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The influence 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 investigate the factors influencing infection control fatigue among emergency room nurses, specifically examining the roles of job stress, burnout, and positive psychological capital. A cross-sectional survey was conducted with 170 emergency nurses using validated instruments. Data were analyzed using descriptive statistics, Pearson's correlation, and multiple regression analysis. The findings indicated that infection control fatigue was positively correlated with job stress ($r = .750$, $p < .001$) and burnout ($r = .428$, $p < .001$), while a negative correlation was observed with positive psychological capital ($r = -.085$, $p = .136$). Multiple regression analysis revealed that these variables collectively explained 58.9% of the variance in infection control fatigue. The results underscore the critical need to address occupational stressors and emotional exhaustion in emergency settings. Enhancing positive psychological capital may serve as a protective factor, reducing fatigue and improving infection control compliance. Practical implications include the implementation of institutional strategies such as stress management programs, resilience training, and supportive leadership to sustain frontline nurse well-being and performance.

Keywords: *Burnout, Emergency room nurse, Infection control fatigue, Job stress, Positive psychological capital.*

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 an essential part in managing critical situations and providing immediate attention 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

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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 add 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].

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 level 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:

1.3. Research Objectives

1) To investigate the levels of positive psychological capital, job stress, burnout, and infection control fatigue among the research participants based on their general characteristics.

2) To investigate the association among positive psychological capital and infection control fatigue among emergency room nurses.

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3) To explore the relationship among job stress and infection control fatigue among emergency room nurses.

4) To investigate the association among 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.

1.4. 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 develop the quality of patient care in the emergency room setting.

2. Methodology

2.1. Research Design and Research Tools

The current paper 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 investigates 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 [10]. The infection control fatigue measurement tool was developed by Gu [3] and modified and supplemented by Jang [11] 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

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point for "not at all" to 5 points for "very much so", with advanced scores showing higher levels of fatigue. Cronbach's α=.94 in the study of emergency room nurses by Jang [11] and Cronbach's α=.97.

2.1.2. Positive Psychological Capital

Positive psychological capital denotes to aspects such as self-efficacy, optimism, hope, and resilience [12]. The self-efficacy of positive psychological capital induces internal motivation and becomes the driving force of positive performance [13]. Optimism is linked to positive thinking in cognitive terms, and hope becomes a process of searching for goals and thinking passion [14]. Internal resilience is expressed as an active willingness to overcome stressful situations [15]. The greater the positive psychological capital, the lower the correlation of job stress [16]. The Positive Psychological Capital Scale of Luthans, et al. [12] and Hwang and Lee [13] that 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 [17]. 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 [18] 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 [19]. 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 [20] the degree of job stress was measured with a tool modified and supplemented by Jang [11] 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. Utilizing a 5-point Likert scale, the scores ranged from "Not at all" (1 point) to "feel very bad" (5 points), with higher scores showing higher levels of job stress. The reliability of the study conducted by Jang [11] 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 idea of burnout discusses to a specific type of work stress response that arises when stress becomes unmanageable. It is characterized as a condition involving physical and emotional tiredness, leading to negative self-concept, negative work attitudes, and a diminished interest in patients [21]. 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 [19]. 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

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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 [22, 23]. In this study, burnout was measured using the adapted instrument developed by Pines, et al. [22] and Pick [24] which was translated, modified, and supplemented by Lee [25]. 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 Lee [25] 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 following approval from the Institutional Review Board (IRB number: 1041455-202208-HR-013-01). Ethical considerations were thoroughly addressed prior to data collection. The principal investigator utilized an online Google survey accessible via mobile devices to explain the study's objectives, methodology, procedures, data protection measures, and policies ensuring anonymity and confidentiality. Informed consent was obtained from all participants before their inclusion in the study.

The participants consisted of nurses who had a minimum of six months of work experience in emergency departments located in Seoul, Gyeonggi, and Incheon. Participation was voluntary. The sample size was calculated using G*Power 3.1, with parameters set at a significance level (α) of 0.05, power (1–β) of 0.95, and a medium effect size of 0.30 for regression analysis. The required sample size was determined to be 143; however, to accommodate potential dropouts, the target sample was increased to 170. Data were collected over a 21-day period from September 19 to October 9, 2022, and 170 complete responses were obtained and analyzed.

Strict health protocols were followed during the data collection process to protect both researchers and participants. All members of the research team adhered to public health guidelines, including the use of personal protective equipment (PPE) such as masks and gloves. Hand sanitizers and disinfectants were regularly used to maintain hygiene.

The survey, distributed through a secure online platform, included a series of structured items assessing positive psychological capital, job stress, burnout, and infection control fatigue. Participants were provided with a survey link and detailed instructions for completion.

Participant confidentiality and data privacy were rigorously maintained. All data were securely stored and accessible only to authorized members of the research team. No personally identifiable information was disclosed, and the collected data were used exclusively for academic research purposes.

By enforcing comprehensive health safety protocols and safeguarding participants' privacy, the research team minimized risks and upheld ethical research standards throughout the study.

2.3. Data Analysis

All collected data were encrypted to ensure the protection of participants' personal information. Data analysis was conducted using the SPSS/WIN 21.0 statistical software package.

Descriptive statistics, including frequencies, percentages, means, and standard deviations, were used to summarize the general characteristics of the participants and the levels of positive psychological capital, job stress, burnout, and infection control fatigue.

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To identify differences in these variables based on participants' demographic characteristics, independent t-tests and one-way analysis of variance (ANOVA) were employed. Post hoc analyses were performed using Scheffé's test when significant differences were found.

The relationships among positive psychological capital, job stress, burnout, and infection control fatigue were analyzed using Pearson's correlation coefficients.

Lastly, multiple regression analysis was conducted to determine the significant predictors of infection control fatigue among emergency room nurses.

3. Research Results

3.1. Differences in Positive Psychological Capital, Job Stress, Burnout, and Infection Control Fatigue According to General Characteristics

Significant differences in positive psychological capital were observed based on participants' age ($F = 4.893$, $p = .003$) and workplace type ($F = 3.748$, $p = .026$). Post hoc analysis revealed that nurses aged 30–39 exhibited significantly higher levels of positive psychological capital compared to those aged 40–49. Additionally, nurses employed at tertiary general hospitals reported higher levels of positive psychological capital compared to those working in secondary general hospitals.

Job stress showed statistically significant differences based on sex ($t = -2.473$, $p = .014$), age ($F = 6.503$, $p < .001$), health condition ($t = 2.012$, $p = .046$), and place of work ($F = 3.72$, $p = .005$). Specifically, female nurses, those aged 40–49, those in poorer health, and those working in tertiary hospitals experienced higher levels of job stress.

Burnout levels differed significantly according to age ($F = 3.737$, $p = .012$), health condition ($t = 5.4$, $p < .001$), type of emergency medical institution ($F = 4.868$, $p = .009$), and place of work ($F = 4.868$, $p = .009$). Burnout was higher among those aged 40–49, those in poor health, and those working in more intensive emergency care settings.

Infection control fatigue also showed statistically significant differences by sex ($t = -2.352$, $p = .028$), health condition ($t = 2.407$, $p = .017$), age ($F = 3.106$, $p = .028$), and type of emergency facility ($F = 3.602$, $p = .029$). Nurses aged 30–49, those in poorer health, and those working in regional emergency medical centers reported higher levels of infection control fatigue. [See Table 1 for detailed statistics.]

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Table 1.
Differences in Positive Psychological Capital, Job Stress, Burnout, and Infection Control Fatigue According to General Characteristics (n = 170).

Characteristics		Positive psychological capital		Job stress		Burnout		Infection fatigue	
	Categories	M±SD	t/F(*p*) Scheffé's	M±SD	t/F(*p*) Scheffé's	M±SD	t/F(*p*) Scheffé's	M±SD	t/F(*p*) Scheffé's
Sex	Male	3.25±.50	0.188	3.41±.69	-2.473	3.06±.43	-0.291	3.45±.79	-2.352
	Female	3.23±.56	(0.852)	3.77±.15	(0.014)	3.09±.59	(0.773)	3.89±.70	(0.028)
Emergency room career(year)	< 6month -1year	3.25±.52	1.946	3.59±.64	2.539	3.11±.47	0.319	3.67±.80	1.845
	1-3 year	3.13±.56	(0.105)	3.69±.71	(0.042)	3.09±.56	(0.865)	3.82±.72	(0.123)
	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	3.79±.63	2.012	3.20±.49	5.4	3.91±.70	2.407
	Healthy	3.59±.40	(<.001)	3.57±.61	(0.46)	2.72±.54	(<.001)	3.61±.74	(0.017)
Age	20-29 a	3.22±.51	4.893	3.48±.70	6.503	3.03±.50	3.737	3.62±.81	
	30-39 b	3.07±.53	(<.001)	3.83±.54	(<.001)	3.25±.58	(0.012)	3.95±.66	3.106
	40-49 c	3.49±.60	b>c	4.00±.54	a<b,	2.93±.54		3.99±.62	(0.028)
	50-59 d	3.36±.27		3.72±.46	a<c	2.80±.42		3.82±.48	
Marital state	Married	3.25±.58	0.478	3.95±.47	4.059	3.06±.51	-0.482	4.03±.59	3.273
			(0.633)		(<.001)		(0.631)		(0.001)
	Unmarried	3.21±.52		3.59±.68		3.10±.57		3.69±.77	
Religion	Yes	3.16±.55	-1.005	3.83±.56	1.361	3.07±.54	-0.217	3.87±.57	0.521
	No	3.26±.55	(0.316)	3.69±.65	(0.175)	3.09±.55	(0.828)	3.81±.77	(0.604)
Place of work	Secondary Hospital	3.19±.54	3.748	3.72±.65	0.505	3.84±.56	0.254	3.08±.72	0.056
	Univ.-affil. Secondary	3.13±.50	(0.026)	3.64±.55	(0.604)	3.84±.52	(0.776)	3.18±.65	(0.946)
	Tertiary Hospital	3.54±.52	c>a	3.85±.56		3.78±.49		3.04±.79	
Kind of emergency care facility	Local Institution	3.18±.51	0.635 (0.531)	3.79±.51	2.445 (0.089)	3.09±.55	4.868	3.92±.61	3.602
	Local Center	3.24±.57		3.66±.69		3.02±.54	-0.009	3.73±.76	(0.029)
	Regional Center	3.38±.49		4.09±.45		3.55±.40	c>a c>b	4.27±.71	
Type of wrok	A 24-hour shift	3.24±.48	0.191	4.07±.62	1.609	3.23±.63	0.353	4.21±.50	1.416
	A 12-hour shift	3.22±.52	(0.826)	3.70±.63	(0.203)	3.07±.54	(0.703)	3.80±.71	(0.246)
	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	4.01±.62	1.609	3.23±.63	0.353	4.21±.50	1.416
	Master's degree	3.22±.52	(0.826)	3.70±.63	(0.203)	3.07±54	(0.703)	3.80±.71	(0.246)
	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	3.73±.62	0.277	3.07±.55	0.589	3.82±.72	0.598
	Non-regular worker	3.12±.60	(0.573)	3.85±.77	(0.600)	3.23±.45	(0.444)	4.02±.76	(0.440)

Note: **p*<0.01, ***p*<0.001.

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3.2. Levels of Positive Psychological Capital, Job Stress, Burnout, and Infection Control Fatigue

The average infection control fatigue score among emergency room nurses was 3.73 ± 0.63 (range: 1.84–5.00), indicating a moderate to high level of fatigue.

Positive psychological capital showed a mean score of 3.23 ± 0.55 (range: 1.83–4.67), reflecting a moderate level of psychological resources such as self-efficacy, optimism, hope, and resilience.

The mean job stress score was 3.83 ± 0.72 (range: 1.84–5.00), indicating that participants experienced relatively high levels of work-related stress.

The average burnout score was 3.06 ± 0.55 (range: 1.75–4.55), suggesting a moderate degree of burnout among emergency room nurses. [See Table 2 for detailed descriptive statistics.]

Table 2.
Levels of Positive Psychological Capital, Job Stress, Burnout, and Infection Control Fatigue (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±0.72	1.84	5
Burnout	3.06±.55	1.75	4.55

3.3. Correlation Among Positive Psychological Capital, Job Stress, Burnout, and Infection Control Fatigue

Pearson's correlation analysis revealed that infection control fatigue was significantly and positively correlated with job stress ($r = .750$, $p < .001$) and burnout ($r = .428$, $p < .001$), indicating that higher levels of job stress and burnout were associated with greater infection control fatigue.

Positive psychological capital showed no statistically significant correlation with infection control fatigue ($r = -0.085$, $p = .136$).

In addition, burnout was positively correlated with job stress ($r = .385$, $p < .001$). Positive psychological capital demonstrated significant negative correlations with both job stress ($r = -0.144$, $p = .031$) and burnout ($r = -0.438$, $p < .001$), suggesting that individuals with higher psychological capital tended to experience lower levels of stress and burnout. . [See Table 3 for detailed descriptive statistics.]

Table 3.
Correlation Among Positive Psychological Capital, Job Stress, Burnout, and Infection Control Fatigue (n = 170).

Variable	Infection control fatigue	Positive Psychological Capital	Job stress	Burnout
Infection control fatigue	1			
Positive Psychological Capital	-0.085	1		
	(-0.136)			
Job stress	0.75**	-0.144*	1	
	(0.000)	(-0.031)		
Burnout	0.428**	-0.48**	0.385**	1
	(0.000)	(0.000)	(0.000)	

Note: *p <0.05, **p < 0.01, ***p < 0.001.

3.4. Predictors of Infection Control Fatigue

A multiple regression analysis was conducted to identify factors influencing infection control fatigue among emergency room nurses. The model was statistically significant ($F = 81.827$, $p < .001$), with an adjusted R^2 of 0.589, indicating that approximately 58.9% of the variance in infection control fatigue was explained by the predictors.

Among the independent variables, job stress ($\beta = 0.681$, $p < .001$) had the strongest positive influence on infection control fatigue, followed by burnout ($\beta = 0.224$, $p < .001$). Positive psychological

capital was also found to be a significant predictor ($\beta = 0.121$, $p < .05$), though with a relatively smaller effect size.

These findings suggest that higher job stress and burnout levels are associated with increased infection control fatigue, while higher positive psychological capital contributes to lower fatigue levels. [See Table 4 for detailed regression coefficients.]

Table 4.
Multiple Regression Analysis of Predictors of Infection Control Fatigue Among 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	*		

Note: *p<0.01, **p<0.001.

4. Discussion

This study aimed to identify the influence of positive psychological capital, job stress, and burnout on infection control fatigue among emergency room nurses and to provide foundational data for potential interventions.

The results revealed that infection control fatigue was significantly influenced by job stress, burnout, and positive psychological capital. The correlation and regression analyses confirmed that higher job stress and burnout contributed to increased infection control fatigue, whereas higher positive psychological capital served as a buffer.

Positive psychological capital was significantly higher among nurses aged 30–39 years and those working in tertiary general hospitals. This aligns with recent findings that suggest mid-career professionals often possess a balance of clinical experience, career motivation, and social stability, all contributing to psychological resilience. A recent study by Kim, et al. [26] emphasized that psychological resources such as hope, efficacy, and optimism can be strengthened through peer collaboration and structured feedback systems in high-acuity settings. Tertiary hospitals, which often provide stronger team dynamics and institutional support, may facilitate these factors more effectively than smaller hospitals.

Conversely, nurses in smaller general hospitals may experience higher role overload due to insufficient staffing and limited access to continuing education. This could lead to a decline in positive psychological resources. Lee and Park [27] found that nurses with limited autonomy and fewer opportunities for professional growth reported lower psychological capital and greater emotional exhaustion.

The mean positive psychological capital score in this study (M = 3.23, SD = 0.55) was lower than that of Lee [25] who reported a mean of 3.99. This gap may reflect pandemic-related emotional exhaustion, especially among emergency nurses dealing with constant exposure to high-risk infectious cases. Interventions such as psychological first aid, recognition systems, and tailored resilience training can mitigate this decline.

Job stress remained consistently high (M = 3.83, SD = 0.72) across all demographics, underscoring the intense and unpredictable nature of emergency care. Jang [11] and Choi [28] reported similar findings, attributing elevated stress to rapid turnover, risk of infection, and emotional labor. More recently, Zhang, et al. [29] highlighted the impact of prolonged PPE use and constant protocol changes as significant contributors to nurse stress during pandemic surges. Effective strategies should therefore include role clarification, rest-to-work ratio adjustments, and pre-crisis simulation training.

Burnout also varied significantly by facility type, with regional emergency centers reporting the highest levels. These centers, as frontline institutions, manage complex and high-severity cases, increasing cognitive and emotional load. The mean burnout score (M = 3.06, SD = 0.55) was higher than those in historical benchmarks, such as Pick [24]. High burnout has been associated with

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medication errors, absenteeism, and reduced teamwork. In a recent survey by World Health Organization [30] emergency nurses globally ranked burnout as the second most serious threat to clinical safety after infection risk. Interventions must therefore address systemic workload, enable supportive supervision, and promote meaningful rest periods.

Infection control fatigue was significantly related to age, especially among nurses in their 30s, who reported greater fatigue than those in their 20s. This is consistent with [31], who found that mid-career nurses bear more operational responsibility and family obligations, thereby experiencing higher physical and emotional exhaustion. The mean infection control fatigue score (M = 3.73, SD = 0.63) exceeded prior averages by Gu [3]; Jang [11] and Choi [28] suggesting that pandemic-induced strain continues to affect frontline nurses. Technological integration, simplified infection control protocols, and flexible scheduling are viable methods to alleviate this burden.

Collectively, the findings suggest that infection control fatigue is deeply intertwined with emotional and organizational stressors. Enhancing positive psychological capital offers a protective buffer, mitigating the impact of burnout and stress. According to Chen, et al. [32] promoting resilience through leadership feedback, reflective practice, and emotional intelligence training results in measurable improvements in nurse well-being and infection control performance.

Healthcare organizations and policymakers should prioritize structural interventions: maintaining consistent PPE supply, enabling rest breaks, offering stress debriefing sessions, and integrating well-being indicators into performance metrics. Psychological capital should be cultivated as a core competency in emergency settings.

In conclusion, reducing infection control fatigue among emergency room nurses requires a multifaceted approach targeting job stress, burnout, and psychological capital. A comprehensive framework combining personal coping strategies, organizational design, and policy-level protections is essential for sustainable frontline nursing performance.

5. Conclusions and Suggestions

This study identified job stress, burnout, and positive psychological capital as significant predictors of infection control fatigue among emergency room nurses. The regression model was statistically significant and explained approximately 58.9% of the variance in infection control fatigue. Job stress showed the strongest positive influence, followed by burnout, while positive psychological capital was negatively associated with fatigue, albeit with a smaller effect size.

These results emphasize the importance of addressing both occupational stress and psychological resilience to improve infection control performance. Interventions targeting job stress reduction and burnout prevention are essential, alongside initiatives to foster positive psychological capital. Such strategies can lead to lower fatigue levels, more consistent infection control practices, and better overall well-being among emergency room nurses.

In light of these findings, healthcare institutions should prioritize the development of supportive work environments, implement structured stress management programs, and offer resilience training to frontline nurses. Leadership support, organizational justice, and a culture of psychological safety may further promote adaptive coping and reduce chronic stress. By doing so, it is possible to enhance the sustainability and effectiveness of infection control efforts in high-risk emergency care settings.

It is also necessary to develop strategic education programs for nurses, focusing on infection control competencies, psychological coping skills, and team-based communication under pressure. Simulation-based learning, mindfulness-based stress reduction, and institutional wellness initiatives may serve as protective buffers. These multifaceted strategies can strengthen individual nurse capabilities while reinforcing institutional resilience during infectious disease outbreaks.

For policymakers, this study highlights the urgency of systemic reforms that go beyond individual-level training. Revisions to staffing models, infection control policy updates, and investment in emergency infrastructure are essential to protect the workforce. Institutions should adopt evidence-

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based frameworks for fatigue management and staff support, particularly in emergency and high-acuity environments.

These findings offer valuable insights for healthcare administrators, policymakers, and educators aiming to improve infection management and nurse retention in high-risk clinical environments.

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Transparency:

The authors confirm that the manuscript is an honest, accurate, and transparent account of the study; that no vital features of the study have been omitted; and that any discrepancies from the study as planned have been explained. This study followed all ethical practices during writing.

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