


# Moderating Roles of Resilience and Social Support on Psychiatric and Practice Outcomes in Nurses Working During the COVID-19 Pandemic

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## Abstract

**Introduction:** Staff and equipment shortages and an easily transmissible virus make working in the COVID-19 pandemic demanding physically and psychologically. Nurses on the frontlines are particularly vulnerable to the adversity of working under these conditions, particularly with regard to mental health. Thus, understanding risk and protective factors for this vulnerable and essential group is critical for identifying potential targets of interventions. We had two aims for the current study: (a) to examine work functioning and symptoms of depression, anxiety, and posttraumatic stress (PTSD) among nurses who did and did not care for patients with COVID-19; and (b) to determine if resilience and social support moderate these relationships.

**Methods:** For three weeks in July 2020, nurses across the United States were invited to participate in an online survey collecting data on demographics, resilience, social support, and screening measures of depression, PTSD, anxiety, and distracted practice. Data were analyzed using descriptive statistics and hierarchical regression for each outcome measure.

**Conclusions:** Our findings support a growing body of research reporting that nurses are experiencing mental health sequelae during the COVID-19 pandemic, especially those providing direct care to patients with the virus. We found that compared to nurses who did not care for patients with COVID-19, those who did reported increased symptoms of PTSD, depression, and anxiety. A novel contribution is our finding that nurses providing direct COVID-19 care also experienced increased levels of distracted practice, a behavioral measure of distraction linking to a potential impact on patient care. We also found that resilience and social support acted as moderators of some of these relationships. Fostering resilience and social support may help buffer the effects of providing care to patients with COVID-19 and could potentially decrease nurse vulnerability to developing psychological symptoms and impairment on the job.

## Keywords

COVID-19, nurses, pandemic, depression, posttraumatic stress disorder, anxiety, resilience, social support

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The novel coronavirus disease 2019 (COVID-19) initiated a worldwide health crisis in December 2019. The virus is characterized by rapid and effective transmission, with the World Health Organization declaring the outbreak a pandemic within four months (Li et al., 2020; Wang et al., 2020). Almost one year later, global infections and deaths have reached 91 million and 2 million, respectively (WHO, 2021). Countries across the globe

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face a public health crisis that extends across health, social, and economic domains.

Healthcare providers are particularly vulnerable to the pandemic's effects, facing unrelenting challenges while providing services essential to managing the COVID-19 pandemic. There are critical shortages of staff, hospital beds, testing, and medical supplies, including personal protective equipment (PPE) (Centers for Disease Control and Prevention, 2021; Cohen et al., 2020; WHO, 2021). Demands on time and effort remain elevated as medical facilities encounter a persistent high volume of sick patients (COVID-NET, 2020). Nurses constitute the majority of healthcare providers and play a unique role in treating patients in the pandemic in that they directly and intensively care for patients (Smiley et al., 2018). During the COVID-19 pandemic, their scope of practice has expanded to include triaging suspected cases, providing wraparound services, standing in for relatives unable to enter medical settings, deploying to areas outside of their expertise, and working long hours (Jackson et al., 2020, Jansson et al., 2020).

Such extraordinary events and stressful work conditions place healthcare workers at risk for developing adverse psychological outcomes. Medical providers working during the pandemic are distressed, endorsing elevated symptoms of anxiety, depression, insomnia, and overall psychological problems (Cullen et al., 2020; Que et al., 2020). Nurses, in particular, are at higher risk for worsened psychological outcomes (Vizheh et al., 2020). They report worry, pressure, exhaustion, trauma, and isolation associated with their work during COVID-19 (Hu et al., 2020). Fears of becoming infected or unknowingly infecting others are prominent and interfering and exist in the context of real threat to their lives and those of their colleagues (C.-Y. Liu et al., 2020; Mo et al., 2020). Accordingly, COVID-19 frontline healthcare workers experience higher symptoms of anxiety, depression, exhaustion, stress, sleep problems, and posttraumatic stress disorder symptoms than those working in lower-risk settings (Lai et al., 2020; Li et al., 2020; C.-Y. Liu et al., 2020; Tan et al., 2020). These findings are consistent with outcomes from the 2003 SARS pandemic in which 90% of healthcare providers in high-risk settings were found to experience psychological symptoms, some of which persisted after several years (Chua et al., 2004; X. Liu et al., 2012; Maunder et al., 2006).

Providing direct care to patients with COVID-19 adds additional adversity to the stress of working in healthcare during the pandemic. As most of the energy and resources are directed towards alleviating physical morbidity, psychological wellbeing is often neglected, and nurses' mental health and ability to provide quality care are impacted (Cheung et al., 2021; Shanafelt et al., 2020; Xiao et al., 2020). Little is known about

the impact of COVID-related workplace conditions on behavioral outcomes impacting nursing care. No known studies explore how COVID-related adversity affects the quality of nursing practice. Past studies examining the impact of occupation stress on nurses' caring behaviors found a positive correlation between stress and impaired functioning at work (Sarafis et al., 2016). This dynamic may add to suboptimal patient care and reduced safety in clinical practice (Aiken et al., 2002).

Not everyone with stress exposure experiences psychopathology or disruption in functioning, underscoring the significance of identifying factors that buffer the effects of these conditions. Resilience may help nurses and other providers more adaptively and effectively tolerate the stress caused by the pandemic (Beasley et al., 2003; Fletcher & Sarkar, 2013). Resilience is defined as the ability to adapt positively in the face of adversity (Fletcher & Sarkar, 2013). Possessing resilience is thought to enable nurses to adapt to workplace stressors, avoid psychological sequela, and continue to provide safe patient care (Cooper et al., 2020). A robust body of literature supports that higher resilience levels protect against adverse effects of stress exposure, including in previous virus outbreaks (Marjanovic et al., 2007). Limited studies examine healthcare providers' psychological resilience during the current pandemic; findings indicate that higher resilience levels were positively associated with increased sleep, positive affective state, and overall life satisfaction (Bozdağ & Ergün, 2020).

Social support drawn from important others also protects against the development of stress-associated psychopathology (Southwick et al., 2005). This factor may be particularly salient as fears of COVID-19 transmission have isolated nurses from support providers (Lorenzo & Carrisi, 2020). Social support is associated with lower anxiety and stress symptoms in providers treated with COVID-19 (Bihlmaier & Schlarb, 2016; Xiao et al., 2020). This finding is consistent with a broader literature that indicates social support is one of the most crucial protective factors against developing psychopathology in nurses (Albar Marín & García-Ramírez, 2005; Sayed et al., 2015).

The COVID-19 pandemic is poised to significantly impact nurses' mental health and work behaviors, particularly for nurses providing direct care to patients with the virus. Influences of resilience and social support on nurses' psychiatric and work outcomes following exposure to COVID-19 pandemic working conditions are largely unknown. The purpose of this article is to examine symptoms of depression, anxiety, and posttraumatic stress disorder and work functioning among nurses and to determine if resilience and social support moderate these relationships.

## Methods

### Study Design

A descriptive correlational research design was used to describe the relationships among the variables of interest in nurses working during the COVID-19 pandemic. Data were collected using an online survey distributed to nurses throughout the United States.

### Participants

Nurses were recruited by sharing the survey link on social media and posting the link on the American Association of Critical Care Nurses *Participate in Research Studies* webpage. A total of 312 nurses opened the online survey, 240 began the survey but did

not complete any of the scales, and 177 nurses had complete data (see Table 1 for descriptive statistics).

### Measures

In addition to answering demographic questions, participants completed several scales screening for symptoms of depression, posttraumatic stress disorder, anxiety, and distracted practice. Participants were also asked if they had access to adequate personal protective equipment if they tested positive for COVID-19 and cared for patients with confirmed COVID-19 (these variables were coded 1 = yes, 2 = no).

Depressive symptomatology was measured using the 9-item Patient Health Questionnaire (PHQ-9; Kroenke et al., 2001). This scale asks participants how often they experienced nine symptoms of depression in the previous

**Table 1.** Descriptive Statistics.

Variable	Cared for patients with COVID-19			
	Yes		No	
	M	SD	M	SD
Age	36.91	11.25	38.85	13.49
Years of nursing experience***	11.57	10.76	20.09	14.23
Hours worked per week*	38.44	8.53	34.19	10.80
PTSD symptoms***	2.48	0.85	1.91	0.70
Depressive symptoms*	1.10	0.73	0.77	0.61
Anxiety*	8.55	5.23	6.50	5.30
Distracted practice**	1.76	0.69	1.30	0.67
Resilience	3.52	0.78	3.46	0.84
Social Support	5.41	1.33	5.60	1.22
Variable	<i>n</i>	%	<i>n</i>	%
Gender				
Male	8	5.5	1	5.1
Female	137	94.5	31	94.9
Race				
White	135	93.1	31	96.9
Non-White	10	90.9	1	3.1
Ethnicity				
Mexican, Hispanic, or Latino	9	6.2	0	0
Not Mexican, Hispanic, or Latino	136	93.8	32	100
Nurse education*				
HS Diploma	3	2.1	3	9.4
Associate's	13	9.0	4	12.5
Bachelor's	106	73.1	15	46.9
Master's	20	13.8	7	21.9
Doctorate	3	2.1	3	9.4
Had access to adequate PPE				
Yes	90	62.1	18	56.3
No	55	37.9	14	43.8
Tested positive for COVID-19				
Yes	12	8.3	2	6.3
No	133	91.7	30	93.8

Note. \*\*\*,\*\*,\* denotes significant differences between nurses who reported caring for patients with COVID-19 versus those who did not at  $p < .05$ ,  $p < .01$ , and  $p < .001$ , respectively.

two weeks (0 = not at all to 3 = nearly every day). Responses were averaged across the nine items, and higher scores reflect increased depressive symptomatology. The PHQ-9 is a widely-used and reliable measure for depression with a reported Cronbach alpha of .89 (Kroenke et al., 2001; Letvak et al., 2012).

Symptoms of posttraumatic stress disorder were measured with the PTSD Checklist for DSM-5-Civilian Version (PCL-C; Conybeare et al., 2012; Norris & Hamblen, 2003). This 17-item scale asks participants to rate how bothered they were by problems such as “repeated, disturbing dreams of a stressful experience” or “being super-alert or watchful or on guard” on a scale of 1 (not at all) to 5 (quite a bit). Responses were averaged, and scores can range from 1 to 5, with higher scores reflecting more symptoms. The PCL scales and subscales have demonstrated reliability in a sample of healthcare workers, including nurses. Cronbach’s alpha coefficients in this sample ranged from 0.85 to 0.94 (Tang et al., 2017).

Distracted practice was measured with a 16-item scale was developed to assess how much nurses are distracted in their workspace (DPS; L. D’Esmond et al., 2020). Example items include “I am rushed to accomplish work-related tasks” and “I think my team members’ behaviors are a distraction.” Participants respond on a 0 (none of the time) to 4 (all of the time) scale, and responses are averaged, with higher scores reflecting more distraction. The DPS was developed for use with nurses and other healthcare workers and has demonstrated excellent reliability (Cronbach’s alpha = 0.91) in this population (L. K. D’Esmond et al., 2021).

The 7-item Generalized Anxiety Scale (GAD-7; Spitzer et al., 2006) was used to assess anxiety. Participants were asked how often they were bothered by problems over the last two weeks (e.g., “how often have you felt nervous, anxious, or on edge?”). Responses to these questions ranged from 0 (not at all) to 3 (nearly every day). The scores for each question were then summed together to form a score ranging from 0-21. The GAD-7 is a widely-accepted, reliable, and valid measure of anxiety that has been used in several populations in research related to the COVID-19 pandemic (Kellogg et al., 2018; Pappa et al., 2020).

Resilience was measured using the 6-item Brief Resilience Scale (BRS; Smith et al., 2008). Participants respond to items such as “I tend to bounce back quickly after hard times” on a 1 (strongly disagree) to 5 (strongly agree) scale. Scores on the items were averaged, with higher scores indicating more resilience. The 6-item BRS has shown good reliability (Cronbach’s alpha = 0.71), and has been used in nurses and healthcare workers (Fung, 2020; Kemper et al., 2015).

Social support was measured using the Multidimensional Scale of Perceived Social Support

(Zimet et al., 1990). This scale includes 12 items scored on a 1 (very strongly agree) to 7 (very strongly agree). The scale assesses perceived support from family, friends, and significant others. Items were averaged; higher scores indicate more perceived support. This scale and subscales have demonstrated reliability in a sample of nurses (Cronbach’s alphas > .90) (Tsilika et al., 2019).

## Analysis

The analyses involved two steps. First, we conducted preliminary analyses, including calculating descriptive statistics and examining group differences between nurses who treated patients with confirmed COVID-19 and those who have not. The second step of the analyses included a series of hierarchical multiple regressions, one for each outcome, that included education, years worked as a nurse, the average number of hours worked, access to adequate PPP, past COVID-19 diagnosis (step 1), work with patients with COVID-19, resilience, social support (step 2), and the interactions of work with patients with COVID-19 by resilience and work with patients with COVID-19 by social support (step 3). Hierarchical multiple regressions allow for the simultaneous examination of how several predictors are related to the outcome variable while also considering how the predictors are related to one another. In addition, this approach estimates the associations among study variables while controlling for predictors in earlier steps.

## Results

### Preliminary Analyses

Descriptive statistics are presented in Table 1. One of our objectives of this study was to examine differences between nurses who treated patients with COVID-19 and those who did not. To this end, univariate analyses compared these groups on several outcome variables. Concerning work-related differences, our findings suggest that compared with nurses who did not treat patients with COVID-19, nurses who did treat these patients tended to work more hours and worked as a nurse for fewer years. In terms of our dependent variables, we found that nurses who treated patients with COVID-19 scored higher in DP (distracted practice), the PCL-C (PTSD symptomatology), PHQ scores (depressive symptomatology), and the GAD7 (anxiety). There were no differences in social support or resilience.

### Regression Analyses

Our study also aimed to determine if resilience and social support moderate the relationships between treating patients with COVID-19 and symptoms of depression,

anxiety, and post-traumatic stress disorder and distracted practice. Hierarchical regression was performed for each of the primary outcome measures (DP, PCL-C, GAD7, and PHQ). The first step in the regressions included the average number of hours worked per week, number of years as a nurse, access to PPE, highest level of education, and if the respondent has been diagnosed with COVID-19. The second step added social support, resilience, and if the respondent cared for patients with confirmed COVID-19. The final step included the interaction terms of social support by treating patients with COVID-19 and resilience by treating patients with COVID-19. Results of the regressions are presented in Table 2.

For scores on the PHQ, the first step of the regression accounted for 7.6% of the variance,  $F(5, 171) = 2.83$ ,  $p = .02$ . The second step accounted for an additional 31.2% of the variance,  $F(3, 168) = 28.66$ ,  $p < .00$ . The third step with the interaction terms accounted for an additional 16.2% of the variance,  $F(2, 166) = 29.95$ ,  $p < .00$ . In total, the model accounted for 52.3% of the variance in PHQ scores,  $F(10, 166) = 20.34$ ,  $p < .00$ . Regarding specific predictors, we found that the average number of hours worked and working with patients with COVID-19 were related to higher scores on the PHQ and higher levels of social support were related to lower scores. In addition, there was a significant interaction between treating patients with COVID-19 and social support. Follow-up tests suggested that negative relationships between social support and PHQ scores were stronger among nurses who treated patients with COVID-19 than those who did not. In other words, the difference in PHQ scores between the groups tended to decrease as social support increased.

For scores on the PCL-C, the first step of the regression accounted for 8.7% of the variance,  $F(5, 171) = 3.28$ ,  $p = .01$ . The second step accounted for an additional 23.4% of the variance,  $F(3, 168) = 19.47$ ,  $p < .00$ . The third step with the interaction terms accounted for an additional 3.5% of the variance,  $F(2, 167) = 4.53$ ,  $p = .01$ . In total, the model accounted for 31.8% of the variance in PHQ scores,  $F(10, 166) = 9.26$ ,  $p < .00$ . With regard to specific predictors, we found that education and resilience were negatively related to scores on the PCL-C, while average number of hours worked and working with patients with COVID-19 were related to higher scores. In addition, there was a significant interaction between treating patients with COVID-19 and resilience. Follow-up tests suggested that a negative relationship between resilience and PCL-C scores was stronger among nurses who treated patients with COVID-19 than those who did not. In other words, the difference in PCL-C scores between the groups tended to decrease as resilience increased.

For scores on the distracted practice scale, the first step of the regression accounted for 7.2% of the variance,  $F(5, 171) = 2.67$ ,  $p = .02$ . The second step accounted for an additional 43.9% of the variance,  $F(3, 168) = 50.18$ ,  $p < .00$ . The third step with the interaction terms accounted for an additional 1.8% of the variance,  $F(2, 166) = 3.17$ ,  $p = .04$ . In total, the model accounted for 52.9% of the variance in PHQ scores,  $F(10, 166) = 18.73$ ,  $p < .00$ . Concerning specific predictors, we found that access to adequate PPE and treating patients with COVID-19 were related to increased scores on the scale, while resilience was related to lower scores. In addition, there was a significant interaction between treating patients with COVID-19 and resilience. Follow-up tests suggested that a negative relationship between resilience and distracted practice scores was stronger among nurses who treated patients with COVID-19 than those who did not. In other words, the difference in scores on the distracted practice scale between the groups tended to decrease as resilience increased.

For scores on the GAD-7, the first step of the regression accounted for 8.8% of the variance,  $F(5, 171) = 3.30$ ,  $p = .01$ . The second step accounted for an additional 16.4% of the variance,  $F(3, 168) = 15.81$ ,  $p < .00$ . The interaction terms did not account for a significant amount of variance (less than 1%),  $F(2, 166) = 0.40$ ,  $p = .67$ , so they are not included in the final model. In total, the model accounted for 25.2% of the variance in GAD-7 scores,  $F(8, 168) = 7.09$ ,  $p = .00$ . With regard to specific predictors, we found that years worked as a nurse and resilience scores were negatively related to GAD-7 scores, while the number of years as a nurse and the average number of hours worked per week was related to increased scores.

## Discussion

The circumstances of nurses in the COVID-19 pandemic are an endemic part of the healthcare crisis worldwide. Consistent with the growing literature, our results show that treating patients with COVID-19 places nurses at risk for developing psychological problems, namely symptoms of depression and posttraumatic stress disorder. These findings are consistent with other studies of nurses in the COVID-19 pandemic and may represent the vulnerability associated with treating critically ill patients amidst a risk to one's health (Chew et al., 2020; Kang et al., 2020; Lai et al., 2020; Xiao et al., 2020). Our data echo studies from previous pandemics; nurses working directly with SARS patients were more depressed, anxious, and traumatized than their counterparts who did not work in high-risk settings (Chan & Huak, 2004).

**Table 2** . Final Regression Model Results.

Variable	PHQ (depressive symptoms)				PCL (PTSD symptoms)				GAD7 (anxiety symptoms)				DP (distracted practice)			
	$\Delta R^2$	B	SE	$\beta$	$\Delta R^2$	B	SE	$\beta$	$\Delta R^2$	B	SE	$\beta$	$\Delta R^2$	B	SE	$\beta$
Step 1	0.08*															
Education		-0.10	0.05	-0.10	0.09**	-0.17	0.08	-0.14*	0.09**	-0.69	0.53	-0.09	0.08*	-0.07	0.05	-0.07
Years as a nurse		0.00	0.00	-0.05		-0.01	0.01	-0.07		-0.07	0.03	-0.15*		0.00	0.00	0.00
Average hours worked/week		0.01	0.00	0.12*		0.01	0.01	0.15*		0.12	0.04	0.20**		0.01	0.00	0.06
Access to PPE		0.06	0.08	0.04		0.13	0.11	0.07		0.75	0.77	0.07		0.16	0.08	0.11*
Tested positive for COVID-19		0.09	0.15	0.03		0.10	0.21	0.03		-0.16	1.43	-0.01		-0.03	0.14	-0.01
Cared for patients with COVID-19		-4.13	0.60	-2.20***		-2.41	0.85	-1.09*		0.35	1.02	0.02		-1.36	0.59	-0.76*
Step 2	0.31***				0.23***				0.16***				0.44***			
Resilience		-0.29	0.15	-0.31		-1.08	0.22	-1.01*		-2.85	0.49	-0.41***		-0.93	0.15	-1.07***
Social Support (SS)		-1.02	0.10	-1.84***		-0.08	0.14	-0.13		-0.25	0.29	-0.06		-0.06	0.10	-0.11
Step 3	0.16***				0.04*				0.01				0.02*			
Caring for patients by Resilience interaction		0.23	0.12	0.53		0.51	0.17	0.98*		NA	NA	NA		0.29	0.12	0.69**
Caring for patients by SS interaction		0.60	0.08	2.28***		0.03	0.12	0.09		NA	NA	NA		0.02	0.08	0.08
Full Model	$R^2=0.55,$ $F(10,166)=20.34, p<.001$				Full Model	$R^2=0.26,$ $F(10,166)=9.26, p<.001$			Full Model	$R^2=0.25,$ $F(8,168)=7.09, p<.001$			Full Model	$R^2=0.50,$ $F(10,166)=18.73, p<.001$		

Note. + Was significant in model without STSS, which suggests that STSS might mediate the relationship between treating patients with COVID-19 and functional outcomes; \*\* $p<.01$ ; \*\*\* $p<.001$ .

One unique contribution of this study was the impact of nurses working with COVID-19 patients on distracted practice, a behavioral measure of workplace distraction (L. K. D'Esmond, 2016). Nurses who provided care to COVID-19 patients were more likely to report symptoms of distracted practice. This finding extends our results beyond mental health sequelae and reflects the potential impact of working with patients with COVID-19 on nursing behaviors. Providing care to COVID-19 patients is physically and emotionally taxing. The high levels of distraction posed by the internal and external demands of these work conditions may serve as antecedents for distracted practice (L. K. D'Esmond, 2016). These findings also suggest a potential impact on patient care as distracted practice is believed to compromise patient safety and increase error risk (Feil, 2013).

Our results also offer evidence of factors that may buffer the psychological and behavioral impacts of working with patients with COVID-19. Resilience was found to moderate the relationship between treating patients with COVID-19 and symptoms of posttraumatic stress disorder and distracted practice. Nurses reporting higher levels of resilience were likely able to adjust to the adversity of working with patients with COVID-19 and were protected from the risk of developing trauma-related symptoms and experiencing distracted practice. Other studies suggest a moderating role of resilience on nurses' stress and mental health more generally (García-Izquierdo et al., 2018). Research on resilience in healthcare workers during COVID-19 has been largely descriptive, noting resilience in COVID-19 healthcare workers is associated with quality of sleep, positive emotions, and life satisfaction (Bozdağ & Ergün, 2020).

Social support was found to moderate the relationship between treating patients with COVID-19 and symptoms of depression. Critical infection prevention measures and fears of virus transmission leave nurses caring for COVID-19 patients socially isolated. It is well documented that social isolation has implications on wellbeing, including depressive symptoms (Aylaz et al., 2012). Conversely, social support is protective against the deleterious effects of stressful work conditions, likely by boosting an individual's coping resources (Chen et al., 2020). Our study highlights the importance of social support as a protective factor against depressive symptoms in nurses working with COVID-19 patients.

### *Limitations and Future Directions*

This study has several limitations. This was a cross-sectional survey so causal relationships should be interpreted with caution. The results were based on self-report screening questionnaires, which may be different

than findings from clinical diagnostic interviews. Even though all the scales were validated, future studies utilizing standardized interviews may provide more accurate and detailed information regarding the complex mechanisms underlying the relationship between these factors. Our data represent nurses from a limited range of geographic locations and sociodemographic factors and may not be generalizable nor representative of the general population. Future longitudinal studies should also identify risk and protective factors and an understanding of the interactive mechanisms underlying the association between working with patients with COVID-19 and the development of psychological symptoms and impairment at work.

### *Clinical Implications*

Our study reinforces that attention should be paid to nurses' psychological and work functioning during the COVID-19 pandemic, especially for those who are providing direct care to patients with the infectious disease. Nurses were already stressed and experiencing mental health problems before the pandemic (Albini et al., 2011; Farquharson et al., 2012). We found that nurses caring for patients with COVID-19 continue to experience symptoms of PTSD, depression, and distracted practice, which may impact their nursing behaviors and, ultimately, patient care. Our results suggest that fostering resilience and social support may help buffer the effects of providing care to patients with COVID-19.

This knowledge gap has important clinical implications as interventions designed to enhance resilience and social support may protect against the impact of COVID-19 work conditions and can likely be applied during future healthcare crises. Programs aimed at preventing or ameliorating psychiatric symptoms and impaired functioning should target these factors on individual and organizational levels. For example, nursing administrators might assess the level of social support nurses perceive at work and develop initiatives to enhance communication and exchange of support based on nurse feedback. Individual or organizational programs could also consider promoting factors associated with nurse resilience during training, including gratitude, problem solving, self-efficacy, and self-care (Cooper et al., 2020). Nurse-centered changes like these may reduce nurse vulnerability to the development of psychological symptoms and possibly buffer patient- and organization-level outcomes from the deleterious impacts of nurses working during pandemics.

### **Conclusions**

Our findings extend on the well-documented psychological symptoms reported by nurses and other healthcare

workers treating patients with COVID-19, offering a potential target to reduce these symptoms. To our knowledge, this is the first study that illustrates that possessing resilience and social support may equip nurses to adapt to the stressors of COVID-19 work conditions adequately.

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### References

- Aiken, L. H., Clarke, S. P., Sloane, D. M., Sochalski, J., & Silber, J. H. (2002). Hospital nurse staffing and patient mortality, nurse burnout and job dissatisfaction. *JAMA*, 288(16), 1987–1993.
- Albar Marín, M. J., & García-Ramírez, M. (2005). Social support and emotional exhaustion among hospital nursing staff. *The European Journal of Psychiatry*, 19(2), 96–106.
- Albini, E., Zoni, S., Parrinello, G., Benedetti, L., & Lucchini, R. (2011). An integrated model for the assessment of stress-related risk factors in health care professionals. *Industrial Health*, 49(1), 15–23.
- Aylaz, R., Aktürk, Ü., Erci, B., Öztürk, H., & Aslan, H. (2012). Relationship between depression and loneliness in elderly and examination of influential factors. *Archives of Gerontology and Geriatrics*, 55(3), 548–554. <https://doi.org/10.1016/j.archger.2012.03.006>
- Beasley, M., Thompson, T., & Davidson, J. (2003). Resilience in response to life stress: The effects of coping style and cognitive hardness. *Personality and Individual Differences*, 34(1), 77–95. [https://doi.org/10.1016/S0191-8869\(02\)00027-2](https://doi.org/10.1016/S0191-8869(02)00027-2)
- Bihlmaier, I., & Schlarb, A. A. (2016). Self-efficacy and sleep problems. *Somnologie*, 20(4), 275–280. <https://doi.org/10.1007/s11818-016-0085-1>
- Bozdağ, F., & Ergün, N. (2020). Psychological resilience of healthcare professionals during COVID-19 pandemic. *Psychological Reports*, 1–20. Advance online publication. <https://doi.org/10.1177/0033294120965477>
- Centers for Disease Control and Prevention. (2021, January 4). *COVIDView*. <https://www.cdc.gov/coronavirus/2019-ncov/covid-data/covidview/index.html>
- Chan, A. O., & Huak, C. Y. (2004). Psychological impact of the 2003 severe acute respiratory syndrome outbreak on health care workers in a medium size regional general hospital in Singapore. *Occupational Medicine*, 54(3), 190–196.
- Chen, J., Li, J., Cao, B., Wang, F., Luo, L., & Xu, J. (2020). Mediating effects of self-efficacy, coping, burnout, and social support between job stress and mental health among young Chinese nurses. *Journal of Advanced Nursing*, 76(1), 163–173. <https://doi.org/10.1111/jan.14208>
- Cheung, T., Fong, T. K. H., & Bressington, D. (2021). COVID-19 under the SARS cloud: Mental health nursing during the pandemic in Hong Kong. *Journal of Psychiatric and Mental Health Nursing*, 28(2), 115–117. <https://doi.org/10.1111/jpm.12639>
- Chew, N. W. S., Lee, G. K. H., Tan, B. Y. Q., Jing, M., Goh, Y., Ngiam, N. J. H., Yeo, L. L. L., Ahmad, A., Ahmed Khan, F., Napoleon Shanmugam, G., Sharma, A. K., Komalkumar, R. N., Meenakshi, P. V., Shah, K., Patel, B., Chan, B. P. L., Sunny, S., Chandra, B., Ong, J. J. Y., . . . Sharma, V. K. (2020). A multinational, multicentre study on the psychological outcomes and associated physical symptoms amongst healthcare workers during COVID-19 outbreak. *Brain, Behavior, and Immunity*, 88, 559–565. <https://doi.org/10.1016/j.bbi.2020.04.049>
- Chua, S. E., Cheung, V., Cheung, C., McAlonan, G. M., Wong, J. W. S., Cheung, E. P. T., Chan, M. T. Y., Wong, M. M. C., Tang, S. W., Choy, K. M., Wong, M. K., Chu, C. M., & Tsang, K. W. T. (2004). Psychological effects of the SARS outbreak in Hong Kong on high-risk health care workers. *Canadian Journal of Psychiatry. Revue Canadienne De Psychiatrie*, 49(6), 391–393. <https://doi.org/10.1177/070674370404900609>
- Cohen, J., & Rodgers, Y., & van der, M. (2020). Contributing factors to personal protective equipment shortages during the COVID-19 pandemic. *Preventive Medicine*, 141, 106263. <https://doi.org/10.1016/j.ypmed.2020.106263>
- Conybeare, D., Behar, E., Solomon, A., Newman, M., & Borkovec, T. (2012). The PTSD checklist—Civilian version: Reliability, validity, and factor structure in a nonclinical sample. *Journal of Clinical Psychology*, 68(6), 699–713.
- Cooper, A. L., Brown, J. A., Rees, C. S., & Leslie, G. D. (2020). Nurse resilience: A concept analysis. *International Journal of Mental Health Nursing*, 29(4), 553–575.
- COVID-NET. (2020). *COVID-19-Associated Hospitalization Surveillance Network, Centers for Disease Control and Prevention*. [https://gis.cdc.gov/grasp/COVIDNet/COVID19\\_3.html](https://gis.cdc.gov/grasp/COVIDNet/COVID19_3.html)
- Cullen, W., Gulati, G., & Kelly, B. D. (2020). Mental health in the COVID-19 pandemic. *QJM: Monthly Journal of the Association of Physicians*, 113(5), 311–312. <https://doi.org/10.1093/qjmed/hcaa110>
- D’Esmond, L. K. (2016). Distracted practice: A concept analysis. *Nursing Forum*, 51(4), 275–285. <https://doi.org/10.1111/nuf.12153>
- D’Esmond, L., Bova, C., & Moreau, P. (2020). Psychometric evaluation of the distracted practice scale. *Nursing Research*, 69(3), E49.
- D’Esmond, L. K., Moreau, P., Shanley, K., Machado, M., & Bova, C. (2021). *The distracted practice scale: Development and psychometric evaluation, [unpublished manuscript] community department, college of nursing and health sciences*. University of Massachusetts.



- Farquharson, B., Allan, J., Johnston, D., Johnston, M., Choudhary, C., & Jones, M. (2012). Stress amongst nurses working in a healthcare telephone-advice service: Relationship with job satisfaction, intention to leave, sickness absence and performance. *Journal of Advanced Nursing, 68*(7), 1624–1635.
- Feil, M. (2013). Distractions and their impact on patient safety. *Pennsylvania Patient Safety Advisory, 10*, 1–10.
- Fletcher, D., & Sarkar, M. (2013). Psychological resilience: A review and critique of definitions, concepts, and theory. *European Psychologist, 18*(1), 12–23.
- Fung, S. F. (2020). Validity of the brief resilience scale and brief resilient coping scale in a Chinese sample. *International Journal of Environmental Research and Public Health, 17*(4), 1265. <https://doi.org/10.3390/ijerph17041265>
- García-Izquierdo, M., Meseguer de Pedro, M., Ríos-Risquez, M. I., & Sánchez, M. I. S. (2018). Resilience as a moderator of psychological health in situations of chronic stress (burnout) in a sample of hospital nurses. *Journal of Nursing Scholarship: An Official Publication of Sigma Theta Tau International Honor Society of Nursing, 50*(2), 228–236. <https://doi.org/10.1111/jnu.12367>
- Hu, D., Kong, Y., Li, W., Han, Q., Zhang, X., Zhu, L. X., Wan, S. W., Liu, Z., Shen, Q., Yang, J., He, H.-G., & Zhu, J. (2020). Frontline nurses' burnout, anxiety, depression, and fear statuses and their associated factors during the COVID-19 outbreak in Wuhan, China: A large-scale cross-sectional study. *EClinicalMedicine, 24*, 100424. <https://doi.org/10.1016/j.eclinm.2020.100424>
- Jackson, D., Bradbury-Jones, C., Baptiste, D., Gelling, L., Morin, K., Neville, S., & Smith, G. (2020). Life in the pandemic: Some reflections on nursing in the context of COVID-19. *Journal of Clinical Nursing, 29*(13–14), 2041–2044. <https://doi.org/10.1111/jocn.15257>
- Jansson, M., Liao, X., & Rello, J. (2020). Strengthening ICU health security for a coronavirus epidemic. *Intensive & Critical Care Nursing, 57*, 102812.
- Kang, L., Ma, S., Chen, M., Yang, J., Wang, Y., Li, R., Yao, L., Bai, H., Cai, Z., Xiang Yang, B., Hu, S., Zhang, K., Wang, G., Ma, C., & Liu, Z. (2020). Impact on mental health and perceptions of psychological care among medical and nursing staff in Wuhan during the 2019 novel coronavirus disease outbreak: A cross-sectional study. *Brain, Behavior, and Immunity, 87*, 11–17. <https://doi.org/10.1016/j.bbi.2020.03.028>
- Kellogg, M., Knight, M., Dowling, J., & Crawford, S. (2018). Secondary traumatic stress in pediatric nurses. *Journal of Pediatric Nursing, 43*, 97–103. <https://doi.org/10.1016/j.pedn.2018.08.016>
- Kemper, K. J., Mo, X., & Khayat, R. (2015). Are mindfulness and self-compassion associated with sleep and resilience in health professionals? *Journal of Alternative and Complementary Medicine (New York, N.Y.), 21*(8), 496–503. <https://doi.org/10.1089/acm.2014.0281>
- Kroenke, K., Spitzer, R. L., & Williams, J. B. W. (2001). The PHQ-9: Validity of a brief depression measure. *Journal of General Internal Medicine, 16*(9), 606–613. <https://doi.org/10.1046/j.1525-1497.2001.016009606.x>
- Lai, J., Ma, S., Wang, Y., Cai, Z., Hu, J., Wei, N., Wu, J., Du, H., Chen, T., Li, R., Tan, H., Kang, L., Yao, L., Huang, M., Wang, H., Wang, G., Liu, Z., & Hu, S. (2020). Factors associated with mental health outcomes among health care workers exposed to coronavirus disease 2019. *JAMA Network Open, 3*(3), E203976.
- Letvak, S., Ruhm, C. J., & McCoy, T. (2012). Depression in hospital employed nurses. *Clinical Nurse Specialist, 26*(3), 177–182.
- Li, Q., Guan, X., Wu, P., Wang, X., Zhou, L., Tong, Y., Ren, R., Leung, K. S. M., Lau, E. H. Y., Wong, J. Y., Xing, X., Xiang, N., Wu, Y., Li, C., Chen, Q., Li, D., Liu, T., Zhao, J., Liu, M., . . . Feng, Z. (2020). Early transmission dynamics in Wuhan, China, of novel coronavirus-infected pneumonia. *The New England Journal of Medicine, 382*(13), 1199–1207. <https://doi.org/10.1056/NEJMoa2001316>
- Liu, C.-Y., Yang, Y.-Z., Zhang, X.-M., Xu, X., Dou, Q.-L., Zhang, W.-W., & Cheng, A. S. K. (2020). The prevalence and influencing factors in anxiety in medical workers fighting COVID-19 in China: A cross-sectional survey. *Epidemiology and Infection, 148*, e98. <https://doi.org/10.1017/S0950268820001107>
- Liu, X., Kakade, M., Fuller, C. J., Fan, B., Fang, Y., Kong, J., Guan, Z., & Wu, P. (2012). Depression after exposure to stressful events: Lessons learned from the severe acute respiratory syndrome epidemic. *Comprehensive Psychiatry, 53*(1), 15–23. <https://doi.org/10.1016/j.comppsy.2011.02.003>
- Lorenzo, D., & Carrisi, C. (2020). COVID-19 exposure risk for family members of healthcare workers: An observational study. *International Journal of Infectious Diseases: Official Publication of the International Society for Infectious Diseases, 98*, 287–289. <https://doi.org/10.1016/j.ijid.2020.06.106>
- Marjanovic, Z., Greenglass, E. R., & Coffey, S. (2007). The relevance of psychosocial variables and working conditions in predicting nurses' coping strategies during the SARS crisis: An online questionnaire survey. *International Journal of Nursing Studies, 44*(6), 991–998. <https://doi.org/10.1016/j.ijnurstu.2006.02.012>
- Maunder, R., Lancee, W., Balderson, K., Bennett, J., Borgundvaag, B., Evans, S., Fernandes, C., Goldbloom, D., Gupta, M., Hunter, J., McGillis Hall, L., Nagle, L., Pain, C., Peczeniuk, S., Raymond, G., Read, N., Rourke, S., Steinberg, R., Stewart, T., . . . Wasylenki, D. (2006). Long-term psychological and occupational effects of providing hospital healthcare during SARS outbreak. *Emerging Infectious Diseases, 12*(12), 1924–1932. <https://doi.org/10.3201/eid1212.060584>
- Mo, Y., Deng, L., Zhang, L., Lang, Q., Liao, C., Wang, N., Qin, M., & Huang, H. (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>
- Norris, F. H., & Hamblen, J. L. (2003). Standardized self-report measures of civilian trauma and PTSD. In J. Wilson & T. Keane (Eds.), *Assessing psychological trauma and PTSD: A practitioner's handbook* (2nd ed., pp. 63–102). Guilford.

- Pappa, S., Ntella, V., Giannakas, T., Giannakoulis, V. G., Papoutsis, E., & Katsaounou, P. (2020). Prevalence of depression, anxiety, and insomnia among healthcare workers during the COVID-19 pandemic: A systematic review and meta-analysis. *Brain, Behavior, and Immunity*, *88*, 901–907. <https://doi.org/10.1016/j.bbi.2020.05.026>
- Que, J., Shi, L., Deng, J., Liu, J., Zhang, L., Wu, S., Gong, Y., Huang, W., Yuan, K., Yan, W., Sun, Y., Ran, M., Bao, Y., & Lu, L. (2020). Psychological impact of the COVID-19 pandemic on healthcare workers: A cross-sectional study in China. *General Psychiatry*, *33*(3), e100259. <https://doi.org/10.1136/gpsych-2020-100259>
- Sarafis, P., Rousaki, E., Tsounis, A., Malliarou, M., Lahana, L., Bamidis, P., Niakas, D., & Papastavrou, E. (2016). The impact of occupational stress on nurses' caring behaviors and their health related quality of life. *BMC Nursing*, *15*(1), 56–56. <https://doi.org/10.1186/s12912-016-0178-y>
- Sayed, S., Iacoviello, B. M., & Charney, D. S. (2015). Risk factors for the development of psychopathology following trauma. *Current Psychiatry Reports*, *17*(8), 612. <https://doi.org/10.1007/s11920-015-0612-y>
- Shanafelt, T., Ripp, J., & Trockel, M. (2020). Understanding and addressing sources of anxiety among health care professionals during the COVID-19 pandemic. *JAMA*, *323*(21), 2133–2134. <https://doi.org/10.1001/jama.2020.5893>
- Smiley, R. A., Lauer, P., Bienemy, C., Berg, J. G., Shireman, E., Reneau, K. A., & Alexander, M. (2018). The 2017 national nursing workforce survey. *Journal of Nursing Regulation*, *9*(3), S1–S88.
- Smith, B., Dalen, J., Wiggins, K., Tooley, E., Christopher, P., & Bernard, J. (2008). The brief resilience scale: Assessing the ability to bounce back. *International Journal of Behavioral Medicine*, *15*(3), 194–200.
- Southwick, S. M., Vythilingam, M., & Charney, D. S. (2005). The psychobiology of depression and resilience to stress: Implications for prevention and treatment. *Annual Review of Clinical Psychology*, *1*(1), 255–291. <https://doi.org/10.1146/annurev.clinpsy.1.102803.143948>
- Spitzer, R., Kroenke, K., Williams, J., & Lowe, B. (2006). A brief measure for assessing generalized anxiety disorder. *Archives of Internal Medicine*, *166*(10), 1092–1097.
- Tan, B. Y. Q., Chew, N. W. S., Lee, G. K. H., Jing, M., Goh, Y., Yeo, L. L. L., Zhang, K., Chin, H.-K., Ahmad, A., Khan, F. A., Shanmugam, G. N., Chan, B. P. L., Sunny, S., Chandra, B., Ong, J. J. Y., Paliwal, P. R., Wong, L. Y. H., Sagayanathan, R., Chen, J. T., . . . Sharma, V. K. (2020). Psychological impact of the COVID-19 pandemic on health care workers in Singapore. *Annals of Internal Medicine*, *173*(4), 317–320. <https://doi.org/10.7326/M20-1083>
- Tang, L., Pan, L., Yuan, L., & Zha, L. (2017). Prevalence and related factors of post-traumatic stress disorder among medical staff members exposed to H7N9 patients. *International Journal of Nursing Sciences*, *4*(1), 63–67. <https://doi.org/10.1016/j.ijnss.2016.12.002>
- Tsilika, E., Galanos, A., Polykandriotis, T., Parpa, E., & Mystakidou, K. (2019). Psychometric properties of the multidimensional scale of perceived social support in Greek nurses. *The Canadian Journal of Nursing Research = Revue Canadienne de Recherche en Sciences Infirmieres*, *51*(1), 23–30. <https://doi.org/10.1177/0844562118799903>
- Vizheh, M., Qorbani, M., Arzaghi, S. M., Muhidin, S., Javanmard, Z., & Esmaeili, M. (2020). The mental health of healthcare workers in the COVID-19 pandemic: A systematic review. *Journal of Diabetes and Metabolic Disorders*, *19*, 1–12. <https://doi.org/10.1007/s40200-020-00643-9>
- Wang, W., Tang, J., & Wei, F. (2020). Updated understanding of the outbreak of 2019 novel coronavirus (2019-nCoV) in Wuhan, China. *Journal of Medical Virology*, *92*(4), 441–447.
- World Health Organization. (2021, January 13). *WHO coronavirus disease (COVID-19) dashboard*. <https://covid19.who.int/>
- Xiao, H., Zhang, Y., Kong, D., Li, S., & Yang, N. (2020). The effects of social support on sleep quality of medical staff treating patients with coronavirus disease 2019 (COVID-19) in January and February 2020 in China. *Medical Science Monitor: International Medical Journal of Experimental and Clinical Research*, *26*, e923549–e923549-8. <https://doi.org/10.12659/MSM.923549>
- Zimet, G. D., Powell, S. S., Farley, G. K., Werkman, S., & Berkoff, K. A. (1990). Psychometric characteristics of the multidimensional scale of perceived social support. *Journal of Personality Assessment*, *55*(3–4), 610–617.