

# PTSD Symptoms and Functional Impairment among Nurses Treating COVID-19 Patients

SAGE Open Nursing  
Volume 8: 1–8  
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DOI: 10.1177/23779608221074651  
journals.sagepub.com/home/son



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## Abstract

**Introduction:** Nurses providing direct care for patients with COVID-19 may be at particular risk for developing symptoms of post-traumatic stress disorder (PTSD). However, little is known about how these symptoms are related to workplace and non-workplace impairment.

**Objective:** We examined if PTSD symptoms mediated the relationship between treating patients with COVID-19 and functional impairment.

**Methods:** An online survey collected data regarding demographic and workplace variables, PTSD symptoms, functional impairment, distracted practice, and if the nurse treated patients with confirmed COVID-19. Data collected in November 2020 from 218 primarily White and female nurses were analyzed. We followed the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) guidelines in reporting the methods and results.

**Results:** Analyses involved two steps: (a) calculating descriptive statistics, conducting univariate tests, and examining correlations among study variables; and (b) conducting a path analysis examining the mediating role of PTSD symptoms in the relationship between treating patients with COVID-19 and functional outcomes. Univariate tests found that nurses who had a diploma/associate's/bachelor's and nurses who treated patients with COVID-19 reported more PTSD symptoms, functional impairment, and distracted practice compared to nurses with graduate degrees and those who did not treat patients with COVID-19. Compared to nurses who reported having access to adequate PPE, nurses who reported not having access to adequate PPE reported more PTSD symptoms but lower functional impairment and distracted practice. Men reported lower distracted practice scores than women. In step two of the analyses, the path model suggested that treating patients with COVID-19 was indirectly related to both distracted practice and functional impairment through PTSD symptoms.

**Conclusion:** The probable PTSD symptoms and work- and non-work-related functional impairment of nurses working with patients with COVID-19 highlight the importance of developing interventions that help these essential workers address vulnerabilities associated with working during the COVID-19 pandemic.

## Keywords

COVID-19, PTSD, mental health, functional impairment

Received 4 October 2021; Revised received 23 December 2021; accepted 1 January 2022

## Introduction and Background

Since the onset of the COVID-19 outbreak, over 47 million people have been infected, and 770,000 people have died due to the virus in the United States, reflecting extraordinary pressure on the healthcare system (Centers for Disease Control and Prevention, 2021). Nurses face a disproportionate burden while working in conditions that present occupational strain above and beyond the stressful nature of routine clinical practice. They must make difficult patient care decisions in exhausting and unpredictable conditions, including

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inconsistent access to personal protective equipment, high-nurse patient ratios, shifting guidelines, and increased work hours and workload (Bruyneel et al., 2021; Cohen & Rodgers, 2020; González-Gil et al., 2021; LoGiudice & Bartos, 2021). These decisions are being made in the context of a highly transmissible and potentially deadly disease (González-Gil et al., 2021). Thus, nurses are not only caring for patients but doing so amidst fear of contracting the virus themselves and potentially transmitting it to their loved ones. Additionally, those nurses caring directly for patients with COVID-19 bear witness to the plight of patients suffering from the virus, many of whom are often alone and isolated from their families and relying on health care staff for support (Dutheil et al., 2020).

Nurses and other healthcare workers are vulnerable to developing symptoms of post-traumatic stress disorder (PTSD), a psychiatric condition that may occur in individuals who experience or witness a traumatic event (American Psychiatric Association, 2013). Prior to the current COVID-19 pandemic, PTSD rates of healthcare providers ranged from 6 to 18% (Carmassi et al., 2020; DeLucia et al., 2019; Mealer et al., 2009), which is higher than prevalence rates reported for the general population (Zhang et al., 2020). Data from previous pandemics suggest PTSD rates increase in healthcare workers during healthcare crises, particularly for those providers working directly with infected patients (Chan & Huak, 2004; Maunder et al., 2006). Studies exploring mental health in the first wave of the COVID-19 pandemic outside the United States report psychological distress and trauma-related stress symptoms in nurses and other healthcare providers (Chew et al., 2020; Kader et al., 2021a; Kader et al., 2021b; Kang et al., 2020; Lai et al., 2020; Tan et al., 2020; Zhang et al., 2020). US-based studies substantiate early findings indicating that approximately 23% of healthcare workers reported probable PTSD (Hennein et al., 2021) and that 57% scored above the cutoff on a PTSD screening measure (Schechter et al., 2020). Women, nurses, and those working directly with COVID-19 patients reported more severe traumatic stress symptoms (Lai et al., 2020; Zhang et al., 2020).

The current classification system of DSM-5 requires a diagnosis of PTSD to include both symptoms as well as impairment across important areas of functioning (American Psychiatric Association, 2013). The DSM-5 provides little guidance on the diagnostic classification of functional impairment, which is believed to reflect limitations due to mental illness (Üstün & Kennedy, 2009). Determinations are made through assessments of day-to-day functioning across the domains of work, relationships, leisure activities, and other aspects of daily life (American Psychiatric Association, 2013).

While a growing number of studies report on the symptomatology of nurses during COVID-19, to our knowledge none have examined how treating patients with COVID-19 is related to the functional impairment of nurses, which

also may be an important predictor of patient outcomes. Nurses distracted on the job, for example, are believed to compromise patient safety and increase error risk (Feil, 2013). Understanding the functioning and potential impairments of nurses as they continue to be a backbone of the pandemic responses is a critical step in identifying those who may be in most need of support, identifying targets of potential interventions, as well as minimizing potential adverse patient care outcomes.

The present study seeks to confirm and extend emerging literature examining the mental health sequelae of nurses working during the COVID-19 pandemic. We examined two research questions. First, we investigated the question of whether nurses who provided direct care to patients for patients with COVID-19 report higher levels of PTSD symptoms compared to those who do not care for patients with COVID-19. Second, we explored if trauma-related distress (PTSD symptoms) mediated the relationship between providing direct care to patients with COVID-19 and functional outcomes (i.e., functional impairment and distracted practice).

## Methods

We followed the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) guidelines in reporting the methods and results of this study (von Elm et al., 2007). The study was approved by the University's Institutional Review Board.

## Participants

Data were collected through an online survey distributed to nurses in the United States for two weeks in November of 2020. The relationships among the variables of interest in nurses working during the COVID-19 pandemic were interpreted using a descriptive correlational research design. Participants were recruited by posting a survey link on social media and the American Association of Critical Care Nurses *Participate in Research Studies* webpage. Participants were asked to share the survey link with other nurses to allow for snowball sampling. Nurses who completed the survey were entered into a raffle to win a \$100 gift cards. There were no exclusion criteria. Initial data were collected from 255 nurses working in the United States during the COVID-19 pandemic. Due to missing data on key study variables, the following analyses were based on data from 218 nurses working in varying specialties. In general, our sample was majority White, female, and had a bachelor's degree in nursing. Note that education was dichotomized into two groups: diploma/associate's/bachelor's degree and post-graduate higher. In addition, approximately 79% of our sample reported treating patients with COVID-19. Descriptive data are presented in Table 1.

**Table 1.** Descriptive Statistics and Group Differences in Study Variables.

Variable	PCL		BIPF		DP	
	M	SD	M	SD	M	SD
Treated patients with COVID-19	$t(216) = -3.39, p < 0.001$		$t(216) = -2.37, p = 0.019$		$t(216) = -2.99, p = 0.003$	
Yes (n = 172)	26.31	17.64	45.04	22.05	1.72	0.62
No (n = 46)	16.76	14.26	36.43	21.35	1.41	0.59
Education	$t(216) = 1.89, p = 0.047$		$t(216) = 2.84, p = 0.005$		$t(216) = 2.87, p = 0.004$	
Associate's/Bachelor's/Diploma (n = 155)	25.71	17.12	45.89	21.88	1.73	0.63
Post-graduate (n = 63)	20.83	17.73	36.66	21.57	1.47	0.59
Access to adequate PPE	$t(216) = 4.47, p < 0.001$		$t(216) = 3.67, p < 0.001$		$t(216) = 2.53, p = 0.012$	
Yes (n = 153)	21.01	16.07	51.47	19.96	1.82	0.67
No (n = 65)	32.05	18.05	39.72	22.15	1.59	0.60
Gender	$t(216) = -1.76, p = 0.080$		$t(216) = -1.74, p = 0.083$		$t(216) = 2.14, p = 0.034$	
Male (n = 12)	15.75	15.62	32.44	19.15	1.28	0.52
Female (n = 206)	24.79	17.40	43.85	22.18	1.68	0.63
Race	$t(216) = -1.57, p = 0.118$		$t(216) = 0.23, p = 0.821$		$t(216) = -0.87, p = 0.386$	
White (n = 198)	23.71	17.35	43.33	22.45	1.64	0.64
Non-white (n = 20)	30.10	17.23	42.15	19.30	1.77	0.47

## Measures

**PTSD symptoms.** PTSD symptoms were assessed using the civilian version of the PTSD Checklist for DSM-5 (PCL-5; Blevins et al., 2015). This 20-item scale asks participants to rate how bothered they were by problems such as “Feeling very upset when something reminded you of the stressful experience” or “feeling jumpy or easily startled” during the past month on a scale of 0 (not at all) to 4 (extremely). Responses were summed so that scores could range from 0–80, with higher scores reflecting increased symptoms. In a sample of healthcare staff, including nurses exposed to Asian Avian Flu (H7N9), PCL scales and subscales were found to be reliable (Tang et al., 2017). Reliability for this scale was good in our sample (Chronbach’s  $\alpha = 0.95$ ).

**Functional impairment.** Functional impairment was measured with the 7-item Brief Inventory of Psychosocial Functioning (B-IPF; Kleiman et al., 2020). Participants are asked if they had trouble in seven domains, including romantic relationships, relationships with children, family relationships, friends and socializing, work, training and education, and day-to-day activities. Participants respond on a scale of not at all to very much, and only items that apply to the participant are scored. Scores are scaled and can range from 0 to 100, with higher scores indicating higher levels of functional impairment. Reliability for this scale was good in this study (Chronbach’s  $\alpha = 0.82$ ).

**Distracted practice.** Distracted practice was measured with a 16-item scale developed to assess how distracted nurses are in their work performance (D’Esmond et al., 2020). Example items include “I am rushed to accomplish work-related tasks” and, “I think my team member’s 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 increased distraction. Similar to previous samples of healthcare workers (D’Esmond et al., 2020), reliability for this scale was good in this study (Chronbach’s  $\alpha = 0.90$ ).

## Analyses

Analysis of the data involved two steps. The first step was to calculate descriptive statistics, conduct univariate tests, and examine the bivariate correlations among the study variables. The second step of the analyses was to conduct a path analysis examining the mediating role of PTSD symptoms in the relationship between treating patients with COVID-19 and functional outcomes. A path model was specified that included the direct paths of caring for patients with COVID-19 to PTSD symptoms and from PTSD symptoms to functional impairment and distracted practice. The indirect paths from caring for patients with COVID-19 to functional impairment and distracted practice were also estimated. The model also included several control variables, including gender, education, years worked as a nurse, the average number of hours worked per week, access to adequate PPE, and race. Paths from these variables to PTSD symptoms, functional impairment, and distracted practice were included in the model.

## Results

### Step 1: Descriptive Statistics and Univariate Tests

Several univariate tests examining group differences in the outcome variables were significant (see Table 1 for results).

**Table 2.** Bivariate Correlations among Study Variables.

Variable	1	2	3	4	5
1. Years as nurse	1.00				
2. Average weekly hours	0.09	1.00			
3. PTSD symptoms	-0.21**	0.19**	1.00		
4. Distracted practice	-0.16*	0.06	0.67***	1.00	
5. Functional impairment	-0.18**	0.10	0.64***	0.51***	1.00

Note. \* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$ .

Nurses who treated patients with COVID-19 reported more PTSD symptoms, as well as more functional impairment and distracted practice compared to nurses who did not treat patients with COVID-19. This same pattern was present for nurses who had a bachelor's degree, associate's degree, or diploma in nursing compared to nurses with a post-graduate degree. Nurses who reported not having access to adequate PPE reported more PTSD symptoms, but lower functional impairment and distracted practice, compared to those who reported having adequate access. Gender was only related to distracted practice, with men reporting lower scores than women. Race was not related to any of the outcome variables.

The bivariate correlations examining the associations among continuous variables are presented in Table 2. Years worked as a nurse were significantly negatively related to PTSD symptoms, distracted practice, and functional impairment. Average number of hours worked per week was significantly positively associated with PTSD symptoms. There were also positive significant correlations among PTSD symptoms, functional impairment, and distracted practice.

### Step 2: Path Analysis

The second step of the analyses involved examining if the association between caring for patients with COVID-19 and functional outcomes was mediated by symptoms of PTSD (See Table 3 and Figure 1). The final model fit the data very well,  $\chi^2(2) = 0.65$ ,  $p = 0.72$ , RMSEA = 0.00 (90% CI = 0.00, 0.09), CFI = 1.00 (See Table 3 and Figure 1). Several control variables were related to PTSD symptoms. Respondents who were non-White and who reported not having adequate access to PPE had significantly higher levels of PTSD symptoms compared to White respondents and those who reported having adequate access to PPE. In addition, the average number of hours worked was positively related to PTSD symptoms. None of the control variables were significantly related to functional impairment or distracted practice.

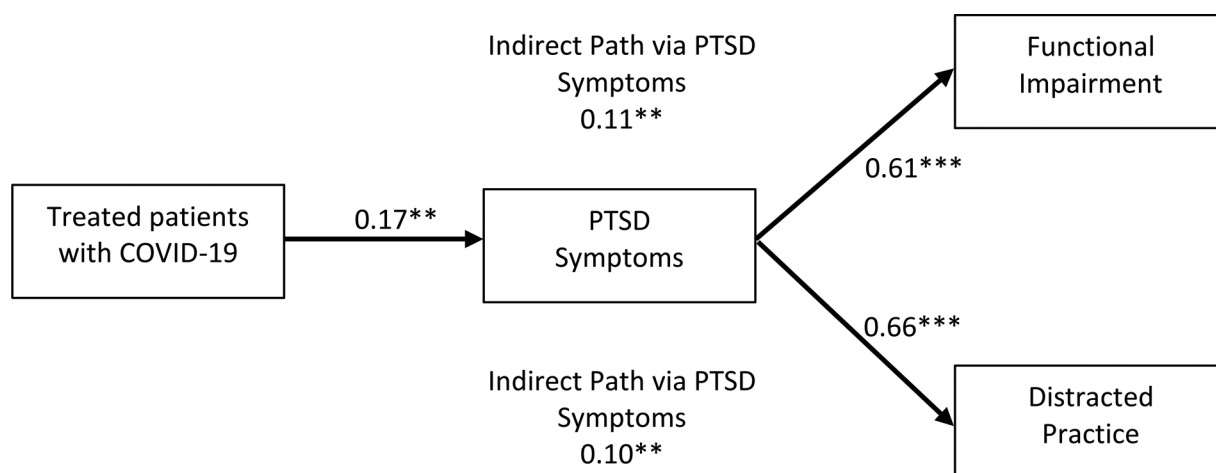
Regarding the main study variables, there was a significant positive path from caring for patients with COVID-19

**Table 3.** Results of Path Analysis.

Path	Regression Coefficients		
	Unstandardized	SE	Standardized
PTSD symptoms on	7.39	2.69	
Treated patients with COVID-19	7.49	4.73	0.17**
Gender	-3.47	2.68	0.10
Education	7.87	3.69	-0.09
Race	-0.15	0.10	0.13*
Years as nurse	0.34	0.10	-0.10
Average number of hours worked/week	-10.66	2.34	0.21***
Access to PPE	7.39	2.69	-0.28***
Functional impairment on			
PTSD Symptoms	0.77	0.07	0.61***
Treating patients with COVID-19 via PTSD symptoms (indirect path)	0.18	0.07	0.11**
Gender	3.03	5.06	0.03
Education	-4.39	2.83	-0.09
Race	-5.04	3.97	-0.07
Years as nurse	-0.04	0.10	-0.02
Average number of hours worked/week	0.08	0.11	0.04
Access to PPE	-2.79	2.60	-0.06
Distracted practice on			
PTSD Symptoms	0.02	0.00	0.66***
Treating patients with COVID-19 via PTSD symptoms (indirect path)	0.11	0.04	0.10**
Gender	0.15	0.14	0.06
Education	-0.11	0.08	-0.08
Race	0.00	0.11	0.00
Years as nurse	0.00	0.00	-0.01
Average number of hours worked/week	0.00	0.00	-0.05
Access to PPE	0.04	0.07	0.03
Distracted practice with functional impairment	1.12	0.52	0.15*
R <sup>2</sup> Endogenous variables			
PTSD symptoms	0.21		
Functional impairment	0.44		
Distracted practice	0.46		
Model Fit			
<sup>2</sup> (df)	0.65 (2), $p = 0.72$		
RMSEA	0.000 (90%CI = 0.00, 0.09)		
CFI	1.00		

Note. \* $p < 0.05$ , \*\* $p < 0.01$ , \*\*\* $p < 0.001$ .

to the number of PTSD symptoms, and positive paths between the number of PTSD symptoms to functional impairment and distracted practice. Based on modification indices, adding the direct paths from treating patients with COVID-19 to functional impairment and distracted practice



**Figure 1.** Path model. All estimates are standardized. \*\* $p < 0.01$ , \*\*\* $p < 0.001$ .

would not have improved model fit and were therefore not included. To test for mediation, the indirect paths from treating patients with COVID-19 to the outcomes were tested using the MODEL INDIRECT command in Mplus (Muthén & Muthén, 1998–2011). The indirect path from treating patients with COVID-19 to functional impairment ( $\beta = 5.68$ ,  $p = 0.008$ ) and to distracted practice ( $\beta = 0.18$ ,  $p = 0.007$ ) were both significant.

## Discussion

The results of this study highlight the psychological and functional impact of treating patients with COVID-19. Consistent with a growing body of literature, our findings indicate that nurses who treat patients with COVID-19 are at an increased risk of reporting mental health symptoms, including the symptoms of PTSD (Duarte et al., 2021). Our data were collected during the fall of 2020 a phase of the pandemic when nurses were unvaccinated and had inconsistent access to PPE resources and other staffing precautions. Nurses caring directly for COVID-19 patients faced increased health risks from these conditions, witnessed the frequent deaths of patients, and made difficult triage decisions about allocating resources to those in their care. Our results are consistent with findings from previous pandemics. Specifically, nurses who worked directly with SARS patients reported significantly more psychological issues, including depression, anxiety, and self-reported feelings of trauma compared to nurses who worked in other settings (Chan & Huak, 2004). In addition, nurses working in China during the H7N9 influenza epidemic and nurses who provided care for patients with Middle East Respiratory Syndrome (MERS) reported higher levels of PTSD symptoms than other healthcare groups (Jung et al., 2020; Tang et al., 2017). The development of PTSD is an increasing concern in nursing and can have a negative impact on the profession (Schuster & Dwyer, 2020).

Our results contribute to this literature by finding that PTSD symptoms mediate the relationship between treating patients with COVID-19 and functional outcomes (i.e., functional impairment and distracted practice). In other words, treating patients with COVID-19 is related to functional outcomes in multiple domains through PTSD symptoms. Our connection between treating patients with COVID-19 and impaired functioning highlights the clinical significance of the trauma-related symptoms experienced by nurses treating patients with COVID-19. Previous research of non-COVID-related clinical samples indicates that individuals with PTSD experience functional impairments across multiple domains, including academic and occupational performance, marital and family functioning, parenting, and friendships (Kessler, 2012; Pagotto et al., 2015; Rodriguez et al., 2012). Among nurses, specifically, there is a link between PTSD symptoms and impairments at work (i.e., negative perceptions about colleagues), relationships, intimacy, and leisure activities (Mealer et al., 2009).

Nurses working with patients with COVID-19 are not only experiencing psychiatric symptoms, but those symptoms are causing limitations in participating fully in their lives. This is a particularly salient finding given the potential adverse outcomes to both patient and staff safety with increased distracted practice and error risk. To care for the increased volume of patients with COVID-19, nurses' work environments have changed; new teams have been created to care for patients in new settings such as newly designated for COVID units. Additionally, patient volumes with additional infection control guidelines and the absence of family/visitor support have increased staff workloads, causing them to feel even greater pressure to provide necessary care (Lucchini, 2020). Team awareness, environmental disruptions, individual differences, and rush mode/time pressure were factors that increased distracted practice before the pandemic (D'Esmond, 2017). The combination of these factors has the potential to significantly strain the emotional

and cognitive load of team members, placing them at greater risk for making errors (Institute for Safe Medication Practices, 2020).

“Pandemic nursing” is a perfect storm for making errors. Once an error occurs, the staff and patients are at greater risk for poor outcomes up to and including leaving their profession (Lewis, Baernholdt & Hamric, 2013). Errors may exacerbate psychological distress and contribute to staff’s functional impairment and distracted practice due to guilt, self-doubt, and stigma taking up cognitive space that may be needed to perform current patient care. Work-related stress is also related to an increase in turnover intention (Jung et al., 2020). Turnover in nursing can compound work-related stress through staffing problems, resulting in higher nurse–patient ratios, less experienced nurses, and potentially impact patient safety. The trauma-related symptoms and functional impairments for nurses treating patients with COVID-19 is cause for concern, as the pandemic hit when the United States was already facing a nursing shortage. Researchers predict that there will be a shortage of over 500,000 registered nurses by the year 2030 (Zhang et al., 2020).

### Limitations and Future Directions

Our results should be interpreted in the context of certain limitations. First, the sample is overwhelmingly White and female. Future research should try to collect data from a more diverse population if possible. A further limitation is that all of our data are based on a limited selection of self-reported data. The psychiatric history and job classification of nurses were not included in our model. Additionally, we used a self-report questionnaire to assess PTSD symptoms. Research using standardized clinical interviews might provide more details regarding clinical diagnostic thresholds of PTSD symptoms as well as the dimensions of PTSD that are related to functional outcomes. This approach could identify specific targets of interventions that could reduce symptoms of PTSD, including those that are amenable to change. Our data is also cross-sectional. Longitudinal data are needed to examine how PTSD symptoms and functional outcomes are changing throughout the current pandemic. Finally, we only collected data during a two-week window and did not account for geographical variations in the seriousness of the pandemic. Future research should also investigate how PTSD symptoms are related to workplace outcomes, including variables such as errors, turnover intention, burnout, and safety.

### Implications for Practice

Our findings have implications for nurses’ mental health and functioning who are caring for patients with COVID-19. Caring for seriously ill patients is related to several adverse mental health outcomes among nurses, including increased

levels of depression and anxiety (Azoulay et al., 2020). The results of this study not only indicate that caring for patients with COVID-19 is related to probable PTSD but that it is indirectly related to functional impairment including distracted practice, which can lead to medical errors or decreased patient outcomes. On the organizational level, the mediating role of PTSD suggests that the psychological health of nurses should be a key focus in the development of organizational programs to improve health outcomes. On an individual level, it is important that nurses are aware of the signs and symptoms of PTSD and other psychiatric conditions. The additional stress due to the pandemic and the relationship to nurse mental health has implications for patient outcomes (MacPhee et al., 2017). Healthcare organizations should enhance the support and communication between individual team members as well as across all levels of the organization (Rangachari & Woods, 2020). Our findings suggest that treatment of PTSD symptoms in nurses should improve functioning across multiple domains.

### Conclusion

Many nurses working directly for COVID-19 patients experience probable PTSD symptoms, along with work- and non-work-related functional impairment. These findings emphasize the significance of disseminating treatments to help these essential workers overcome the challenges of working during a pandemic. Action is needed to help protect the nursing workforce so that they can better care for the community.

### Acknowledgments

The authors acknowledge all the nurses who participated in our study.


### Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

### Funding

The author(s) received no financial support for the research, authorship and/or publication of this article.

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