



Original article

Work stress and perceived organisational support on young Korean nurses' care for COVID-19 patients



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ABSTRACT

Background: Since the outbreak of COVID-19 worldwide, frontline nurses have faced tremendous stress. Younger nurses in their early-to-mid careers can be more exposed to burnout and work stress, and perceived organisational support can influence the quality of nursing care for vulnerable patients.

Aim: To identify the impact of younger nurses' work stress and perceived organisational support on their willingness to care for COVID-19 patients.

Methods: The cross-sectional secondary data analysis included 211 hospital nurses (<35 years) in South Korea with a mean age of 24.60 years ($SD=1.90$). Multiple logistic regression analysis was used to identify the factors influencing willingness to care.

Findings: Supplying personal protective equipment, training in the use of personal protective equipment, lower work stress, and positive perceptions of organisational support significantly increased early-career nurses' willingness to care. For mid-career nurses, being male and higher work stress significantly increased their willingness to care.

Discussion: Support, including COVID-19-related education or training, should be provided to reduce work stress arising from being exposed to infection or while providing care to critically ill patients, especially among early-career nurses. Support from nurse managers, senior staff, and colleagues could help younger nurses cope better with the challenges of COVID-19, thus increasing their willingness to care.

Conclusion: Perceived organisational support may facilitate early-career nurses' organisational commitment. Healthy work environments can relieve early-to-mid-career nurses' work stress, thus facilitating patient-centred care.

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Summary of relevance

Problem or issue

Little is known about the impact of younger nurses' work stress and perceived organisational support on their willingness to care for COVID-19 patients.

What is already known

Nurses at the frontline of caring for COVID-19 patients likely have higher work stress than doctors and other hospital staff. Perceived organisational support can reduce mental and physical fatigue among nurses.

What this paper adds

Higher work stress among younger Korean nurses disrupted their involvement in patient care during the COVID-19 pandemic. Support from nurse managers and experienced colleagues could help early-career nurses cope with challenges, increasing their willingness to care.

1. Introduction

Similar to many countries, the Korean healthcare system has experienced challenges during the COVID-19 pandemic (Heo, Jeong, Lee, & Seo, 2021), with a significant impact on healthcare institutions, requiring more frontline healthcare providers and increased work capacity (Liu et al., 2020). As burdens on overextended healthcare systems intensified and the pandemic prolonged, healthcare providers increasingly struggled because of high intensity demands and mental health issues, including depression and burnout (Kakemam, Chegini, Rouhi, Ahmadi, & Majidi, 2021; Lee, Jang, Jeong, Sok, & Kim, 2021; Wang et al., 2020).

Among frontline health professionals, nurses have the highest contact with patients (Wu et al., 2020). Unfortunately, nurse shortages and staffing shortfalls exist worldwide, largely owing to aging populations (Uthaman, Chua, & Ang, 2016). This problem is also prevalent in South Korea despite an increased number of newly graduated nurses (Hospital Nurses Association, 2020). The number of active nurses in South Korea is extremely low compared with other Organisation for Economic Co-operation and Development countries (Lee, 2019). As there are not enough nurses to provide care for patients, the ratio of nurses to patients is skewed (Kang & Shin, 2020), and COVID-19 has doubled the required number of nurses (K. Heo et al., 2021). Thus, the retention of nurses has become increasingly crucial in South Korea (Loerzel, Rice, Warshawsky, Kinser, & Matthews, 2021; Modaresnezhad, Andrews, Mesmer-Magnus, Viswesvaran, & Deshpande, 2020).

Work stress is a result of the conflict between work requirements or patients' needs and workers' abilities; it can cause decreased mental health and increased turnover intention or actual turnover among workers (Adekanmbi & Ukpere, 2020; Kuo, Yang, Hsu, Su, & Chen, 2020). Nurses who care for COVID-19 patients can experience serious distress, anxiety, and depression (Wang et al., 2020). Work-related stress during the COVID-19 pandemic predicts anxiety, depression, and burnout among healthcare providers (Lee et al., 2021). Therefore, nurses' work stress during the pandemic should be evaluated from the perspective of occupational health. Studies confirm a relationship between work stress, social support, and more work experience among nurses (Adekanmbi & Ukpere, 2020; Lee et al., 2021). Perceived organisational support refers to employees' perception that organisations acknowledge their contributions (Robaee, Atashzadeh-Shoorideh, Ashktorab, Baghestani, & Barkhordari-Sharifabad, 2018). When employees perceive organisational support, they are more committed to their duties and organisations; moreover, their turnover intention decreases (Sarfranz et al., 2019). Perceived organisational support can reduce workplace stressors and improve care for vulnerable

patients, especially those with COVID-19 (Zhang, Xu, Li, & Gong, 2021).

Compared to older nurses, younger nurses have less role clarity and poorer clinical decision-making confidence (Salminen & Miettinen, 2019). Early-career nurses—including newly graduated nurses—often feel inadequately prepared for their roles, increasing work stress and discouraging professional role adaptation (Brook, Aitken, Webb, MacLaren, & Salmon, 2019). Organisational support is crucial in the implementation of sustainable nurse retention strategies and the promotion of quality patient care (Van der Heijden, Brown Mahoney, & Xu, 2019). When caring for patients with COVID-19 in critical conditions, nurses need professional knowledge and skills of the highest level (Gan, Shi, Chair, Cao, & Wang, 2020). However, the uncertain nature of the virus and inadequate protection, such as shortages of personal protective equipment (PPE), may complicate COVID-19 care (Gan et al., 2020; Wu et al., 2020).

Therefore, work stress and perceived organisational support are likely to have affected younger nurses' care of vulnerable patients during the COVID-19 pandemic. However, topics such as work-related and organisational factors associated with organisational commitment and avoiding nursing shortages—especially in terms of nurses' work experience—have been inadequately explored, both in South Korea and globally. Therefore, the current study identifies the impact of work stress and perceived organisational support on the willingness to care for COVID-19 patients among early- and mid-career registered nurses.

2. Methods

2.1. Study design and participants

This secondary analysis used data were obtained using convenience sampling, between August and October 2020, from 232 nurses (Heo, Lee, & Jang, 2021) working in seven COVID-19 hospitals, as designated by the Korea Disease Control and Prevention Agency. The parent study (Y. Heo et al., 2021)'s inclusion and exclusion criteria were as below: "nurses with prior experience in providing care for patients confirmed or suspected to have COVID-19 were considered, while nurse managers who did not directly provide patient care and nurses with a clinical career of fewer than 6 months were excluded from the study". In this current study, data on 211 younger (≤ 35 years old) nurses (World Health Organization, 2021) were included for analysis, and that on 21 nurses (> 35 years old) were excluded.

Nurses with < 3 years of experience were classified as early-career nurses, while those with 3–10 years' experience were classified as mid-career nurses. The required sample size for logistic regression analysis was 97, which was calculated using G*Power version 3.1.9.2 by assuming two-tailed analyses, with a significance level of .05, statistical power of .90, effect size odds ratio=2.2 (Goshin, Sissoko, Stringer, Sufrin, & Byrnes, 2020), X para $\sigma=1$, and $Pr(Y=1|X=1) H_0=.7$. Thus, the sample size of 211 participants (early-career nurses, $n=99$; mid-career nurses, $n=112$) was deemed sufficient.

2.2. Measures

A questionnaire survey was administered to collect respondents' demographic (i.e., age, marital/relationship status, and educational attainment) and work-related characteristics (i.e., total clinical experience, current working unit, COVID-19 infection control education, training related to PPE, and sufficient PPE supply).

2.2.1. Work stress

In the parent study, to measure nurses' work stress, the Korean version of the Perceived Stress Scale was used, which has been validated for Korean hospital workers (Lee et al., 2012). This 10-item tool uses a five-point scale (0 = *not at all* to 4 = *very much so*), with scores ranging from 0 to 40. High scores indicate high levels of perceived stress. Cronbach's α for the Korean version (Lee et al., 2012) was .82 (.83~.89), and in this study it was .80 (.72~.81).

2.2.2. Perceived organisational support

For measuring perceived organisational support, a social support tool (Jeong, 2014) was used, with the cut-off score as the mean. This tool comprises nine items and three domains (co-worker, supervisor, and organisation in general). Construct validity results using confirmatory factor analysis were: $\chi^2/df = 2.71$, goodness of fit index = .89, root mean square error of approximation = .07, Tucker-Lewis index = .84, and comparative fit index = .92 (Jeong, 2014). The items are graded on a 5-point scale (1=*not at all* to 5=*very much so*), with scores ranging from 9 to 45, with higher scores indicating higher perceived organisational support. Cronbach's α was .87 (.85~.89) in Jeong (2014) and .80~.84 in this study.

2.2.3. Willingness to care for COVID-19 patients

As in Wu et al. (2020), a single item was used to measure nurses' willingness to care for COVID-19 patients: 'I am willing to participate in providing care as the nurse in charge of COVID-19 patients'. Answers were graded on a 7-point rating scale (1=*not at all* to 7=*very much so*). A score of 1–4 points (*not at all* to *moderate*) indicated an 'absence of willingness to care', and a score of 5–7 points indicated a 'willingness to care'.

2.3. Data analysis

All statistical analyses were conducted using IBM SPSS Statistics (version 26.0; Armonk, NY: IBM Corp). Demographic and work-related characteristics, work stress, perceived organisational support, and willingness to care were analysed using descriptive statistics. The Kolmogorov-Smirnov test was used to test for normality of distribution. Differences in willingness to care by demographic and work-related characteristics were analysed using independent *t*-tests, one-way analysis of variance, and chi-square tests. Logistic regression analysis was used to identify the factors influencing willingness to care. Participants were divided into early- and mid-career nurses. All variables tested in the univariate analysis were included in the regression analysis.

2.4. Ethical considerations

We obtained approval for secondary data analysis from the Institutional Review Board of Chung-Ang University (Approval number: 1041078-202104-HRSB-113-01). The parent study was approved by the Institutional Review Board of Eulji University (Approval number: EUN20-017). All participants provided informed consent in the parent study. The study adheres to the Strengthening the Reporting of Observational Studies in Epidemiology guidelines.

3. Results

3.1. Participants' demographic and work-related characteristics

Table 1 presents the participants' demographic and work-related characteristics and the differences in these characteristics between early- and mid-career nurse groups' age, marital/relationship status, and total clinical experience. There was a

significant difference in age, marital/relationship status, and total clinical experience between the two groups.

3.2. Comparison of major variables between early- and mid-career nurses

Table 2 shows comparisons between early- and mid-career nurses in terms of the major variables. Mean scores were used to distinguish between the two groups for perceived organisational support and work stress. The level of perceived organisational support differed between the two groups, with 66.7% ($n=66$) of early-career and 87.5% ($n=98$) of mid-career nurses reporting low perceived organisational support ($p<.001$). However, there were no significant differences concerning work stress and willingness to care for COVID-19 patients.

3.3. Willingness to care according to demographic and work-related characteristics

Table 3 shows comparisons between early- and mid-career nurses' willingness to care according to demographic and work-related characteristics. Early-career nurses showed differences in willingness to care based on their training related to PPE, sufficient PPE supply, work stress, and perceived organisational support. Among the participants who expressed willingness to care, 90.6% ($n=48$) had received PPE training, and 71.7% ($n=38$) had received sufficient PPE supply. Mid-career nurses showed differences in willingness to care depending on their marital/relationship status.

3.4. Logistic regression analysis for predictors of willingness to care

Logistic regression analysis was performed to determine the influence of work stress and perceived organisational support on willingness to care among early-to-mid-career nurses (Table 4). To control for gender, marital/relationship status, educational attainment, current working unit, COVID-19 infection control education, training related to PPE, and sufficient PPE supply, all variables were input together with work stress and perceived organisational support.

First, the logistic analysis of early-career nurses showed that the regression model was significant ($\chi^2=26.83$, $p=.001$). The variance inflation factor ranged within 1.03–1.26; as the value was <10.00 , the results confirmed no multicollinearity between the independent variables. The analysis results showed that work stress and perceived organisational support influenced willingness to care among early-career nurses. Moreover, the most significant individual influence was high perceived organisational support (mean ≥ 31 points), which increased willingness to care by 5.02 times (95% confidence interval [CI]: 1.64–15.34), followed by training related to PPE (4.44 times; 95% CI: 1.18–16.67), low work stress (3.43 times; 95% CI: 1.26–9.39), and sufficient PPE supply (2.70 times; 95% CI: 1.01–7.24; Table 4).

The regression model for willingness to care among mid-career nurses was also significant ($\chi^2=20.91$, $p=.013$). The variance inflation factor ranged within 1.03–1.26; as the value was <10.00 , the results confirmed no multicollinearity. The Hosmer-Lemeshow test results showed that the regression model had a good fit ($\chi^2=9.14$, $p=.330$). While the effect of perceived organisational support was not significant, work stress influenced willingness to care; high work stress increased willingness to care by 2.52 times. Among mid-career nurses, being a man increased willingness to care by 3.65 times (95% CI: 1.06–12.54).

Table 1
Participants' demographic and work-related characteristics (n=211).

Characteristic	Category	< 3 years(n=99)	≥ 3 years(n=112)	t/F or χ^2	p-value
		n (%)M±SD			
Age (year)		24.60±1.90	28.32±2.36	3.73	<.001
Gender	Women	80 (80.8)	94 (83.9)	0.35	.552
	Men	19 (19.2)	18 (16.1)		
Marital/relationship status	No	97 (98.0)	100 (89.3)	6.41	.011
	Yes	2 (2.0)	12 (10.7)		
Educational attainment	< Bachelor's degree	8 (8.1)	27 (24.1)	9.76	.002
	Bachelor's degree or higher	91 (91.9)	85 (75.9)		
Total clinical experience		1.43±0.69	5.71±2.34	4.27	<.001
Current working unit	ED	41 (41.4)	54 (48.2)	2.04	.564
	ICU	26 (26.3)	24 (21.4)		
	General ward	19 (19.2)	24 (21.4)		
	Dedicated COVID-19 ward	13 (13.1)	10 (9.0)		
COVID-19 infection control education	No	30 (30.3)	38 (33.9)	0.32	.574
	Yes	69 (69.7)	74 (66.1)		
Training related to PPE	No	17 (17.2)	16 (14.3)	0.33	.565
	Yes	82 (82.8)	96 (85.7)		
Sufficient PPE supply	No	40 (40.4)	50 (44.6)	0.38	.534
	Yes	59 (59.6)	62 (55.4)		

Abbreviations: M, mean; SD, standard deviation; ED, emergency department; ICU, intensive care unit; PPE, personal protective equipment; COVID-19: coronavirus disease 2019.

Table 2
Comparison of major variables between early- and mid-career nurses.

Characteristic	Category	< 3 years(n=99)	≥ 3 years(n=112)	χ^2	p-value
		n (%)			
Work stress ^a	High	39 (39.4)	59 (52.7)	3.73	.072
	Low	60 (60.6)	53 (47.3)		
Perceived organisational support ^a	High	33 (33.3)	14 (12.5)	13.17	<.001
	Low	66 (66.7)	98 (87.5)		
Willingness to care for COVID-19 patients	No	46 (46.5)	50 (44.6)	0.07	.791
	Yes	53 (53.5)	62 (55.4)		

Abbreviations: M, mean; SD, standard deviation; COVID-19: coronavirus disease of 2019.

^a cut off value: mean

Table 3
Willingness to care according to demographic and work-related characteristics of early- and mid-career nurses (n=211).

Characteristic	Category	Willingness to care for COVID-19 patients							
		< 3 years (n=99)		χ^2	p-value	≥ 3 years (n=112)		χ^2	p-value
		No (n=46) n (%)	Yes (n=53) n (%)			No (n=50) n (%)	Yes (n=62) n (%)		
Gender	Women	41 (89.1)	39 (73.6)	3.84	.050	45 (90.0)	49 (79.0)	2.47	.116
	Men	5 (10.9)	14 (26.4)			5 (10.0)	13 (21.0)		
Marital/relationship status	No	45 (97.8)	52 (98.1)	0.01	.919	48 (96.0)	52 (83.9)	4.26	.039
	Yes	1 (2.2)	1 (1.9)			2 (4.0)	10 (16.1)		
Educational attainment	College	4 (8.7)	4 (7.5)	0.04	.834	15 (30.0)	12 (19.4)	1.71	.190
	University or higher	42 (91.3)	49 (92.5)			35 (70.0)	50 (80.6)		
Current working unit	ED	20 (43.5)	21 (39.6)	4.04	.257	27 (54.0)	27 (43.5)	3.18	.364
	ICU	14 (30.4)	12 (22.6)			10 (20.0)	14 (22.6)		
	General ward	5 (10.9)	14 (26.4)			11 (22.0)	13 (21.0)		
	Dedicated COVID-19 ward	7 (15.2)	6 (11.4)			2 (4.0)	8 (12.9)		
COVID-19 infection control education	No	14 (30.4)	16 (30.2)	<0.01	.979	19 (38.0)	19 (30.6)	0.67	.414
	Yes	32 (69.6)	37 (69.8)			31 (62.0)	43 (69.4)		
Training related to PPE	No	12 (26.1)	5 (9.4)	4.80	.028	8 (16.0)	8 (12.9)	0.22	.642
	Yes	34 (73.9)	48 (90.6)			42 (84.0)	54 (87.1)		
Sufficient PPE supply	No	25 (54.3)	15 (28.3)	6.94	.008	25 (50.0)	25 (40.3)	1.05	.306
	Yes	21 (45.7)	38 (71.7)			25 (50.0)	37 (59.7)		
Work stress ^a	High	23 (50.0)	16 (30.2)	4.05	.063	23 (46.0)	36 (58.1)	1.62	.254
	Low	23 (50.0)	37 (69.8)			27 (54.0)	26 (41.9)		
Perceived organisational support ^a	High	9 (19.6)	24 (45.3)	7.33	.010	3 (6.0)	11 (17.7)	3.49	.085
	Low	37 (80.4)	29 (54.7)			47 (94.0)	51 (82.3)		

Abbreviations: ED, emergency department; ICU, intensive care unit; PPE, protective personal equipment; COVID-19: coronavirus disease of 2019.

^a cut off value: mean

Table 4
Factors influencing younger nurses' willingness to care for COVID-19 patients (n=211).

< 3 years (n=99)			≥3 years (n=112)		
Variables	AOR ² (95% CI)	p-value	Variables	AOR ² (95% CI)	p-value
Sufficient PPE supply			Gender		
No	1		Women	1	
Yes	2.70 (1.01–7.24)	.049	Men	3.65 (1.06–12.54)	.040
Training related to PPE			Work stress		
No	1		Yes	1	
Yes	4.44 (1.18–16.67)	.027	No	0.40 (0.17–0.94)	.036
Work stress ^a					
High	1				
Low	3.43 (1.26–9.39)	.016			
Perceived organisational support ^a					
Low	1				
High	5.02 (1.64–15.34)	.005			
$\chi^2=26.83, p=.001$			$\chi^2=20.91, p=.013$		
-2 Log likelihood $\chi^2=109.92$, Cox & Snell $R^2=.24$,			-2 Log likelihood $\chi^2=133.07$, Cox & Snell $R^2=.17$,		
Nagelkerke $R^2=.32$			Nagelkerke $R^2=.23$		
Hosmer–Lemeshow $\chi^2=8.75, p=.364$			Hosmer–Lemeshow $\chi^2=9.14, p=.330$		

Abbreviations: AOR, adjusted odds ratio; CI, confidence interval; PPE, protective personal equipment; COVID-19: coronavirus disease of 2019.
Note. Adjusted variables: gender, marital/relationship status, educational attainment, current working unit, COVID-19 infection control education, training related to PPE, sufficient PPE supply, work stress, and perceived organisational support.
^a cut off value: mean

4. Discussion

This study analysed the influence of work stress and perceived organisational support on the willingness to care for COVID-19 patients in younger and less experienced Korean registered nurses. Logistic regression analysis among early-career nurses showed that lower work stress, higher perceived organisational support, and training related to PPE significantly increased the likelihood of willingness to care.

Nurses have higher work stress levels than doctors and other hospital staff who treat COVID-19 patients (Kuo et al., 2020). The main stressors for nurses were fear of social isolation, discomfort due to protective equipment, and the burden of patient care (Kuo et al., 2020). Under such circumstances, early-career nurses may lack awareness or confidence about their roles (Salminen & Miettinen, 2019). Moreover, they may experience work stress owing to a perceived lack of adequate preparation (Brook et al., 2019). Higher work stress leads to increased burnout and turnover (Fessell & Cherniss, 2020), which can reduce the quality of patient care and safety (Van der Heijden et al., 2019). The present study found that willingness to care decreased as work stress increased, which is in line with the findings of previous studies. Therefore, appropriate measures to manage work stress among early-career nurses must be formulated.

Perceived organisational support can reduce mental, physical, and emotional fatigue among nurses (Zhang et al., 2021) and is closely associated with work stress and burnout (Adekanmbi & Ukpere, 2020). Among newly graduated nurses, transitional support is the foundation of success (Hussein, Everett, Ramjan, Hu, & Salamonson, 2017). Further, organisational support is crucial for early-career nurses to develop willingness to care for COVID-19 patients. Moreover, perceived organisational support has been found to be strongly associated with perceived stress in younger nurses (Khrais, Higazee, Khalil, & Wahab, 2018). Therefore, support from nurse managers, senior staff, and colleagues could help early-career nurses cope with the challenges of COVID-19, thus increasing their willingness to care.

In comparing early- and mid-career nurses, the results revealed differences in willingness to care among early-career nurses based on their training related to PPE and sufficient PPE supply. This may indicate that early-career nurses with limited experience lack confidence in their nursing competency (Salminen & Miettinen, 2019). However, they may develop a greater willingness to

care for COVID-19 patients upon receiving PPE training. While adequate training and learning influenced willingness to care among Chinese nurses (Gan et al., 2020), the only predictor of willingness to care among Australian intensive care unit nurses was timely communication from managers (Lord, Loveday, Moxham, & Fernandez, 2021). Thus, timely education and information delivery is crucial to increase nurses' willingness to care. In particular, providing sufficient PPE to nurses caring for COVID-19 patients is key to ensuring the safety of patients and nurses, and nurse managers should be vigilant in this matter and in upskilling nurses (Hofmeyer & Taylor, 2021).

Unlike early-career nurses, mid-career nurses showed a higher likelihood of willingness to care for COVID-19 patients when work stress was high than when it was low. However, perceived organisational support did not have an influence on their willingness to care for COVID-19 patients. As described above, several studies have confirmed the negative impact of high work stress on nursing and patient outcomes (Fessell & Cherniss, 2020; Van der Heijden et al., 2019). By contrast, the current results unexpectedly showed that willingness to care increased with higher work stress. While the causes of work stress among nurses were not analysed in detail, several factors may play a part—even during the COVID-19 pandemic (Mo et al., 2020). Moreover, for mid-career nurses, other factors, not directly associated with caring for COVID-19 patients, may have contributed to increased work stress. Therefore, additional studies with several work stress-related factors are needed to reexamine the relationship between work stress and willingness to care for COVID-19 patients among mid-career nurses.

The results of the current study showed that perceived organisational support was a key factor in increasing willingness to care for COVID-19 patients among early-career nurses. However, perceived organisational support was not significant among mid-career nurses. This difference may be because, in the analysis of differences between the two groups, the percentage of participants with low perceived organisational support was significantly higher in the mid-career nurse group. As mid-career nurses had lower perceived organisational support, there was no significant association with their willingness to care for COVID-19 patients, unlike early-career nurses. However, lower perceived organisational support could cause higher perceived stress (Khrais et al., 2018) and decreased intention to stay (Adekanmbi, & Ukpere, 2020). Therefore, organisational and leadership roles are needed to promote

a positive perception of organisational support among mid-career nurses.

5. Implications

The present study confirmed that work stress should be managed among early- and mid-career nurses to increase their willingness to care for COVID-19 patients and provide safer patient care; organisational support plays an important role in this endeavour. Thus, support—including COVID-19-related education or training—should be provided to reduce work stress arising from being exposed to infection or providing care to critical patients, especially among early-career nurses. Furthermore, sufficient PPE supply was essential in increasing nurses' willingness to care; therefore, nurse managers must ensure that nurses can access adequate PPE, support strategies, and resources to practice safely. A multidimensional analysis of the various factors influencing nurses' work stress and perceived organisational support through follow-up studies could facilitate the development of specific strategies to foster a healthy and safe work environment.

6. Limitations

This study has several limitations. First, as a secondary data analysis study, a limited number of variables could be selected, measured, and controlled. Further studies are needed to identify the relationships between variables. Second, cross-sectional studies are limited in their ability to explain causality between the major variables. Longitudinal studies are needed to examine the influence of work stress and perceived organisational support on nurses—not only on their willingness to care but also on other long-term nursing outcomes, such as turnover intention. Third, there was potential recall bias as the data were collected using self-reports. Finally, measures of perceived organisational support are limited in their ability to assess actual levels of organisational support. Although a nurses' perceptions of organisational support are important, organisational support should be assessed with standards that allow for objective comparison. This would enable analysing the influence of actual organisational support on nurses' willingness to care and intention to stay. Despite these limitations, this study is meaningful because it classified participants into early- and mid-career nurses to identify the influence of work stress and perceived organisational support on their willingness to care for COVID-19 patients. The findings provide evidence for the establishment of effective measures for managing work stress and enhancing organisational support for nurses during crises such as the COVID-19 pandemic.

7. Conclusions

Work stress significantly decreased willingness to care for COVID-19 patients among early-career nurses, whereas perceived organisational support significantly increased willingness to care among them. Unexpectedly, work stress significantly increased willingness to care among mid-career nurses. Therefore, further research is needed to determine the relationship between work stress and willingness to care for COVID-19 patients. It is important to create work environments with work and psychological support from leaders and colleagues at the organisational level.

Data availability statement

The data presented in this study are available on request from the corresponding author and with permission of the Institutional Review Board of Chung-Ang University.

Author contribution statement

All authors have read and agreed to the published version of the manuscript.

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Ethical approval

We obtained approval for secondary data analysis from the Institutional Review Board of Chung-Ang University (Approval Number: 1041078-202104-HRSB-113-01). The parent study was approved by the Institutional Review Board at Eulji University (Approval Number: EUN20-017). All study participants provided informed consent in the parent study.

Conflict of interest

The authors have no conflict of interest to declare.

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References

- Adekanmbi, F. P., & Ukpere, W. (2020). Work stress, perceived organizational support, demographics, and burnout of registered nurses in Nigeria. *Psychology and Education Journal*, 57(8), 1136–1145. <https://doi.org/10.1016/j.ijnurstu.2015.06.017>.
- Brook, J., Aitken, L., Webb, R., MacLaren, J., & Salmon, D. (2019). Characteristics of successful interventions to reduce turnover and increase retention of early career nurses: a systematic review. *International Journal of Nursing Studies*, 91, 47–59. <https://doi.org/10.1016/j.ijnurstu.2018.11.003>.
- Fessell, D., & Cherniss, C. (2020). Coronavirus disease 2019 (COVID-19) and beyond: Micropractices for burnout prevention and emotional wellness. *Journal of the American College of Radiology*, 17(6), 746–748. <https://doi.org/10.1016/j.jacr.2020.03.013>.
- Gan, X., Shi, Z., Chair, S. Y., Cao, X., & Wang, Q. (2020). Willingness of Chinese nurses to practice in Hubei combating the coronavirus disease 2019 epidemic: a cross-sectional study. *Journal of Advanced Nursing*, 76(8), 2137–2150. <https://doi.org/10.1111/jan.14434>.
- Goshin, L. S., Sissoko, D. R. G., Stringer, K. L., Sufrin, C., & Byrnes, L. (2020). Stigma and US nurses' intentions to provide the standard of maternal care to incarcerated women. 2017. *American Journal of Public Health*, 110(S1), S93–S99. <https://doi.org/10.2105/AJPH.2019.305408>.
- Heo, K., Jeong, K., Lee, D., & Seo, Y. (2021). A critical juncture in universal health-care: Insights from South Korea's COVID-19 experience for the United Kingdom to consider. *Humanities and Social Sciences Communications*, 8(1) Article 57. <https://doi.org/10.1057/s41599-021-00731-y>.
- Heo, Y., Lee, M., & Jang, S. J. (2021). Intentions of frontline nurses regarding COVID-19 patient care: A cross-sectional study in Korea. *Journal of Nursing Management*, 29(6), 1880–1888. <https://doi.org/10.1111/jonm.13333>.
- Hofmeyer, A., & Taylor, R. (2021). Strategies and resources for nurse leaders to use to lead with empathy and prudence so they understand and address sources of anxiety among nurses practising in the era of COVID-19. *Journal of Clinical Nursing*, 30(1–2), 298–305. <https://doi.org/10.1111/jocn.15520>.
- Hospital Nurses Association. (2020). 2019 survey on hospital nurse staffing. Hospital Nurses Association. Available from: <https://khna.or.kr/home/pds/utilities.php> 31, July, 2022
- Hussein, R., Everett, B., Ramjan, L. M., Hu, W., & Salamonsen, Y. (2017). New graduate nurses' experiences in a clinical specialty: a follow up study of new-comer perceptions of transitional support. *BMC Nursing*, 42, 16 Article. <https://doi.org/10.1186/s12912-017-0236-0>.
- Jeong, C. H. (2014). A study on the effect emotional labor on the job stress and job burnout of social work civil servant of SMG. Focused on regulation effect of social support [Doctoral dissertation]. Seoul: University of Seoul.
- Kakemam, E., Chegini, Z., Rouhi, A., Ahmadi, F., & Majidi, S. (2021). Burnout and its relationship to self-reported quality of patient care and adverse events during COVID-19: a cross-sectional online survey among nurses. *Journal of Nursing Management*, 29(7), 1974–1982. <https://doi.org/10.1111/jonm.13359>.
- Kang, Y., & Shin, K. R. (2020). COVID-19: Korean nurses' experiences and ongoing tasks for the pandemic's second wave. *International Nursing Review*, 67(4), 445–449. <https://doi.org/10.1111/inr.12644>.

- Khrais, H., Higazee, M. Z. A., Khalil, M., & Wahab, S. D. A. (2018). Impact of organizational support on nursing job stressors: a comparative study. *Health Science Journal*, 12(4) Article 582. <https://doi.org/10.21767/1791-809X.1000582>.
- Kuo, F. L., Yang, P. H., Hsu, H. T., Su, C. Y., Chen, C. H., et al., (2020). Survey on perceived work stress and its influencing factors among hospital staff during the COVID-19 pandemic in Taiwan. *Kaohsiung Journal of Medical Sciences*, 36(11), 944–952. <https://doi.org/10.1002/kjm2.12294>.
- Lee, E. (2019). Why newly graduated nurses in South Korea leave their first job in a short time? A survival analysis. *Human Resources for Health*, 17(1) Article 61. <https://doi.org/10.1186/s12960-019-0397-x>.
- Lee, H. Y., Jang, M. H., Jeong, Y. M., Sok, S. R., & Kim, A. S. (2021). Mediating effects of anger expression in the relationship of work stress with burnout among hospital nurses depending on career experience. *Journal of Nursing Scholarship*, 53(2), 227–236. <https://doi.org/10.1111/jnu.12627>.
- Lee, J. H., Shin, C. M., Ko, Y. H., Im, J. H., Cho, S. H., Kim, S. H., et al., (2012). The reliability and validity studies of the Korean version of the Perceived Stress Scale. *Korean Journal of Psychosomatic Medicine*, 20(2), 127–134.
- Liu, Q., Luo, D., Haase, J. E., Guo, Q., Wang, X. Q., Liu, S., et al., (2020). The experiences of health-care providers during the COVID-19 crisis in China: a qualitative study. *The Lancet Global Health*, 8(6), e790–e798. [https://doi.org/10.1016/S2214-109X\(20\)30204-7](https://doi.org/10.1016/S2214-109X(20)30204-7).
- Loerzel, V., Rice, M., Warshawsky, N., Kinser, P. A., & Matthews, E. E. (2021). Areas of satisfaction and challenges to success of mid-career nurse scientists in academia. *Nursing Outlook*, 69(5), 805–814 Advance online publication. <https://doi.org/10.1016/j.outlook.2021.03.011>.
- Lord, H., Loveday, C., Moxham, L., & Fernandez, R. (2021). Effective communication is key to intensive care nurses' willingness to provide nursing care amidst the COVID-19 pandemic. *Intensive and Critical Care Nursing*, 62, Article 102946. <https://doi.org/10.1016/j.iccn.2020.102946>.
- Mo, Y., Deng, L., Zhang, L., Lang, Q., Liao, C., Wang, N., et al., (2020). Work stress among Chinese nurses to support Wuhan in fighting against COVID-19 epidemic. *Journal of Nursing Management*, 28(5), 1002–1009. <https://doi.org/10.1111/jonm.13014>.
- Modaresnezhad, M., Andrews, M. C., Mesmer-Magnus, J., Viswesvaran, C., & Deshpande, S. (2020). Anxiety, job satisfaction, supervisor support and turnover intentions of mid-career nurses: a structural equation model analysis. *Journal of Nursing Management*, 29(5), 931–942. <https://doi.org/10.1111/jonm.13229>.
- Robaee, N., Atashzadeh-Shoorideh, F., Ashktorab, T., Baghestani, A., & Barkhordari-Sharifabad, M. (2018). Perceived organizational support and moral distress among nurses. *BMC Nursing*, 2, 17. <https://doi.org/10.1186/s12912-017-0270-y>.
- Salminen, H., & Miettinen, M. (2019). The role of perceived development opportunities on affective organizational commitment of older and younger nurses. *International Studies of Management and Organization*, 49(1), 63–78. <https://doi.org/10.1080/00208825.2019.1565094>.
- Sarfraz, M., Qun, W., Sarwar, A., Abdullah, M. I., Imran, M. K., & Shafique, I. (2019). Mitigating effect of perceived organizational support on stress in the presence of workplace ostracism in the Pakistani nursing sector. *Psychology Research and Behavior Management*, 12, 839–849. <https://doi.org/10.2147/PRBM.S210794>.
- Uthaman, T., Chua, T. L., & Ang, S. Y. (2016). Older nurses: a literature review on challenges, factors in early retirement and workforce retention. In *Proceedings of Singapore Healthcare*: 25 (pp. 50–55). <https://doi.org/10.1177/2010105815610138>.
- Van der Heijden, B., Brown Mahoney, C., & Xu, Y. (2019). Impact of job demands and resources on nurses' burnout and occupational turnover intention towards an age-moderated mediation model for the nursing profession. *International Journal of Environmental Research and Public Health*, 16(11) Article 2011. <https://doi.org/10.3390/ijerph16112011>.
- Wang, H., Liu, Y., Hu, K., Zhang, M., Du, M., Huang, H., & Yue, X. (2020). Healthcare workers' stress when caring for COVID-19 patients: an altruistic perspective. *Nursing Ethics*, 27(7), 1490–1500. <https://doi.org/10.1177/0969733020934146>.
- World Health Organization. (2021). State of the world's nursing report—2020: investing in education, jobs and leadership. Available from: <https://www.who.int/publications/i/item/9789240003279> 31, July, 2022
- Wu, B., Zhao, Y., Xu, D., Wang, Y., Niu, N., Zhang, M., et al., (2020). Factors associated with nurses' willingness to participate in care of patients with COVID-19: a survey in China. *Journal of Nursing Management*, 28(7), 1704–1712. <https://doi.org/10.1111/jonm.13126>.
- Zhang, N., Xu, D., Li, J., & Gong, Z. (2021). Effect of perceived organizational support on fatigue of Chinese nurses during the COVID-19 pandemic: resilience as a mediator. *International Journal of Mental Health Promotion*, 23(2), 243–254. <https://doi.org/10.32604/IJMHP.2021.015487>.