infection control fatigue and effective coping abilities. The quantitative correlation between infection control fatigue and job stress shows that as the level of job stress increases, the level of infection control fatigue also increases. This emphasizes the impact of job-related stressors on the well-being and performance of healthcare professionals, highlighting the importance of implementing support mechanisms to alleviate job stress and its effects. Furthermore, a significant correlation between infection control fatigue and burnout highlights the role of personal energy depletion in infection control situations. Nurses experiencing higher levels of burnout may struggle to maintain vigilance and comply with infection control regulations. Therefore, interventions aimed at reducing burnout and

promoting self-care practices are crucial in enhancing infection control efforts.

An interesting finding is that positive psychological capital showed a negative correlation with infection control fatigue. This indicates that individuals who possess higher levels of positive psychological capital, such as self-confidence, optimism, hope, and resilience, may experience reduced levels of fatigue related to infection control. Strengthening positive psychological capital through targeted interventions and creating a supportive work environment can alleviate infection control fatigue among emergency room nurses.

Regression analysis results showed that job stress, burnout, and positive psychological capital accounted for 58.9% of the variance in infection control coping. This underscores the importance of considering these factors simultaneously when developing strategies and interventions to enhance infection control practices. By alleviating job stress, promoting self-care practices, and fostering a positive work environment, the well-being of emergency room nurses can be enhanced, leading to more effective infection control practices.

Recognizing the limitations of this study is crucial. The results are based on a sample of emergency room nurses from a specific region, which may limit the generalizability of the findings. Further research including diverse healthcare settings and larger samples is needed to validate these results. Additionally, relying on self-report measures in this study introduces the possibility of bias. Incorporating objective measures and qualitative methods can provide a more comprehensive understanding of factors influencing infection control practices. Several suggestions are proposed for future research and improvement. Firstly, conducting studies that encompass various work environments and diverse groups of nurses is necessary to enhance the generalizability of the results. Secondly, it is recommended to establish programs that improve the work environment of emergency room nurses and enhance their infection response capabilities. This could include the introduction of infection control education, provision of appropriate resources and support, and fostering a culture of safety and well-being. Lastly, experimental studies are suggested to develop and evaluate strategic programs aimed at reducing burnout and job stress while enhancing positive psychological capital among emergency room nurses.

In conclusion, this study emphasizes that job stress, burnout, and positive psychological capital are significant factors influencing infection control fatigue among emergency room nurses. By implementing interventions and supportive strategies to address these factors, it is possible to alleviate job stress, reduce burnout, and foster a positive work environment, thereby promoting effective infection control practices among emergency room nurses. This, in turn, enables healthcare institutions to ensure effective infection control and support the well-being of emergency room nurses.

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