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The mental health impact of contact with COVID-19 patients on healthcare workers in the United States

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ABSTRACT

This study assessed the relationship between contact with COVID-19 patients and the mental health of healthcare workers (HCWs) in the United States (US). In a convenience sample of 957 HCWs who completed an anonymous online survey between April-May 2020, HCWs who provided direct care to confirmed or suspected COVID-19 patients reported increased depressive and posttraumatic symptoms compared to HCWs with no COVID-19 patient contact. Additionally, more frequent contact was associated with higher distress. More data drawn from diverse samples that better represent US HCWs are needed to fully assess the scope of this association.

1.0. Introduction

The COVID-19 pandemic has been associated with increased symptoms of anxiety, depression, and trauma-related conditions, and healthcare workers (HCWs) are particularly vulnerable (Marvaldi et al., 2021; Uphoff et al., 2021).

Internationally, front-line HCWs (i.e., those who have direct contact with COVID-19 patients) appear at elevated risk for negative mental health outcomes, although prevalence rates vary widely (Moitra et al., 2021; Uphoff et al., 2021). Early in the pandemic in the US, HCWs reported significant distress (Schechter et al., 2020; Young et al., 2021). However, relatively little is known about the specific impact of greater contact with COVID-19 patients. Some (Sagherian et al., 2020), but not all (Hennein et al., 2021), US data have suggested that front-line HCWs report higher distress than those with less or no patient interaction.

This study sought to assess whether increased contact (i.e., providing direct care and/or having more frequent contact) with COVID-19 patients was associated with increased negative mental health symptoms among HCWs.

2.0. Methods

2.1. Recruitment and data collection

Participants were recruited online using convenience sampling between April 24-May 25, 2020—a period of nearly universal “lockdown”/stay-at-home orders in the US. Study staff shared the study website through direct email, listservs, and social media. Although snowball sampling was not explicitly used, study authors’ colleagues may have participated (anonymously) and encouraged HCWs in their professional networks to participate, who then shared the study with others. Any adult who could read/write English and self-identified as working in healthcare in any capacity was eligible.

2.2. Participants

Participants ($n = 957$) were predominantly white (90.1%) and female (84.2%). Although most (60.1%) HCWs were working outside the home, many reported teleworking sometimes (20.9%) or always (18.5%) at assessment. Demographic information is provided in

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Supplementary Table S1. Analyses included participants who completed at least one of the psychological measures (Table 1 and Supplementary Fig. S1).

2.3. Procedures

This study was exempt from full review by the NIH Institutional Review Board. Participation was anonymous, although respondents could provide their email for follow-up surveys. Only a subset of baseline data is presented here. Respondents were given links to mental health resources, including crisis phone numbers.

2.4. Psychological outcome measures

The following instruments were used to measure mental health symptoms: 1) The 5-item Kessler Psychological Distress Scale (Kessler-5), a brief measure of distress that includes symptoms of anxiety and depression (Kessler et al., 2002); 2) The DSM-5 Self-Rated Level 1 Cross-Cutting Symptom Measure for adults (DSM-XC), which assesses the frequency and severity of transdiagnostic psychiatric symptoms ranging from “none/not at all” (0) to “severe/nearly every day” (4) (American Psychiatric Association, 2013). Only depressive symptoms (depressed mood and anhedonia) are presented here; 3) The National Stressful Events Survey for Posttraumatic Stress Disorder-Short Scale (NSESSS), which assesses the severity of posttraumatic stress symptoms (e.g., flashbacks, feeling easily startled) during the past week (LeBeau et al., 2014).

2.5. Contact with suspected or confirmed COVID-19 patients

Two survey items assessed workplace contact with COVID-19 patients. The first asked, “What is your level of contact with patients who have COVID-19 (or those suspected of having COVID-19)?” with response options: “I provide direct care or treatment to COVID-19 patients” (Direct Care); “I don’t provide direct care or treatment, but I have direct contact or interaction with COVID-19 patients” (Direct Contact); “I don’t provide care or interact with COVID-19 patients, but I support clinical services in another way” (No Contact); or “Other” (with space to provide additional details). “Other” responses ($n = 102$) were then recategorized into one of the three primary groups (e.g., HCWs treating

symptomatic patients who had not yet received positive tests were recategorized as Direct Care).

The second item asked: “On average, how many days of the week are you in direct contact with COVID-19 patients (or those suspected of having COVID-19)?” (0–7).

2.6. Statistical analyses

The association between contact with COVID-19 patients and outcome measures was assessed with quantile regression, which was used because of marked right skewness that was not sufficiently managed with log transformations. All models included sex and age as covariates and allowed for nonlinear age effects using restricted cubic splines. Model estimates and bootstrap confidence intervals are reported rather than p-values. All statistics were performed in R (www.r-project.org).

3.0. Results

The Direct Care group reported higher depressive and posttraumatic symptoms than the No Contact group. The Direct Contact group reported higher posttraumatic stress symptoms than the No Contact group. No additional psychological differences were detected between groups. More days/week of contact with COVID-19 patients corresponded to higher scores on all outcome measures. See Table 1 for details.

4.0. Discussion

Front-line HCWs and/or those with more frequent COVID-19 patient contact may be at elevated risk for psychological symptomatology. Findings may reflect the additional mental health burden borne by HCWs directly caring for COVID-19 patients.

HCWs were surveyed during the first peak of COVID-19 across the US, using relatively accessible methods (i.e., online, anonymous). All HCWs were recruited, generating responses from nurses, mental health providers, physicians, physician assistants, occupational therapists, and support staff, among others.

However, several limitations significantly restrict the conclusions that can be drawn, most notably the biased sample recruited via convenience sampling. Most participants were white and/or female, as with

Table 1
Psychological outcome scores by patient contact level and frequency.

	N	Distress (Kessler-5)	Depressive Symptoms (DSM-XC)	Posttraumatic Stress Symptoms (NSESSS)
Level of Contact with COVID-19 Patients				
Medians (Range, Interquartile Range)				
Direct Care	275	5 (0–18, 6)	3 (0–8, 4)	1.1 (0–3.7, 1.2)
Direct Contact	136	5 (0–20, 5)	2 (0–8, 2)	1 (0–4.0, 1.2)
No Contact	524	4 (0–16, 6)	2 (0–8, 3)	0.8 (0–3.8, 1)
Model Results (Coefficients with 95% Confidence Intervals)				
Direct Contact vs. Direct Care		0.04 (–1.10–1.70)	–0.65 (–1.00–0.00)	–0.05 (–0.19–0.19)
No Contact vs. Direct Care		–1.00 (–1.64–0.13)	–0.65 (–1.01–0.05)	–0.25 (–0.38–0.08)
No Contact vs. Direct Contact		–1.04 (–2.15–0.42)	0.00 (–0.48–0.16)	–0.21 (–0.37–0.05)
Frequency (days/week) of Contact with COVID-19 Patients				
Medians (Range, Interquartile Range)				
0	517	4 (0–16, 5)	2 (0–8, 3)	0.8 (0–3.8, 0.9)
1	98	5 (0–14, 5)	2 (0–8, 3)	0.85 (0–3.7, 1.2)
2	75	5 (0–20, 5)	2 (0–8, 3)	1 (0–4, 1.05)
3	96	6 (0–18, 6)	3 (0–8, 3)	1.2 (0–3.3, 1.02)
4	42	6 (0–17, 8)	3 (0–8, 2)	1 (0–3.1, 0.98)
5	109	6 (0–18, 5)	3 (0–7, 2)	1.1 (0–3.7, 1.4)
6 or 7	12	9 (1–17, 10)	2 (0–7, 4)	1.55 (0–3.3, 1.3)
Model Results (Coefficients with 95% Confidence Intervals)				
Days per week with COVID-19 patient contact		0.50 (0.23–0.74)	0.19 (0.04–0.27)	0.09 (0.06–0.13)

some other US studies (e.g., [Young et al., 2021]). As a result, the present sample does not adequately reflect the diverse US healthcare workforce. This may be due to the fact that nurses and mental health providers were overrepresented in our sample (28.2% and 19.9% respectively). In the US, approximately 75% of full-time HCWs are female, and approximately two-thirds of health care technicians and practitioners (e.g., nurses, physicians) identify as non-Hispanic white (United States Census Bureau, 2021). Recruitment methods (e.g., word-of-mouth from researchers, including several psychiatrists), the online format, and the time required to participate (up to 30mins) likely biased the sample towards mental healthcare providers and/or other professions more likely to be teleworking early in the pandemic. Future studies should systematically recruit more racially/ethnically diverse samples that represent US HCWs, especially because US COVID-19 hospitalizations and deaths have disproportionately affected communities of color (Centers for Disease Control and Prevention, 2021).

Considering the diversity and complexity of HCWs' experiences—and the potential for burnout and worsening mental health with prolonged exposure to COVID-19 patients—large-scale, longitudinal assessment of HCWs' mental health is needed to inform comprehensive interventions that support clinician wellbeing.

5.0. Author contributions

KTH: Conceptualized the study; designed the study; collected the data; drafted the manuscript; revised the manuscript.

EDB: Conceptualized the study; designed the study; edited the manuscript for critical intellectual content.

GEA: Conducted the literature search; collected the data; drafted the manuscript; revised the manuscript.

DKG: created the statistical design; conducted the statistical analyses; provided statistical interpretation; revised the manuscript.

GWC: Conducted the literature search; collected the data; revised the manuscript.

ED: Conducted the literature search; collected the data; revised the manuscript.

KS: helped conceptualize the study; collected the data; revised the manuscript.

CAZ: helped conceptualize the study; edited the manuscript for critical intellectual content; provided research supervision.

JYC: designed the study; edited the manuscript for critical intellectual content; provided research supervision.

LTP: Conceptualized the study; designed the study; helped interpret the statistical analysis; revised the manuscript; provided research supervision.

Declaration of Competing Interest

Dr. Zarate is listed as a co-inventor on a patent for the use of ketamine in major depression and suicidal ideation; as a co-inventor on a patent for the use of (2R,6R)-hydroxynorketamine, (S)-dehydronorketamine, and other stereoisomeric dehydroxylated and hydroxylated metabolites of (R,S)-ketamine metabolites in the treatment of depression and neuropathic pain; and as a co-inventor on a patent application for the use of (2R,6R)-hydroxynorketamine and (2S,6S)-hydroxynorketamine in the treatment of depression, anxiety, anhedonia, suicidal ideation, and post-traumatic stress disorders. He has assigned his patent rights to the US government but will share a percentage of any royalties

that may be received by the government. Dr. Hurst is a contractor for Concentric Methods, Manassas, Virginia. All other authors have no conflict of interest to disclose, financial or otherwise.

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Supplementary materials

Supplementary material associated with this article can be found, in the online version, at [doi:10.1016/j.psychres.2021.114359](https://doi.org/10.1016/j.psychres.2021.114359).

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