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Frontline Interdisciplinary Clinician Perspectives on Caring for Patients with COVID-19: A Qualitative Study

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Frontline Interdisciplinary Clinician Perspectives on Caring for Patients with COVID-19:

A Qualitative Study

Hassan Rao[1,2], Diana Mancini[1,2], Allison Tong[3, 4], Humaira Khan[5], Brissa Santacruz Gutierrez[6],

William Mundo[6], Adriana Collings[7], Lilia Cervantes[1,2,7]

[1]Division of Hospital Medicine, Denver Health, [2]Department of Medicine, University of

Colorado Anschutz Medical Campus, Aurora, Colorado, [3]Sydney School of Public Health, The

University of Sydney, Sydney; [4]Centre for Kidney Research, The Children's Hospital at

Westmead, Westmead, NSW, Australia, [5]Indiana University School of Medicine, [6]University of

Colorado, Anschutz Medical Campus, [7]Office of Research, Denver Health, Denver, Colorado,

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Hassan Rao, MD

Denver Health

777 Bannock, MC 4000

Hassan.Rao@dhha.org

Telephone: 303-602-6000 (Office)

Fax: 303-602-5056

ABSTRACT

OBJECTIVE: To describe the drivers of distress and motivations faced by interdisciplinary clinicians who were on the frontline caring for patients with COVID-19.

DESIGN: 50 Semi-structured interviews. Transcripts were analyzed using qualitative thematic analysis

SETTING: A safety net hospital in Denver, Colorado.

PARTICIPANTS: Interdisciplinary frontline clinicians including physicians, advance practice providers, nurses, respiratory therapists and paramedics providing inpatient hospital care to patients with hospitalized for COVID-19.

RESULTS: Fifty clinicians (32 women and 18 men) participated. Five themes with respective subthemes (in parentheses) were identified: depersonalization and barriers to care (impeding rapport and compassion, focusing on infection risk at the expense of high quality care, grief from witnessing patients suffer in isolation), powerless in uncertainty (inescapable awareness of personal risk, therapeutic doubt in a void of evidence, confronting ethical dilemmas, struggling with dynamic and unfamiliar challenges), overwhelmed and exhausted (burden of PPE, information overload and confusion, overstretched by additional responsibilities at work, compounded by personal life stressors, feeling vulnerable and dispensable, compassion fatigue, distress from the disproportionate impact on socially oppressed communities), bolstering morale and confidence (motivated by community and family support, equipped with data), and driven by moral duty (responsibility to patient care and community, collegial solidarity and collaboration, contributing to the greater good).

CONCLUSION: Frontline clinicians reported distress due to the challenges of PPE, uncertainty

and powerlessness, new responsibilities at work and home, losing control of their schedules,

grief from witnessing patients suffer in isolation and witnessing healthcare disparities

exacerbated by this pandemic. Clinicians feel supported by their colleagues, families, and

community and were driven by a sense of moral duty. Health care system should adopt strategies

to minimize distress faced by interdisciplinary clinicians on the frontline of COVID-19.

STRENGTHS AND LIMITATIONS OF THIS STUDY

- This study explores the experiences of fifty US interdisciplinary clinicians caring for hospitalized COVID-19 patients at one public safety-net hospital in Denver, Colorado between April 22 and July 8, 2020.

- Clinicians described the challenges, motivations and emotions they experienced while caring for hospitalized patients with COVID-19 during the first wave of the COVID-19 pandemic.

- Participating clinicians included physicians, advance practice providers, nurses, paramedics and respiratory therapists working in a variety of hospital settings including the emergency department, medical/surgical floor, and intensive care unit.

- A limitation to this study is the transferability of these findings to other hospital settings given the unique patient population, culture and resources available at this institution.

- Drivers of distress and motivation were identified with recommendations for possible strategies to support interdisciplinary clinicians.

FUNDING STATEMENT

This was an unfunded study.

COMPETING INTEREST STATEMENT

The authors do not have any competing interests or conflicts of interest to declare.

INTRODUCTION

The COVID-19 pandemic has presented unprecedented challenges for the healthcare system. In anticipation of this crisis, healthcare facilities focused on procurement of testing supplies and personal protective equipment (PPE), creating treatment algorithms, ethical resource allocation guidelines, and expanding bed capacity and staffing among other logistics to keep patients and clinicians safe.[1-4] Despite these efforts to protect clinicians, this pandemic has taken a significant toll on the physical, emotional and mental health of frontline clinicians.[2, 5-10] Given epidemic levels of burnout prior to this pandemic, and reports of suicides among frontline clinicians in New York City, it has become increasingly important to understand the driver of clinician distress through this pandemic.[11-13]

While it is clear that frontline responders to public health emergencies are particularly vulnerable to experiencing acute psychological distress, the underlying drivers of distress can be unique in different populations, cultures, clinical settings and with variable extent of impact and time course.[14] During the SARS pandemic, clinicians experienced distress related to uncertainty and fear of the unknown, stigmatization from becoming infected, social isolation and conflicting moral obligations to treat patients yet keep their families safe.[15-17] For some clinicians, this led to long-term mental health problems and burnout.[18-20] The COVID-19 pandemic is unique due to its widespread global impact, unpredictable and extended course, limited supplies, staff and bed capacity, and high risk of infection among frontline staff.[21-23]

Studies have found high rates of psychological symptoms among clinicians during this pandemic, yet there is limited qualitative data describing the drivers of distress.[24-35] The aim of this study was to describe the drivers of distress and motivation with the goals of informing local and national strategies to reduce avoidable distress in interdisciplinary clinicians on the frontline of COVID-19.

METHODS

Study Design

50 semi-structured interviews were conducted with frontline clinicians. All study participants provided informed verbal consent and received financial compensation. Participants were assigned a study identification number and were informed all information provided would remain confidential. The University of Colorado multi-Institutional Review Board approved this study.

Patient and Public Involvement

It was not appropriate or possible to involve patients or the public in the design of this research.

Setting and Participants

Eligible participants included interdisciplinary frontline clinicians including physicians, advance practice providers, nurses, and paramedics that participated in the care of suspected or confirmed positive COVID-19 patients at Denver Health (DH), a safety-net hospital. Participants were recruited by email and the first to respond were included. Purposive sampling was used to capture a diverse sample in terms of demographics (sex, age) and clinical discipline.

Data Collection

Face-to-face semi-structured interviews were conducted using a video conferencing platform from April 22 to July 8, 2020 by authors H.R., D.M., and L.C. until data saturation. The interview guide was based on the literature and discussion among the research team (Appendix Table 1).[7-10, 15-19] Interviews were recorded and transcribed verbatim.

Data Analysis

Using thematic analysis, authors H.R., D.M., A.T., and L.C. read the transcripts and inductively identified initial concepts. Author A.T. grouped similar concepts into themes and subthemes and coded the data using HyperRESEARCH software (version 4.1.1 ResearchWare Inc. Randolph MA). Authors H.R. and L.C. reviewed and discussed the coding and themes to make sure that the findings reflected the full range and depth of the data.

RESULTS

The 50 participants included 22 physicians, 18 registered nurses, 4 nationally registered paramedics, 2 respiratory therapists, and 4 advance practice providers (2 nurse practitioners, 1 physician assistant, and 1 certified registered nurse anesthetist) and 1 emergency medical technician. There were 32 (64%) females, 32 (64%) were married, and 28 (56%) had children. Twenty-seven (54%) lived with frontline clinicians (Table 1). The duration of the interviews ranged from 28 to 92 minutes.

We identified five themes: depersonalization and barriers to care; powerlessness in uncertainty; physical, emotional and mental exhaustion; bolstering morale and confidence; and driven by moral duty. The subthemes are described below with supporting quotations provided in Table 2 The conceptual link among themes are shown in thematic schema (Figure 1).

Depersonalization and barriers to care

Impeding rapport and compassion
The need to use personal protective equipment (PPE) made it difficult for participants to "connect with" and establish trust with patients because they could not communicate properly, were unable to "convey emotion." The PPE stripped away a core dimension of patient care by taking "a lot out of the human experience." Some felt that it was "like a zoo" because they would "look through a glass window and talk about a human being without them being involved."

Focusing on infection risk at the expense of high quality care

To minimize exposure, participants spent less time in patient rooms and assessed patients over the phone. Clinicians acknowledged that this was a "necessary evil," which limited their ability to provide high quality care. Except for in-person physical examination at the time of admission and discharge, clinicians assessed their patients over the phone only: "The hardest part is just having very little to offer out of what I would have considered my strongest toolkit." Some also questioned if they "missed something."

Grief from witnessing patients suffer in isolation

Due to isolation policies, patients were unable to have visitors. Participants felt "indescribable" grief because they could do little to alleviate the terror and loneliness patients suffered. "The family can't be there; it adds to the sadness of the situation where there's so much isolation... Patients are isolated from pretty much all support systems." It was also emotionally difficult helping patients communicate with their family – "I had her FaceTime her sister so she could see the baby that she'd never held…I don't cry, that's as close as it gets." COVID-19 was also considered by some to be "the worst possible way that someone could die because you're surrounded by air, you cannot breathe."

Powerless in uncertainty

Inescapable awareness of personal risk

Initial concerns about infection dissipated with confidence in PPE. However, this "air of invincibility was easily shattered" as more clinicians became sick and cared for patients that were fit or close to their own age – it's "scary, because when you look at them, you see your own family members and the potential for the people that you care about in your own life" to suffer the same fate. They were constantly processing "terrifying" and "existential questions" that intensified distress. Participants that contracted COVID worried about their own health and their loved ones.

Therapeutic doubt in a void of evidence

Participants were challenged by uncertainty and guilt stemming from the lack of data to inform prognostication and therapies. Many felt "powerless" and humbled by the unpredictability of the disease. Some felt like trainees again, "where everything is new and you think you know what you're doing but you're" unsure and have "self-doubt." They accepted that managing COVID-19 was "a lot of trial and error." Participants worried about medications that "weren't proven" and "that some people ended up on the ventilator that maybe wouldn't have needed to."

Confronting ethical dilemmas

Preparing for decisions about rationing resources was "incredibly stressful." It was horrifying to consider bearing the responsibility of "condemning a person to die" and the possibility of having to "sacrifice a few for the greater good." Conversations around goals of care were challenging without family members at the bedside; "it's just hard to really understand what your loved one is

going through." Many clinicians discussed goals of care at the time of admission for all patients regardless of age or comorbidities.

Struggling with dynamic and unfamiliar challenges

Frequent changes in policies, guidelines and conflicting information created a challenging and chaotic environment. They described how "every day was a new day. You really had no idea what was happening." Participants worked in new settings and felt constant anxiety being outside their "comfort zone." The uncertain course of the pandemic was challenging as they lost control over their schedules, cancelled vacations and accepted that they "might be in this for the long haul."

Overwhelmed and exhausted

Burden of PPE

Wearing PPE was exhausting. It was "difficult to breathe," "hot and uncomfortable" and slowed their ability to enter rooms and respond to patient requests for food, water or to use the bathroom. The process of wearing PPE and remembering each step added a new "cognitive load." The "hyper-awareness" of risk added stress – "it's led to me feeling like I made some silly mistakes, because I had energy devoted to what my hands just did, 'did I just use them to touch my face?'" In making decisions about orderings tests (e.g. imaging or labs), they considered if they would be exposing their colleagues. Some were worried about using the same masks all day - "it says on the box 'one-time use.'"

Information overload and confusion

Some participants felt inundated by information – "it's like drinking out of a fire hydrant". They had "informational burnout" and had difficulty processing new information as it was often changing or conflicting. Even outside of work, information about the pandemic was constantly on the news, social media and in conversations with friends – it was "exhausting".

Overstretched by additional responsibilities at work

Participants took on many new tasks such as coordinating internal communications, creating and managing databases, and following up on discharged patients. Many worked additional shifts – "two more weeks of work crammed into four weeks of work."

Compounded by personal life stressors

Participants were concerned about infecting their family and considered whether to isolate from their families. Participants with children had new, time-consuming challenges at home including homeschooling and coordinating childcare. Many felt "worn out" by these responsibilities – "trying to stay normal, to be the mother and the wife… because they [children] don't deserve to get less of me because of what's happening."

Feeling vulnerable and dispensable

As participants coped with the stress of additional shifts, responsibilities and risk, some began to feel "vulnerable." Some participants felt well supported from their leaders, but others felt a disconnect between clinical and administrative leadership. They felt leaders needed to be more present – "I think it would be eye opening for them to have to come in and see" the unique

challenges of providing care in PPE. Some were concerned about the burden of mandatory extra shifts and lack of "hazard pay." Hearing about a "hiring freeze" and seeing colleagues lose their jobs, made them feel expendable.

Compassion Fatigue

As the pandemic progressed, clinicians began feeling emotionally overwhelmed and started developing "compassion fatigue". The grief of caring for COVID patients was further amplified by what some clinicians felt was the psychological impact of quarantine on the community. They described seeing higher rates of patients presenting due to domestic violence, depression and suicides. Over time, clinicians began to feel emotionally exhausted and described symptoms of burnout – "my patience is less. My empathy is less."

Distress from the disproportionate impact on vulnerable communities

The injustice of COVID-19 was traumatic. Witnessing the disproportionate impact of the pandemic on racial and ethnic minorities as well as other vulnerable communities was devastating. It was "heartbreaking" to see multiple members of the same minority family hospitalized and critically ill simultaneously. Many expressed immense grief witnessing the impact on communities that may not have the privilege to isolate, "they were probably essential workers, or needing to work, or they were living in homes with multi-generational" families. They noticed "a huge disparity between the rich and the poor."

Bolstering morale and confidence

Motivated by community and family support

Participants appreciated the "outpouring of love and support" from the community who contributed food and donated PPE. They also relied on support from their families.

Equipped with data

Information could "reduce stress and anxiety" as it provided a "picture of where the hospital's standing." Communicating "big wins" such as the number of extubations and discharges inspired optimism. Executives provided transparency around PPE supplies, plans for procurement, and curated information from clinical trials. This helped many feel safe and informed. They appreciated clinical updates as they did not have "time or bandwidth to search through articles."

Driven by moral duty

Responsibility to patient care and community

Participants were committed to fulfilling their fundamental responsibility of treating patients who "deserve good care". They held a "high level of social justice and responsibility" and strived to care for the "underserved and impoverished" patients that presented with COVID-19.

Collegial solidarity and collaboration

Participants felt "unified around a common goal or a kind of common enemy [SARS-CoV-2]" and were encouraged by "interdisciplinary collaboration" and "sharing of knowledge." They

were "in it together" and needed to "have each other's back," particularly given the additional

staffing required to manage the crisis: "We lean on each other, we support each other, we expect

each other to be there."

Contributing to the greater good

Some believed it was their "responsibility" to contribute to the greater good and to be a "good

and positive force." They felt stimulated to understand a novel disease and use their training and

skills to "contribute new knowledge" in managing patients with COVID-19 and to be "part of the

solution."

DISCUSSION

In this study, we report distress and motivations of interdisciplinary clinicians who provided care

to hospitalized patients with COVID-19. Clinicians at the frontline of COVID-19 experienced

distress from the emotional and physical burden of PPE, increased responsibilities at work and

home, witnessing patients dying in isolation, and the exacerbation of systemic healthcare

disparities. Clinicians also reported feeling fear, guilt and powerlessness stemming from the

many uncertainties of this pandemic. Many clinicians described how these emotions progressed

to compassion fatigue, vulnerability and exhaustion reflected in the qualitative themes. These

findings are consistent with high rates of distress described in quantitative studies during the

current pandemic. Clinicians' fears related to risk of infection, uncertainties of the disease, and

feelings of exhaustion as well as being driven by a sense of duty and solidarity are consistent

with studies from the SARS pandemic and qualitative data describing experiences of clinicians

in China during the early stage of this pandemic. However, many clinicians described how the

emotional challenges of caring for patients with PPE and hospital isolation policies were compounded by the grief of witnessing an exacerbation of systemic healthcare disparities, which has become more apparent in the COVID-19 pandemic.

Increasing workload and loss of a sense of control have been described as powerful contributors to distress that may lead to burnout.[36, 37] We identified many facets of uncertainty in the context of COVID-19 including being unable to prognosticate the course of the illness, lack of evidence and therapeutics leading to clinical decisional uncertainty, rapidly changing guidelines and policies, unclear risk of infection, the unknown duration and severity of the pandemic, and a loss of control to their schedules. Clinicians were also distressed by feeling helpless and distressed from witnessing patients suffering in isolation. While clinicians adapted to these uncertain circumstances, there is concern for maintaining this resiliency if long-term solutions around managing workload are not identified by leadership.

There is also concern of increased distress in clinicians who provide care to patients that face complex social challenges.[38, 39] Clinicians caring for patients with COVID-19 were dismayed and frustrated by how vulnerable groups such as impoverished, racial and ethnic minority communities had disproportionally higher rates of COVID-19 infection than the general population. While it is possible that this impact may be more noticeable in safety-net institutions, several studies have confirmed the increased prevalence and mortality associated with COVID-19 in Latino, Black, and "other" ethnicities.[40] Clinicians felt defeated because there were limited options for safe self-isolation in these communities due to crowded living conditions, use of public transportation, and low-wage service jobs. They were frustrated by barriers that precluded

in-person language interpreters owing to the limited availability of PPE and having to resort to telephone language interpreters compounding the difficulties of communicating while wearing PPE.

Higher rates of distress during the COVID-19 pandemic have been found among younger age groups, females, and nurses (compared to physicians).[5-10] This may be because young clinicians with children are burdened by increased responsibilities at work and home compounded by losing control and predictability of their work schedules. Nurses in our study encountered many logistical obstacles as they were required to work additional shifts and often spend more time at the bedside resulting in more time wearing PPE, higher risk of exposure, and more time spent witnessing patients suffer in isolation.

Our study has key implications to prevent or minimize distress and risk of subsequent burnout in clinicians (Table 3). There is an urgent need to address this, as burnout can lead to poor patient outcomes and will impair the ability of the healthcare system to respond to this crisis.[41-44] We suggest that institutional leadership create clear structures for understanding and addressing concerns of frontline clinicians, communicate contingency staffing plans to manage workload and allow frontline clinicians to regain a sense of control of their schedules. Studies have also shown that it is important to support workers' childcare needs during crisis situations.[35, 45] We recognize that clinicians may not engage in psychological services on their own accord, and therefore suggest that institutions offer proactive psychological counseling and establish peer-to-peer support mechanisms as these provide the most benefit.[32-34, 46] Finally, it is critical to address structural racism and healthcare disparities as this is an important driver of distress highlighted

by this pandemic. This includes improving access to testing, equitable resource allocation,

enhanced outreach programs for minority communities, improved access to in-person translation

services and cultural humility training for all staff.

LIMITATIONS

Our study generated detailed insights on the experiences among frontline clinicians caring for

COVID-19 patients. However, our study has some potential limitations. Clinicians were from

one academic safety-net hospital in Colorado, thus the transferability of the findings to other

settings is uncertain. As this study was performed at the early phase of the COVID-19 pandemic,

it is also possible that clinician experiences have changed with anticipation of new therapies and

the possibility of a vaccine.

Future research is needed to assess the effectiveness of strategies to screen for and reduce

psychological distress. While it is clear that clinicians experiencing distress will benefit from

multifaceted psychological support, ideal implementation strategies to engage and support

clinicians is unclear.[47] There is also limited knowledge of the effectiveness of online-based

counseling which can be implemented more readily and have been used to support clinicians in

China.[48]

CONCLUSION

Frontline clinicians caring for COVID-19 patients experience distress related to challenges of PPE, clinical uncertainty and powerlessness, new responsibilities at work and home, losing control of their schedules, and grief from witnessing patients suffer in isolation and witnessing healthcare disparities exacerbated by this pandemic. Providers feel supported by their colleagues, families, and community and were driven by a sense of moral duty. Institutions should further support frontline clinicians by making efforts to understand and address their challenges, provide proactive mental health support, and advocate vulnerable communities.

References

1. Liu Y, Li J, Feng Y. Critical care response to a hospital outbreak of the 2019-nCoV infection in Shenzhen, China. *Crit Care*. 2020;24(1):56. Published 2020 Feb 19. doi:10.1186/s13054-020-2786-x

2. Liew MF, Siow WT, MacLaren G, See KC. Preparing for COVID-19: early experience from an intensive care unit in Singapore. *Crit Care*. 2020;24(1):83. Published 2020 Mar 9. doi:10.1186/s13054-020-2814-x

3. Chopra V, Toner E, Waldhorn R, Washer L. How Should U.S. Hospitals Prepare for Coronavirus Disease 2019 (COVID-19)?. *Ann Intern Med*. 2020;172(9):621-622. doi:10.7326/M20-0907

4. Wee LE, Fua TP, Chua YY, et al. Containing COVID-19 in the Emergency Department: The Role of Improved Case Detection and Segregation of Suspect Cases. *Acad Emerg Med*. 2020;27(5):379-387. doi:10.1111/acem.13984

5. Lai J, Ma S, Wang Y, et al. Factors Associated With Mental Health Outcomes Among Health Care Workers Exposed to Coronavirus Disease 2019. *JAMA Netw Open*. 2020;3(3):e203976. doi:10.1001/jamanetworkopen.2020.3976

6. Rossi R, Socci V, Pacitti F, et al. Mental Health Outcomes Among Frontline and Second-Line Health Care Workers During the Coronavirus Disease 2019 (COVID-19) Pandemic in Italy. *JAMA Netw Open.* 2020;3(5):e2010185. doi:10.1001/jamanetworkopen.2020.10185

7. Zhang WR, Wang K, Yin L, et al. Mental Health and Psychosocial Problems of Medical Health Workers during the COVID-19 Epidemic in China. *Psychother Psychosom*. 2020;89(4):242-250. doi:10.1159/000507639

8. Wu W, Zhang Y, Wang P, et al. Psychological stress of medical staffs during outbreak of COVID-19 and adjustment strategy [published online ahead of print, 2020 Apr 21]. *J Med Virol*. 2020;10.1002/jmv.25914. doi:10.1002/jmv.25914

9. Cai H, Tu B, Ma J, et al. Psychological Impact and Coping Strategies of Frontline Medical Staff in Hunan Between January and March 2020 During the Outbreak of Coronavirus Disease 2019 (COVID-19) in Hubei, China. *Med Sci Monit*. 2020;26:e924171. Published 2020 Apr 15. doi:10.12659/MSM.924171

10. Mo Y, Deng L, Zhang L, et al. Work stress among Chinese nurses to support Wuhan in fighting against COVID-19 epidemic. *J Nurs Manag*. 2020;28(5):1002-1009. doi:10.1111/jonm.13014

11. National Academies of Sciences, Engineering, and Medicine. Taking action against clinician burnout: a systems approach to professional well-being. Washington, DC: National Academies Press, 2019

12. Watkins, A., Rothfeld, M., Rashbaum, W. and Rosenthal, B., 2020. *Top E.R. Doctor Who Treated Virus Patients Dies By Suicide*. [online] Nytimes.com. Available at: <https://www.nytimes.com/2020/04/27/nyregion/new-york-city-doctor-suicide-coronavirus.html> [Accessed 8 August 2020].

13. Edelman, S., Moore, T., Narizhnaya, K. and Balsamini, D., 2020. *EMT John Mondello Kills Himself After Less Than Three Months On The Job*. [online] New York Post.

Available at: <https://nypost.com/2020/04/25/nyc-emt-commits-suicide-with-gun-belonging-to-his-dad/> [Accessed 8 August 2020].

14. Belfroid E, van Steenbergen J, Timen A, Ellerbroek P, Huis A, Hulscher M. Preparedness and the importance of meeting the needs of healthcare workers: a qualitative study on Ebola. *J Hosp Infect*. 2018 Feb;98(2):212-218. doi: 10.1016/j.jhin.2017.07.001. Epub 2017 Jul 6. PMID: 28690117; PMCID: PMC7114583.

15. Maunder R, Hunter J, Vincent L, et al. The immediate psychological and occupational impact of the 2003 SARS outbreak in a teaching hospital. *CMAJ*. 2003;168(10):1245-1251.

16. Nickell LA, Crighton EJ, Tracy CS, et al. Psychosocial effects of SARS on hospital staff: survey of a large tertiary care institution. *CMAJ*. 2004;170(5):793-798. doi:10.1503/cmaj.1031077

17. Maunder RG, Lancee WJ, Rourke S, et al. Factors associated with the psychological impact of severe acute respiratory syndrome on nurses and other hospital workers in Toronto. *Psychosom Med*. 2004;66(6):938-942. doi:10.1097/01.psy.0000145673.84698.18

18. Wu P, Fang Y, Guan Z, et al. The psychological impact of the SARS epidemic on hospital employees in China: exposure, risk perception, and altruistic acceptance of risk. *Can J Psychiatry*. 2009;54(5):302-311. doi:10.1177/070674370905400504

19. Maunder RG, Lancee WJ, Balderson KE, et al. Long-term Psychological and Occupational Effects of Providing Hospital Healthcare during SARS Outbreak. *Emerging Infectious Diseases*. 2006;12(12):1924-1932. doi:10.3201/eid1212.060584.

20. Lancee WJ, Maunder RG, Goldbloom DS; Coauthors for the Impact of SARS Study. Prevalence of psychiatric disorders among Toronto hospital workers one to two years after the SARS outbreak. *Psychiatr Serv*. 2008;59(1):91-95. doi:10.1176/ps.2008.59.1.91

21. Wu YC, Chen CS, Chan YJ. The outbreak of COVID-19: An overview. *J Chin Med Assoc*. 2020;83(3):217-220. doi:10.1097/JCMA.0000000000000270

22. Kang L, Li Y, Hu S, Chen M, Yang C, Yang BX, et al. The mental health of medical workers in Wuhan, China dealing with the 2019 novel coronavirus. *Lancet Psychiatry*. 2020;7(3):e14. https://doi. org/10.1016/S2215-0366(20)30047-X

23. Chew NWS, Lee GKH, Tan BYQ, et al. A multinational, multicentre study on the psychological outcomes and associated physical symptoms amongst healthcare workers during COVID-19 outbreak [published online ahead of print, 2020 Apr 21]. *Brain Behav Immun*. 2020;S0889-1591(20)30523-7. doi:10.1016/j.bbi.2020.04.049

24. Wang C, Horby PW, Hayden FG, Gao GF. A novel coronavirus outbreak of global health concern [published correction appears in Lancet. 2020 Jan 29;:]. *Lancet*. 2020;395(10223):470-473. doi:10.1016/S0140-6736(20)30185-9

25. Zhang SX, Liu J, Afshar Jahanshahi A, et al. At the height of the storm: Healthcare staff's health conditions and job satisfaction and their associated predictors during the epidemic peak of COVID-19. *Brain Behav Immun*. 2020;87:144-146. doi:10.1016/j.bbi.2020.05.010

26. Preti E, Di Mattei V, Perego G, et al. The Psychological Impact of Epidemic and Pandemic Outbreaks on Healthcare Workers: Rapid Review of the Evidence. *Curr Psychiatry Rep*. 2020;22(8):43. Published 2020 Jul 10. doi:10.1007/s11920-020-01166-z

27. Luo M, Guo L, Yu M, Jiang W, Wang H. The psychological and mental impact of coronavirus disease 2019 (COVID-19) on medical staff and general public - A systematic review and meta-analysis [published online ahead of print, 2020 Jun 7]. *Psychiatry Res*. 2020;291:113190. doi:10.1016/j.psychres.2020.113190

28. Liu Q, Luo D, Haase JE, et al. The experiences of health-care providers during the COVID-19 crisis in China: a qualitative study. *Lancet Glob Health*. 2020;8(6):e790-e798. doi:10.1016/S2214-109X(20)30204-7

29. Sun N, Wei L, Shi S, et al. A qualitative study on the psychological experience of caregivers of COVID-19 patients. *Am J Infect Control*. 2020;48(6):592-598. doi:10.1016/j.ajic.2020.03.018

30. Tan R, Yu T, Luo K, et al. Experiences of clinical first-line nurses treating patients with COVID-19: A qualitative study [published online ahead of print, 2020 Jul 13]. *J Nurs Manag*. 2020;10.1111/jonm.13095. doi:10.1111/jonm.13095

31. Sterling MR, Tseng E, Poon A, et al. Experiences of Home Health Care Workers in New York City During the Coronavirus Disease 2019 Pandemic: A Qualitative Analysis. *JAMA Intern Med*. Published online August 04, 2020. doi:10.1001/jamainternmed.2020.3930

32. Maunder RG, Leszcz M, Savage D, et al. Applying the lessons of SARS to pandemic influenza: an evidence-based approach to mitigating the stress experienced by healthcare workers. *Can J Public Health*. 2008;99(6):486-488. doi:10.1007/BF03403782

33. Brooks SK, Webster RK, Smith LE, et al. The psychological impact of quarantine and how to reduce it: rapid review of the evidence. *Lancet*. 2020;395(10227):912-920. doi:10.1016/S0140-6736(20)30460-8

34. Brooks, Samantha, Dunn, Rebecca, Amlot, Richard, Rubin, Gideon, Greenberg, Neil. A Systematic, Thematic Review of Social and Occupational Factors Associated With Psychological Outcomes in Healthcare Employees During an Infectious Disease Outbreak. *J Occup Environ Med*. 2018;**60**(**3**):248-257. doi:10.1097/JOM.0000000000001235.

35. Shanafelt T, Ripp J, Trockel M. Understanding and Addressing Sources of Anxiety Among Health Care Professionals During the COVID-19 Pandemic. *JAMA*. 2020;323(21):2133–2134. doi:10.1001/jama.2020.5893

36. Southwick FS, Southwick SM. The Loss of a Sense of Control as a Major Contributor to Physician Burnout: A Neuropsychiatric Pathway to Prevention and Recovery. *JAMA Psychiatry*. 2018;75(7):665-666. doi:10.1001/jamapsychiatry.2018.0566

37. Freeborn DK. Satisfaction, commitment, and psychological well-being among HMO physicians. *West J Med*. 2001;174(1):13-18.

38. Cervantes L, Richardson S, Raghavan R, et al. Clinicians' Perspectives on Providing Emergency-Only Hemodialysis to Undocumented Immigrants: A Qualitative Study. *Ann Intern Med.* 2018;169(2):78-86. doi:10.7326/M18-0400

39. Hayashi AS, Selia E, McDonnell K. Stress and provider retention in underserved communities. *J Health Care Poor Underserved*. 2009;20(3):597-604. doi:10.1353/hpu.0.0163

40. Dorn AV, Cooney RE, Sabin ML. COVID-19 exacerbating inequalities in the US. *Lancet*. 2020 Apr 18;395(10232):1243-1244. doi: 10.1016/S0140-6736(20)30893-X. PMID: 32305087; PMCID: PMC7162639.

41. Munnangi S, Dupiton L, Boutin A, Angus LDG. Burnout, Perceived Stress, and Job Satisfaction Among Trauma Nurses at a Level I Safety-Net Trauma Center. *J Trauma Nurs*. 2018;25(1):4-13. doi:10.1097/JTN.0000000000000335

42. Fahrenkopf AM, Sectish TC, Barger LK, et al. Rates of medication errors among depressed and burnt out residents: prospective cohort study. *BMJ* 2008; 336: 488–91.

43. West CP, Tan AD, Habermann TM, Sloan JA, Shanafelt TD. Association of resident fatigue and distress with perceived medical errors. *JAMA* 2009; 302: 1294–300.

44. Shanafelt TD, Balch CM, Bechamps G, et al. Burnout and medical errors among American surgeons. *Ann Surg* 2010; 251: 995–1000.

45. Charney RL, Rebmann T, Flood RG. Emergency Childcare for Hospital Workers During Disasters. *Pediatr Emerg Care*. 2015;31(12):839-843. doi:10.1097/PEC.0000000000000629

46. Chen Q, Liang M, Li Y, et al. Mental health care for medical staff in China during the COVID-19 outbreak [published correction appears in Lancet Psychiatry. 2020 May;7(5):e27]. *Lancet Psychiatry*. 2020;7(4):e15-e16. doi:10.1016/S2215-0366(20)30078-X

47. Pollock A, Campbell P, Cheyne J, Cowie J, Davis B, McCallum J, McGill K, Elders A, Hagen S, McClurg D, Torrens C, Maxwell M. Interventions to support the resilience and mental health of frontline health and social care professionals during and after a disease outbreak, epidemic or pandemic: a mixed methods systematic review. Cochrane Database Syst Rev. 2020 Nov 5;11:CD013779. doi: 10.1002/14651858.CD013779. PMID: 33150970.

48. Liu S, Yang L, Zhang C, et al. Online mental health services in China during the COVID-19 outbreak. *Lancet Psychiatry*. 2020;7(4):e17-e18. doi:10.1016/S2215-0366(20)30077-8

Table 1. Patient Characteristics (N=50)

Characteristic	Value (n = 50)
Age, mean (SD), y	40.6 (8.6)
Females, No (%)	32 (64)
Married, No (%)	32 (64)
Dependents, more than 1, No (%)	28 (56)
Clinical experience, mean (SD), y	12.5 (8.4)
At least 2 frontline workers at home, No (%)	6 (12)
Days worked with COVID 19 patients in past month, mean (SD)	11.5 (5.1)
Patients transferred to ICU in last two weeks, mean (SD)	4.3 (4.3)
Code blues during last two weeks, mean (SD)	1.4 (1.7)
Deaths during last two weeks, mean (SD)	1.5 (2.4)
Participants with COVID-19, No (%)	4 (8)
Discipline, n (%)	
Hospital Medicine	
Physician	5 (10)
Nurse	6 (12)
Nurse Practitioner	1 (2)
Pulmonary/Critical Care	
Physician	6 (12)
Nurse	6 (12)
Emergency Medicine	
Physician	4 (8)
Physician Assistant	1 (2)
Nurse Practitioner	1 (2)
Nurse	5 (10)
Emergency Medical Technicians	1 (2)
Nationally Registered Paramedic	4 (8)
Anesthesiology	
Physician	3 (6)
Certified Registered Nurse Anesthetist	1 (2)
Infectious Disease Physician	2 (4)
Respiratory Therapists	2 (4)

Table 2. Selected supporting quotations

Theme	Quotations
Depersonalization and barriers to care	
Impeding rapport and compassion	You don't get to know the patient as a person (Physician, 30s)
	It just feel very impersonal, when you're used to being very close to people… being able to sit with them … they can see your whole face, see your expressions… It's challenging... to give people confidence and compassion and just convey to them that you really do care. (Nurse, female, 40s)
	The depersonalization of medicine… I feel guilty because I'm not engaged with them on the same humanistic level that I typically would with a patient who is clinically worsening. (Physician, male, 30s)
Focusing on infection risk at the expense of high quality care	We had a patient who fell, she was my patient. And because she put her call light on, she called appropriately, she was impulsive, but like we were not able to get into to the room fast enough, because we had to put on our gear and she, she fell, like she fell hard. (Nurse, female 30s)
	He was brought in, he had tombstone EKGs and he had a massive MI. So, you know, before COVID, shortness of breath in a man you, would think cardiac dyspnea, but it's like, we had these terrible COVID blinders on… I saw a man that had just terrible DKA and he was admitted and he had a cardiac arrest right after that and then suffered a terrible anoxic injury. And…. he would have come in earlier if it hadn't been for COVID. (Physician, male, 40s)
Grief from witnessing patients suffer in isolation	Those family members can't be here. That's just really hard to see that when somebody really needs a loving person… So I gave her a great big hug, and I felt her sadness, and that's just something that I will probably carry with me forever. It's just that feeling of loneliness and sadness that you just can't describe... That truly right now is the hardest thing I deal with every day. (Nurse, female, 50s)
	I held a tablet up for a patient who was not alert, responsive, and the family was just like just like we love you, Grandpa, stay strong, and I felt like I was intruding. I was heartbroken watching this like moment take place. (Nurse, female, 30s)
	He basically just spent the last five days of his life alone, delirious, for which normally we treat delirium with patients' family at the bedside, reorientation. We did none of that. We really provided sub-optimal care and he died in isolation. (Physician, female, 30s)
Powerless in uncertainty	
Inescapable awareness of personal risk	And just that kind of reminder that you don't have to be old to get sick, I'm afraid for the patient, I'm afraid for myself. I'm afraid for the people that I care about in my own life. (Nurse, female, 30s)
	Practicing medicine is just difficult and there are uncertainties about supplies and about my own personal safety as a practicing physician (Physician, female, 40s)
Therapeutic doubt in a void of evidence	The fact that a medication wasn't proven. We didn't have good data. This was disconcerting. To not know what we should be recommending… We've learned a lesson that these unproven therapies could be harmful. If you're going to do something that's unproven, you should do it within a trial. We could really be doing more harm than good. That was just a lesson I learned. I was just excited to jump on the bandwagon and offer whatever I could and whatever other institutions were doing. (Physician, female, 30s)
	It's pretty unpredictable compared to a lot of other things we treat. You might feel like your patient is clinically improving or kind of out of the woods and then suddenly, they take a turn for the worse. And that then relates to how you can talk to a patient because you can't, it's difficult to have 100% confidence and say, you're going to be fine. You're improving, you're going to continue to improve because that's all probably not true. (Physician, male, 30s)
	I have a lot of fear that that we don't know what's going to make them better or not better… there's a lot of times when I leave work that I feel really empty. Like I don't know if I made a difference and It's kind of sad, like I have a lot of sadness. (Nurse, female, 50s)
Confronting ethical dilemmas	So this is a patient who comes in, they're full code, but we don't have the resources and I had to decide if the 88 year old grandma on dialysis gets the ventilator or the 44 year old. And even just the weight that you have to carry if that's your decision right? That you just condemned this person to die and not this person. It's something that I worried a lot about for myself and also

	for our trainees; that our residents would have to be exposed to this stuff and carry it with them for the rest of their lives. (Physician, male, 40s)
Struggling with dynamic and unfamiliar challenges	The uncertainty about the future, not being able to know like 6 months ahead what our schedule is going to be like and it feels like things could change on any given day. (Physician, female, 30s)
	I'm constantly out of my comfort zone there's literally like nothing that is routine or second nature for me. My nervous system is like constantly in like flight mode and sweaty when I am running to a patient's room. (Nurse, female, 30)
Overwhelmed and exhausted	
Burden of PPE	It's very different in a nine hour shift with the PPE… it was uncomfortable and that was also fatiguing. That was all new mental energy that had to be expended to do your job. (Physician, male, 40s)
	Some days I feel really claustrophobic in the mask and it like increases my anxiety. (Nurse, female, 30s)
	Just the physical nature of having so many patients prone and flipping them and all of that it's physically hard. (Nurse, female, 50s)
Information overload and confusion	We're just burnt out from the constant changing of policies and expectations. (Nurse, female, 40s)
	Things are literally changing on like a day to day, hour by hour basis. (Physician, male, 40s)
	It was kind of unique part of COVID is that every day you're also kind of battling the news cycle and being aware of that news cycle, you know, so, like getting questions because the president says he takes hydroxychloroquine. (Physician, female, 30s)
Overstretched by additional responsibilities at work	I'm not alone when I'm saying that I'm feeling burnt out and overwhelmed. (Nurse, female, 30s)
	The last week that I was on… come straight home for an hour or two and then write notes until midnight, or 1230 and then get up and do it all over again... It was kind of you know, basic like functioning, eat food and then do more work. (Physician, male, 40s)
	Calling patients families at the end of each day because they couldn't have visitors … and giving them updates for the day and that by itself took a lot of time and was draining and not something that is normally part of our daily routine. (Physician, male, 30s)
Compounded by life stressors	Having to be like quarantined and do homeschooling on top of all that. It's been very difficult. (Nurse, female, 40s)
	Should I separate myself? We ultimately decided that, that would be more traumatic and that this is a marathon and not a spring and that separating myself would be more traumatic… We decided that the risk of this being really upsetting and traumatic for the children would be worse. We had to weigh all of this. (Physician, female, 30s)
Feeling vulnerable and dispensable	It made me feel dispensable…There's very much a sense of us not being part of the conversation and instead we are just told that this is how things are going to happen. (Physician, female, 40s)
	I never felt more vulnerable than this situation has made me feel in healthcare. (Nurse, female, 40s)
	If you want to do sort of a war analogy, it feels like all the generals are making decisions for the people that are dying on the field and nobody, you know, without knowing the reality of it… And so, I mean, I would just, I think it would be eye opening for them to have to come in and see, you know, a prone patient core, you know, and just watch. (Female, nurse, 30s)
	People are being asked to work more but are not compensated more. Taking more risk despite having loved ones. It hurt a lot of feelings and made people feel unappreciated. (Physician, female, 30s)
Compassion fatigue	My patience is less. And my empathy is less. My empathy meter is low. (Physician assistant, female, 30s)
	So the compassion fatigue I've actually experienced has been with the patients that I don't feel need to be there, right? Like, why are you here? Why are you using these resources? You twisted your ankle three weeks ago, you've been walking around fine.... but yeah, there's some compassion fatigue towards those kind of people and I'm trying to save whatever emotional response I have left for the people who I feel like needed it, if that make sense. (Nurse practitioner, female, 30s)
	I've been much better about it trying to save those emotions for when it matters. So I guess I've been stingier with my feelings, if that makes sense. (Nurse, female 30s)

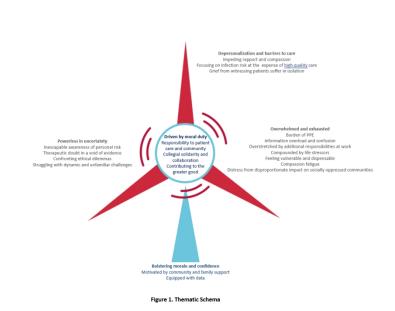| Distress from the disproportionate impact on socially oppressed communities	At one point every single patient in our unit was COVID positive and every single one of them had a Hispanic last name and I just feel a lot of just mixed emotions, probably between sort of anger and just kind of profound sadness. I'm just so saddened by just how unfair it seems. (Nurse, female, 50s)
	I worry a lot about after they leave, sort of depending on their situation, and their ability to either socially distance or remain stay or have access to things like that's a big concern. (Physician, female, 50s)
	I took care of the grandfather or like the father who was 90-something, and his son was on a ventilator, his grandson was in the ICU as well, and I talked to his daughter-in-law… The poor family was just like, totally stressed out; and that was really heartbreaking… There was something about this pandemic in that, three fourths of everyone was Latino. And to know why they were getting it, in that they were probably essential workers, or needing to work, or they were living in homes with multi-generational kind of situations; that was really sad and most of them had nothing. The family, they're barely making it, and how are they going to survive financially? (Physician, female, 40s)
	To be doing the bulk of my interviews through the glass on the phone, particularly with Spanish speakers, it was very unsettling and unsatisfying on a certain level because I just did feel like I was doing my best, which was really hard. You wonder like, did you miss something? (Physician, male, 30s)
Bolstering morale and confidence	
Motivated by community and family support	Community support that's been very touching to me just like the people donating food or like donating masks or create a company like donate goggles, (Nurse, female, 30s)
	It was the fact that like, "Oh, like, people care about us and recognize that what we're doing right now is important" and that lifted spirits. (Physician, male, 40s)
Equipped with data	I feel like I know what's going on and so that's calming. (Physician, female, 30s)
	I think an organized plan for what we will do if there is a surge or whether we will be needed to cover hospital shifts… That communication is important because it gives us an idea of where we are with the curve and our hospital capacity. (Physician, female, 30s)
	We heard the other day we're running low on masks; they're not trying to hide that. They communicate also what this solution is, what the fix is. That's hugely important, that builds trust, we're able to plan for things, know when things are coming. (Nurse, female, 40s)
Driven by moral duty	
Responsibility to patient care and community	A professional obligation that this is what I've trained for. (Female, physician, 30s)
	This has been particularly hard on our…. most vulnerable communities … That kind of gives a little extra motivation to want to like show up and work hard and take really good care of them. (Physician, male, 30s)
Collegial solidarity and collaboration	Specialists, nurses – especially nurses – are a lot more willing to go above and beyond to take care of these people. That collective, all hands on deck, throughout the hospital, is really reassuring – everyone pitching in however they can. (Nurse practitioner, male, 30s)
	I want to support my fellow staff and I don't want to leave them short. (EMT, male, 30s)
Contributing to the greater good	When everything is so negative, I do feel that I can be a good force, I can be at least something positive in all of it. (Nurse, female, 40s)
	To be apart of this illness that nobody really understands. From a scientific background, it is really interesting that we are learning new stuff, day by day, week by week. (Nurse practitioner, male, 30s)

Table 3. Suggested interventions to support frontline clinicians

Strategy	Suggested Actions or Interventions
Acknowledge and address concerns	• Create a clear reporting structure and mechanism to allow frontline clinicians to voice clinical concerns • Communicate acknowledgement and validation of concerns as well as plans to address concerns • Maintain an active presence by administrative leadership on clinical floors to improve communication and better understand frontline clinician challenges • Minimize or consider suspending productivity reports and measurements
Reduce clinical uncertainty	• Establish mechanisms for knowledge sharing and delivering emerging clinical research updates • Create and maintain clinical diagnostic and therapeutic guidelines
Reduce burden of ethical decisions	• Create standardized resource allocation framework to reduce burden of decision making • Standardize processes for discussion of goals of care at admission • Improve access to and staffing for palliative care and chaplain services
Reduce infection risk	• Maintain adequate supplies of PPE • Allow rapid access for employee testing and occupational health support • Provide information and resources on best practices to minimize infection risk for family members of clinicians
Address healthcare disparities	• Allocate testing and access to care fairly with special consideration to communities with preexisting technological and health literacy gaps • Expand respite facilities to allow for greater access to safe social isolation • Ensure that patients have access to robust interpretation services • Develop culture and language concordant educational community outreach programs • Provide cultural humility training
Bolster psychological support	• Validate and communicate understanding of expected psychological distress • Train providers on applying psychological first aid • Establish one on one check-ins with clinicians to screen for severe distress and burnout • Develop programs that allow clinicians reprieve while on clinical shifts • Engage clinicians in counseling by creating opportunities for peer-to-peer support • Increase access to professional psychological counseling
Improve workload management and quality of patient care	• Offer childcare solutions for frontline clinicians • Ensure adequate staffing and create a threshold to hire additional clinicians in anticipation of surging demand • Limit the number of days or consecutives weeks worked • Allow for breaks from COVID-19 wards • Allow and provide adequate training for clinicians to cross-train in units with increasing demand
Improve data transparency	• Deliver information in a simple, coordinated, succinct and consistent matter • Provide transparency on PPE supplies and plans for procurement • Communicate financial and operational plans to address institutional impact of the pandemic

Figure Legend

Figure 1: Thematic schema to visually represent the intersection of all themes and subthemes.

See image in attachment.

Depersonalization and barriers to care
Impeding rapport and compassion
Focusing on infection risk at the expense of high quality care
Grief from witnessing patients suffer in isolation

Powerless in uncertainty
Inescapable awareness of personal risk
Therapeutic doubt in a void of evidence
Confronting ethical dilemmas
Struggling with dynamic and unfamiliar challenges

Driven by moral duty
Responsibility to patient care and community
Collegial solidarity and collaboration
Contributing to the greater good

Overwhelmed and exhausted
Burden of PPE
Information overload and confusion
Overstretched by additional responsibilities at work
Compounded by life stressors
Feeling vulnerable and dispensable
Compassion fatigue
Distress from disproportionate impact on socially oppressed communities

Bolstering morale and confidence
Motivated by community and family support
Equipped with data

Figure 1. Thematic Schema

Thematic Schema

Appendix Table 1. Interview Guide

Motivation

1. What are the reasons you are on service with COVID-19 Patients? What motivates you? Are there any unique or new motivations you feel amid this pandemic?
2. Are there times you feel uncertain or hesitant? If so, why?
3. With a growing number of patients, there may be more clinical shifts that need to be covered. Would you consider volunteering or taking additional shifts? Why or why not?
4. Given some of the unique challenges of these patients, how do you cope after a long day, or several days in a row of caring for these patients? Anything specific you do for yourself or others?

Challenges in the clinical setting

1. What are some challenges you are facing while caring for COVID-19 patients? What impact does this have on you?
2. What kind of emotions or feelings do you have when providing direct care for COVID-19 patients? Does it impact your capacity to provide care, if so, how?
3. What things add to your stress?

Personal/life impact

1. What is life like outside of work on the days you are working? What impact has this had on you and your family?
2. How are the other lifestyle changes (i.e. lock-down, school closures) impacting you?
3. Have you had to make any changes in the way you interact with your family? Protect your family or others in your home?
4. Do you have any specific concerns about the health of any of your family members at home?
5. What has been your biggest challenge outside the hospital during this time? What impact has this had on your clinical work?

Priorities – support for clinicians

1. What do you wish you had known when you first started taking care of patients that has helped you, that you know now?
2. Do you feel supported?
3. What could be done to better support you?
4. What did you find particularly helpful? What was not helpful?
5. Is the way you are receiving information helpful?
6. What could be better? Does the information add or reduce any fears or stress you may have?

Supplementary File. COREQ Checklist

No.	Item	Comment
Domain 1: Research team and reflexivity		
1	Interview/facilitator	HR, DM, LC (page 7, paragraph 1)
2	Credentials	HR (MD), DM (MD), LC (MD) (title page)
3	Occupation	HR, Assistant Professor of Medicine, Hospitalist physician (title page)
		DM, Associate professor of Medicine, Hospitalist Physician (title page)
		LC, Associate professor of Medicine, Hospitalist Physician (title page)
4	Gender	HR (Male) (title page), DM (Female) (title page), LC (Female) (title page)
5	Experience and training	LC has conducted and published qualitative research and lectures in qualitative methods and methodology. (title page)
		HR and DM have undergone training in qualitative research analysis and were mentored by LC
6	Relationship established	Via collegial and professional networks, 35 interviewees were known colleagues of HR, DM and/or LC (Page 6, paragraph 2)
7	Participant knowledge of the interviewer	HR is conducting a study to elicit frontline clinicians' perspectives on caring for patients hospitalized with COVID-19 (page 6 paragraph 2)
8	Interviewer characteristics	HR, DM, and LC are all frontline clinicians caring for patients with COVID-19 (title page)
Study design		
9	Theoretical framework	Qualitative study (using techniques from grounded theory) (Page 7, paragraph 3)
10	Sampling	Purposive (Page 7, paragraph 1)
11	Method of approach	Email (Page 7, paragraph 1)
12	Sample size	N=50 See table 1 (Table 1, Page 24)
13	Non-participation	Two participants who responded to the email were unable to be scheduled for an interview due to schedule conflicts (Page 8, paragraph 1)
14	Setting of data collection	Virtual conferencing using video conferencing software (Page 7, paragraph 2)
15	Presence of non-participants	None (Page 8, paragraph 1)
16	Description of sample	Refer to Table 1, Page 24
17	Interview guide	Provided in Appendix Table 1
18	Repeat interviews	Single interview conducted (Page 7, paragraph 2)
19	Audio/visual recording	Interviews were audio recorded (Page 7, paragraph 2)
20	Field notes	NA
21	Duration	The mean duration of the interviews was 43 minutes (Page 8, paragraph 1)
22	Data saturation	Yes (Page 7, paragraph 2)
23	Transcripts returned	No (Page 7, paragraph 2)
Analysis and findings		
24	Number of data coders	1 (AT) (Page 7, paragraph 3)
25	Description of the coding tree	No – see themes (Pages 8 to 15)
26	Derivation of themes	Inductively derived from data (Page 7, paragraph 3)
27	Software	HyperRESEARCH (Page 7, paragraph 3)
28	Participant checking	Yes (Page 7, paragraph 3)
29	Quotations presented	Refer to Table 2
30	Data and findings consistent	Quotations provided to illustrate each theme.
31	Clarity of major themes	Yes – themes (Pages 8 to 15)
32	Clarity of minor themes	Yes – see subthemes and description of the themes (Pages 8 to 15)

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Frontline Interdisciplinary Clinician Perspectives on Caring for Patients with COVID-19:

A Qualitative Study

Hassan Rao[1,2], Diana Mancini[1,2], Allison Tong[3,4], Humaira Khan[5], Brissa Santacruz Gutierrez[6],

William Mundo[6], Adriana Collings[7], Lilia Cervantes[1,2,7]

[1]Division of Hospital Medicine, Denver Health, [2]Department of Medicine, University of

Colorado Anschutz Medical Campus, Aurora, Colorado, [3]Sydney School of Public Health, The

University of Sydney, Sydney; [4]Centre for Kidney Research, The Children's Hospital at

Westmead, Westmead, NSW, Australia, [5]Indiana University School of Medicine, [6]University of

Colorado, Anschutz Medical Campus, [7]Office of Research, Denver Health, Denver, Colorado,

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Hassan Rao, MD

Denver Health

777 Bannock, MC 4000

Hassan.Rao@dhha.org

Telephone: 303-602-6000 (Office)

Fax: 303-602-5056

ABSTRACT

OBJECTIVE: To describe the drivers of distress and motivations faced by interdisciplinary

clinicians who were on the frontline caring for patients with COVID-19.

DESIGN: 50 Semi-structured interviews. Transcripts were analyzed using qualitative thematic

analysis

SETTING: A safety net hospital in Denver, Colorado.

PARTICIPANTS: Interdisciplinary frontline clinicians including physicians, advance practice

providers, nurses, respiratory therapists and paramedics providing inpatient hospital care to

patients with hospitalized for COVID-19.

RESULTS: Fifty clinicians (32 women and 18 men) participated. Five themes with respective

subthemes (in parentheses) were identified: depersonalization and barriers to care (impeding

rapport and compassion, focusing on infection risk at the expense of high quality care, grief from

witnessing patients suffer in isolation), powerless in uncertainty (inescapable awareness of

personal risk, therapeutic doubt in a void of evidence, confronting ethical dilemmas, struggling

with dynamic and unfamiliar challenges), overwhelmed and exhausted (burden of PPE,

information overload and confusion, overstretched by additional responsibilities at work,

compounded by personal life stressors, feeling vulnerable and dispensable, compassion fatigue,

distress from the disproportionate impact on socially oppressed communities), bolstering morale

and confidence (motivated by community and family support, equipped with data), and driven by

moral duty (responsibility to patient care and community, collegial solidarity and collaboration,

contributing to the greater good).

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CONCLUSION: Frontline clinicians reported distress due to the challenges of PPE, uncertainty and powerlessness, new responsibilities at work and home, losing control of their schedules, grief from witnessing patients suffer in isolation and witnessing healthcare disparities exacerbated by this pandemic. Clinicians feel supported by their colleagues, families, and community and were driven by a sense of moral duty. Health care system should adopt strategies to minimize distress faced by interdisciplinary clinicians on the frontline of COVID-19.

STRENGTHS AND LIMITATIONS OF THIS STUDY

- This study explores the experiences of fifty US interdisciplinary clinicians caring for hospitalized COVID-19 patients at one public safety-net hospital in Denver, Colorado between April 22 and July 8, 2020.

- Clinicians described the challenges, motivations and emotions they experienced while caring for hospitalized patients with COVID-19 during the first wave of the COVID-19 pandemic.

- Participating clinicians included physicians, advance practice providers, nurses, paramedics and respiratory therapists working in a variety of hospital settings including the emergency department, medical/surgical floor, and intensive care unit.

- A limitation to this study is the transferability of these findings to other hospital settings given the unique patient population, culture and resources available at this institution.

- Drivers of distress and motivation were identified with recommendations for possible strategies to support interdisciplinary clinicians.

COMPETING INTEREST STATEMENT

The authors do not have any competing interests or conflicts of interest to declare.

INTRODUCTION

The COVID-19 pandemic has presented unprecedented challenges for the healthcare system. In anticipation of this crisis, healthcare facilities focused on procurement of testing supplies and personal protective equipment (PPE), creating treatment algorithms, ethical resource allocation guidelines, and expanding bed capacity and staffing among other logistics to keep patients and clinicians safe.[1-4] Despite these efforts to protect clinicians, this pandemic has taken a significant toll on the physical, emotional and mental health of frontline clinicians.[2, 5-10] Given epidemic levels of burnout prior to this pandemic, and reports of suicides among frontline clinicians in New York City, it has become increasingly important to understand the driver of clinician distress through this pandemic.[11-13]

While it is clear that frontline responders to public health emergencies are particularly vulnerable to experiencing acute psychological distress, the underlying drivers of distress can be unique in different populations, cultures, clinical settings and with variable extent of impact and time course.[14] During the SARS pandemic, clinicians experienced distress related to uncertainty and fear of the unknown, stigmatization from becoming infected, social isolation and conflicting moral obligations to treat patients yet keep their families safe.[15-17] For some clinicians, this led to long-term mental health problems and burnout.[18-20] The COVID-19 pandemic is unique due to its unpredictable course and widespread global impact.[21] Frontline clinicians across the world have experienced similar challenges with supply constraints, staffing shortages and risk of infection.[22]

Despite cultural, political, and case rate variances, studies have found high rates of psychological symptoms among clinicians during this pandemic.[23-28] However, there is limited qualitative data describing the drivers of distress.[29-37] The aim of this study was to describe the drivers of distress and motivation with the goals of informing local and national strategies to reduce avoidable distress in interdisciplinary clinicians on the frontline of COVID-19.

METHODS

Study Design

50 semi-structured interviews were conducted with frontline clinicians. All study participants provided informed verbal consent and received financial compensation. Participants were assigned a study identification number and were informed all information provided would remain confidential. The University of Colorado multi-Institutional Review Board approved this study.

Patient and Public Involvement

It was not appropriate or possible to involve patients or the public in the design of this research.

Setting and Participants

Eligible participants included interdisciplinary frontline clinicians including physicians, advance practice providers, nurses, and paramedics that participated in the care of suspected or confirmed positive COVID-19 patients at Denver Health (DH), a safety-net hospital. Participants were recruited by a standardized, IRB-approved email sent by the study PI. The first participants to respond were included and scheduled for interviews. Purposive sampling was used to capture a diverse sample in terms of demographics (sex, age) and clinical discipline. We capped participants within each clinical category to ensure a balanced proportion of clinician training backgrounds and departments.

Data Collection

Semi-structured interviews were conducted using a telephone or video conferencing platform from April 22 to July 8, 2020 by authors H.R., D.M., and L.C. until data saturation. LC has conducted and published qualitative research and has lectured in qualitative methodology. HR and DM completed training in qualitative research analysis and were mentored by LC. All three of these authors are Internal Medicine trained physicians that participated on the frontline of caring for patients hospitalized with COVID-19. The interview guide was based on the literature and discussion among the research team (Appendix Table 1).[7-10, 15-19] Interviews were recorded and transcribed verbatim.

Data Analysis

Using thematic analysis, authors H.R., D.M., A.T., and L.C. read the transcripts and inductively

identified initial concepts. Author A.T. grouped similar concepts into themes and subthemes and

coded the data using HyperRESEARCH software (version 4.1.1 ResearchWare Inc. Randolph

MA). Authors H.R. and L.C. reviewed and discussed the coding and themes to make sure that

the findings reflected the full range and depth of the data.

RESULTS

The 50 participants included 22 physicians, 18 registered nurses, 4 nationally registered

paramedics, 2 respiratory therapists, and 4 advance practice providers (2 nurse practitioners, 1

physician assistant, and 1 certified registered nurse anesthetist) and 1 emergency medical

technician. There were 32 (64%) females, 32 (64%) were married, and 28 (56%) had children.

Twenty-seven (54%) lived with frontline clinicians (Table 1). The duration of the interviews

ranged from 28 to 92 minutes.

We identified five themes: depersonalization and barriers to care; powerlessness in uncertainty;

physical, emotional and mental exhaustion; bolstering morale and confidence; and driven by

moral duty. The subthemes are described below with supporting quotations provided in Table 2.

Depersonalization and barriers to care

Impeding rapport and compassion

The need to use personal protective equipment (PPE) made it difficult for participants to "connect with" and establish trust with patients because they could not communicate properly, were unable to "convey emotion." The PPE stripped away a core dimension of patient care by taking "a lot out of the human experience." Some felt that it was "like a zoo" because they would "look through a glass window and talk about a human being without them being involved."

Focusing on infection risk at the expense of high quality care

To minimize exposure, participants spent less time in patient rooms and assessed patients over the phone. Clinicians acknowledged that this was a "necessary evil," which limited their ability to provide high quality care. Except for in-person physical examination at the time of admission and discharge, clinicians assessed their patients over the phone only: "The hardest part is just having very little to offer out of what I would have considered my strongest toolkit." Some also questioned if they "missed something."

Grief from witnessing patients suffer in isolation

Due to isolation policies, patients were unable to have visitors. Participants felt "indescribable" grief because they could do little to alleviate the terror and loneliness patients suffered. "The family can't be there; it adds to the sadness of the situation where there's so much isolation... Patients are isolated from pretty much all support systems." It was also emotionally difficult

helping patients communicate with their family – "I had her FaceTime her sister so she could see the baby that she'd never held…I don't cry, that's as close as it gets." COVID-19 was also considered by some to be "the worst possible way that someone could die because you're surrounded by air, you cannot breathe."

Powerless in uncertainty

Inescapable awareness of personal risk

Initial concerns about infection dissipated with confidence in PPE. However, this "air of invincibility was easily shattered" as more clinicians became sick and cared for patients that were fit or close to their own age – it's "scary, because when you look at them, you see your own family members and the potential for the people that you care about in your own life" to suffer the same fate. They were constantly processing "terrifying" and "existential questions" that intensified distress. Participants that contracted COVID worried about their own health and their loved ones.

Therapeutic doubt in a void of evidence

Participants were challenged by uncertainty and guilt stemming from the lack of data to inform prognostication and therapies. Many felt "powerless" and humbled by the unpredictability of the disease. Some felt like trainees again, "where everything is new and you think you know what you're doing but you're" unsure and have "self-doubt." They accepted that managing COVID-19 was "a lot of trial and error." Participants worried about medications that "weren't proven" and "that some people ended up on the ventilator that maybe wouldn't have needed to."

Confronting ethical dilemmas

Preparing for decisions about rationing resources was "incredibly stressful." It was horrifying to consider bearing the responsibility of "condemning a person to die" and the possibility of having to "sacrifice a few for the greater good." Conversations around goals of care were challenging without family members at the bedside; "it's just hard to really understand what your loved one is going through." Many clinicians discussed goals of care at the time of admission for all patients regardless of age or comorbidities.

Struggling with dynamic and unfamiliar challenges

Frequent changes in policies, guidelines and conflicting information created a challenging and chaotic environment. They described how "every day was a new day. You really had no idea what was happening." Participants worked in new settings and felt constant anxiety being outside their "comfort zone." The uncertain course of the pandemic was challenging as they lost control over their schedules, cancelled vacations and accepted that they "might be in this for the long haul."

Overwhelmed and exhausted

Burden of PPE

Wearing PPE was exhausting. It was "difficult to breathe," "hot and uncomfortable" and slowed their ability to enter rooms and respond to patient requests for food, water or to use the bathroom. The process of wearing PPE and remembering each step added a new "cognitive load." The "hyper-awareness" of risk added stress – "it's led to me feeling like I made some silly

mistakes, because I had energy devoted to what my hands just did, 'did I just use them to touch my face?'" In making decisions about orderings tests (e.g. imaging or labs), they considered if they would be exposing their colleagues. Some were worried about using the same masks all day - "it says on the box 'one-time use.'"

Information overload and confusion

Some participants felt inundated by information – "it's like drinking out of a fire hydrant". They had "informational burnout" and had difficulty processing new information as it was often changing or conflicting. Even outside of work, information about the pandemic was constantly on the news, social media and in conversations with friends – it was "exhausting".

Overstretched by additional responsibilities at work

Participants took on many new tasks such as coordinating internal communications, creating and managing databases, and following up on discharged patients. Many worked additional shifts – "two more weeks of work crammed into four weeks of work."

Compounded by personal life stressors

Participants were concerned about infecting their family and considered whether to isolate from their families. Participants with children had new, time-consuming challenges at home including homeschooling and coordinating childcare. Many felt "worn out" by these responsibilities – "trying to stay normal, to be the mother and the wife… because they [children] don't deserve to get less of me because of what's happening."

Feeling vulnerable and dispensable

As participants coped with the stress of additional shifts, responsibilities and risk, some began to feel "vulnerable." Some participants felt well supported from their leaders, but others felt a disconnect between clinical and administrative leadership. They felt leaders needed to be more present – "I think it would be eye opening for them to have to come in and see" the unique challenges of providing care in PPE. Some were concerned about the burden of mandatory extra shifts and lack of "hazard pay." Hearing about a "hiring freeze" and seeing colleagues lose their jobs, made them feel expendable.

Compassion Fatigue

As the pandemic progressed, clinicians began feeling emotionally overwhelmed and started developing "compassion fatigue". The grief of caring for COVID patients was further amplified by what some clinicians felt was the psychological impact of quarantine on the community. They described seeing higher rates of patients presenting due to domestic violence, depression and suicides. Over time, clinicians began to feel emotionally exhausted and described symptoms of burnout – "my patience is less. My empathy is less."

Distress from the disproportionate impact on vulnerable communities

The injustice of COVID-19 was traumatic. Witnessing the disproportionate impact of the pandemic on racial and ethnic minorities as well as other vulnerable communities was devastating. It was "heartbreaking" to see multiple members of the same minority family hospitalized and critically ill simultaneously. Many expressed immense grief witnessing the impact on communities that may not have the privilege to isolate, "they were probably essential

workers, or needing to work, or they were living in homes with multi-generational" families.

They noticed "a huge disparity between the rich and the poor."

Bolstering morale and confidence

Motivated by community and family support

Participants appreciated the "outpouring of love and support" from the community who contributed food and donated PPE. They also relied on support from their families.

Equipped with data

Information could "reduce stress and anxiety" as it provided a "picture of where the hospital's standing." Communicating "big wins" such as the number of extubations and discharges inspired optimism. Executives provided transparency around PPE supplies, plans for procurement, and curated information from clinical trials. This helped many feel safe and informed. They appreciated clinical updates as they did not have "time or bandwidth to search through articles."

Driven by moral duty

Responsibility to patient care and community

Participants were committed to fulfilling their fundamental responsibility of treating patients who "deserve good care". They held a "high level of social justice and responsibility" and strived to care for the "underserved and impoverished" patients that presented with COVID-19.

Collegial solidarity and collaboration

Participants felt "unified around a common goal or a kind of common enemy [SARS-CoV-2]" and were encouraged by "interdisciplinary collaboration" and "sharing of knowledge." They were "in it together" and needed to "have each other's back," particularly given the additional staffing required to manage the crisis: "We lean on each other, we support each other, we expect each other to be there."

Contributing to the greater good

Some believed it was their "responsibility" to contribute to the greater good and to be a "good and positive force." They felt stimulated to understand a novel disease and use their training and skills to "contribute new knowledge" in managing patients with COVID-19 and to be "part of the solution."

DISCUSSION

In this study, we report distress and motivations of interdisciplinary clinicians who provided care to hospitalized patients with COVID-19. Clinicians at the frontline of COVID-19 experienced distress from the emotional and physical burden of PPE, increased responsibilities at work and home, witnessing patients dying in isolation, and the exacerbation of systemic healthcare disparities. Clinicians also reported feeling fear, guilt and powerlessness stemming from the many uncertainties of this pandemic. Many clinicians described how these emotions progressed to compassion fatigue, vulnerability and exhaustion reflected in the qualitative themes. These findings are consistent with high rates of distress described in quantitative studies during the current pandemic. Clinicians' fears related to risk of infection, uncertainties of the disease, and

feelings of exhaustion as well as being driven by a sense of duty and solidarity are consistent

with studies from the SARS pandemic and qualitative data describing experiences of clinicians

in Europe and China during the early stage of this pandemic. However, many clinicians

described how the emotional challenges of caring for patients with PPE and hospital isolation

policies were compounded by the grief of witnessing an exacerbation of systemic healthcare

disparities, which has become more apparent in the COVID-19 pandemic.

Increasing workload and loss of a sense of control have been described as powerful contributors

to distress that may lead to burnout.[38, 39] We identified many facets of uncertainty in the context

of COVID-19 including being unable to prognosticate the course of the illness, lack of evidence

and therapeutics leading to clinical decisional uncertainty, rapidly changing guidelines and

policies, unclear risk of infection, the unknown duration and severity of the pandemic, and a loss

of control to their schedules. Clinicians were also distressed by feeling helpless and distressed

from witnessing patients suffering in isolation. While clinicians adapted to these uncertain

circumstances, there is concern for maintaining this resiliency if long-term solutions around

managing workload are not identified by leadership.

There is also concern of increased distress in clinicians who provide care to patients that face

complex social challenges.[40, 41] Clinicians caring for patients with COVID-19 were dismayed and

frustrated by how vulnerable groups such as impoverished, racial and ethnic minority

communities had disproportionally higher rates of COVID-19 infection than the general

population. While it is possible that this impact may be more noticeable in safety-net institutions,

several studies have confirmed the increased prevalence and mortality associated with COVID-

19 in Latino, Black, and "other" ethnicities.[42] Clinicians felt defeated because there were limited options for safe self-isolation in these communities due to crowded living conditions, use of public transportation, and low-wage service jobs. They were frustrated by barriers that precluded in-person language interpreters owing to the limited availability of PPE and having to resort to telephone language interpreters compounding the difficulties of communicating while wearing PPE.

Higher rates of distress during the COVID-19 pandemic have been found among younger age groups, females, and nurses (compared to physicians).[5-10] This may be because young clinicians with children are burdened by increased responsibilities at work and home compounded by losing control and predictability of their work schedules. Nurses in our study encountered many logistical obstacles as they were required to work additional shifts and often spend more time at the bedside resulting in more time wearing PPE, higher risk of exposure, and more time spent witnessing patients suffer in isolation.

Our study has key implications to prevent or minimize distress and risk of subsequent burnout in clinicians (Table 3). There is an urgent need to address this, as burnout can lead to poor patient outcomes and will impair the ability of the healthcare system to respond to this crisis.[43-46] We suggest that institutional leadership create clear structures for understanding and addressing concerns of frontline clinicians, communicate contingency staffing plans to manage workload and allow frontline clinicians to regain a sense of control of their schedules. Studies have also shown that it is important to support workers' childcare needs during crisis situations.[47, 48] We recognize that clinicians may not engage in psychological services on their own accord, and

therefore suggest that institutions offer proactive psychological counseling and establish peer-to-peer support mechanisms as these provide the most benefit.[49-52] Finally, it is critical to address structural racism and healthcare disparities as this is an important driver of distress highlighted by this pandemic. This includes improving access to testing, equitable resource allocation, enhanced outreach programs for minority communities, improved access to in-person translation services and cultural humility training for all staff.

LIMITATIONS

Our study generated detailed insights on the experiences among frontline clinicians caring for COVID-19 patients. However, our study has some potential limitations. Clinicians were from one academic safety-net hospital in Colorado, thus the transferability of the findings to other settings is uncertain. Studies have shown variances in PPE use among different countries and cultures. Our findings of distress related to the burden of PPE use may not be consistent with clinician experiences in other cultures.[53] As this study was performed at the early phase of the COVID-19 pandemic, it is also possible that clinician experiences have changed with anticipation of new therapies and the possibility of a vaccine.

Future research is needed to assess the effectiveness of strategies to screen for and reduce psychological distress. While it is clear that clinicians experiencing distress will benefit from multifaceted psychological support, ideal implementation strategies to engage and support clinicians is unclear.[54] There is also limited knowledge of the effectiveness of online-based

counseling which can be implemented more readily and have been used to support clinicians in China.[22,55]

CONCLUSION

Frontline clinicians caring for COVID-19 patients experience distress related to challenges of PPE, clinical uncertainty and powerlessness, new responsibilities at work and home, losing control of their schedules, and grief from witnessing patients suffer in isolation and witnessing healthcare disparities exacerbated by this pandemic. Providers feel supported by their colleagues, families, and community and were driven by a sense of moral duty. Institutions should further support frontline clinicians by making efforts to understand and address their challenges, provide proactive mental health support, and advocate vulnerable communities.

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DATA SHARING STATEMENT: All data relevant to the study are included in the article.
Raw data (full transcriptions of interviews) are stored on an encrypted, secure hospital network
and can be reproduced upon request.

ETHICAL APPROVAL STATEMENT: This study was approved by the University of
Colorado Multi-Institutional Review Board #20-0709.

References

1. Liu Y, Li J, Feng Y. Critical care response to a hospital outbreak of the 2019-nCoV infection in Shenzhen, China. *Crit Care*. 2020;24(1):56. Published 2020 Feb 19. doi:10.1186/s13054-020-2786-x

2. Liew MF, Siow WT, MacLaren G, See KC. Preparing for COVID-19: early experience from an intensive care unit in Singapore. *Crit Care*. 2020;24(1):83. Published 2020 Mar 9. doi:10.1186/s13054-020-2814-x

3. Chopra V, Toner E, Waldhorn R, Washer L. How Should U.S. Hospitals Prepare for Coronavirus Disease 2019 (COVID-19)?. *Ann Intern Med*. 2020;172(9):621-622. doi:10.7326/M20-0907

4. Wee LE, Fua TP, Chua YY, et al. Containing COVID-19 in the Emergency Department: The Role of Improved Case Detection and Segregation of Suspect Cases. *Acad Emerg Med*. 2020;27(5):379-387. doi:10.1111/acem.13984

5. Lai J, Ma S, Wang Y, et al. Factors Associated With Mental Health Outcomes Among Health Care Workers Exposed to Coronavirus Disease 2019. *JAMA Netw Open*. 2020;3(3):e203976. doi:10.1001/jamanetworkopen.2020.3976

6. Rossi R, Socci V, Pacitti F, et al. Mental Health Outcomes Among Frontline and Second-Line Health Care Workers During the Coronavirus Disease 2019 (COVID-19) Pandemic in Italy. *JAMA Netw Open.* 2020;3(5):e2010185. doi:10.1001/jamanetworkopen.2020.10185

7. Zhang WR, Wang K, Yin L, et al. Mental Health and Psychosocial Problems of Medical Health Workers during the COVID-19 Epidemic in China. *Psychother Psychosom*. 2020;89(4):242-250. doi:10.1159/000507639

8. Wu W, Zhang Y, Wang P, et al. Psychological stress of medical staffs during outbreak of COVID-19 and adjustment strategy [published online ahead of print, 2020 Apr 21]. *J Med Virol*. 2020;10.1002/jmv.25914. doi:10.1002/jmv.25914

9. Cai H, Tu B, Ma J, et al. Psychological Impact and Coping Strategies of Frontline Medical Staff in Hunan Between January and March 2020 During the Outbreak of Coronavirus Disease 2019 (COVID-19) in Hubei, China. *Med Sci Monit*. 2020;26:e924171. Published 2020 Apr 15. doi:10.12659/MSM.924171

10. Mo Y, Deng L, Zhang L, et al. Work stress among Chinese nurses to support Wuhan in fighting against COVID-19 epidemic. *J Nurs Manag*. 2020;28(5):1002-1009. doi:10.1111/jonm.13014

11. National Academies of Sciences, Engineering, and Medicine. Taking action against clinician burnout: a systems approach to professional well-being. Washington, DC: National Academies Press, 2019

12. Watkins, A., Rothfeld, M., Rashbaum, W. and Rosenthal, B., 2020. *Top E.R. Doctor Who Treated Virus Patients Dies By Suicide*. [online] Nytimes.com. Available at: <https://www.nytimes.com/2020/04/27/nyregion/new-york-city-doctor-suicide-coronavirus.html> [Accessed 8 August 2020].

13. Edelman, S., Moore, T., Narizhnaya, K. and Balsamini, D., 2020. *EMT John Mondello Kills Himself After Less Than Three Months On The Job*. [online] New York Post.

Available at: <https://nypost.com/2020/04/25/nyc-emt-commits-suicide-with-gun-belonging-to-his-dad/> [Accessed 8 August 2020].

14. Belfroid E, van Steenbergen J, Timen A, Ellerbroek P, Huis A, Hulscher M. Preparedness and the importance of meeting the needs of healthcare workers: a qualitative study on Ebola. *J Hosp Infect*. 2018 Feb;98(2):212-218. doi: 10.1016/j.jhin.2017.07.001. Epub 2017 Jul 6. PMID: 28690117; PMCID: PMC7114583.

15. Maunder R, Hunter J, Vincent L, et al. The immediate psychological and occupational impact of the 2003 SARS outbreak in a teaching hospital. *CMAJ*. 2003;168(10):1245-1251.

16. Nickell LA, Crighton EJ, Tracy CS, et al. Psychosocial effects of SARS on hospital staff: survey of a large tertiary care institution. *CMAJ*. 2004;170(5):793-798. doi:10.1503/cmaj.1031077

17. Maunder RG, Lancee WJ, Rourke S, et al. Factors associated with the psychological impact of severe acute respiratory syndrome on nurses and other hospital workers in Toronto. *Psychosom Med*. 2004;66(6):938-942. doi:10.1097/01.psy.0000145673.84698.18

18. Wu P, Fang Y, Guan Z, et al. The psychological impact of the SARS epidemic on hospital employees in China: exposure, risk perception, and altruistic acceptance of risk. *Can J Psychiatry*. 2009;54(5):302-311. doi:10.1177/070674370905400504

19. Maunder RG, Lancee WJ, Balderson KE, et al. Long-term Psychological and Occupational Effects of Providing Hospital Healthcare during SARS Outbreak. *Emerging Infectious Diseases*. 2006;12(12):1924-1932. doi:10.3201/eid1212.060584.

20. Lancee WJ, Maunder RG, Goldbloom DS; Coauthors for the Impact of SARS Study. Prevalence of psychiatric disorders among Toronto hospital workers one to two years after the SARS outbreak. *Psychiatr Serv*. 2008;59(1):91-95. doi:10.1176/ps.2008.59.1.91

21. Wu YC, Chen CS, Chan YJ. The outbreak of COVID-19: An overview. *J Chin Med Assoc*. 2020;83(3):217-220. doi:10.1097/JCMA.0000000000000270

22. Kang L, Li Y, Hu S, Chen M, Yang C, Yang BX, et al. The mental health of medical workers in Wuhan, China dealing with the 2019 novel coronavirus. *Lancet Psychiatry*. 2020;7(3):e14. https://doi. org/10.1016/S2215-0366(20)30047-X

23. Chew NWS, Ngiam JN, Tan BY, et al. Asian-Pacific perspective on the psychological well-being of healthcare workers during the evolution of the COVID-19 pandemic. *BJPsych Open*. 2020;6(6):e116. Published 2020 Oct 8. doi:10.1192/bjo.2020.98

24. Tan YQ, Wang Z, Yap QV, et al. Psychological Health of Surgeons in a Time of COVID-19: A Global Survey [published online ahead of print, 2021 Jan 22]. *Ann Surg*. 2021;10.1097/SLA.0000000000004775. doi:10.1097/SLA.0000000000004775

25. Chew NWS, Lee GKH, Tan BYQ, et al. A multinational, multicentre study on the psychological outcomes and associated physical symptoms amongst healthcare workers during COVID-19 outbreak [published online ahead of print, 2020 Apr 21]. *Brain Behav Immun*. 2020;S0889-1591(20)30523-7. doi:10.1016/j.bbi.2020.04.049

26. Zhang SX, Liu J, Afshar Jahanshahi A, et al. At the height of the storm: Healthcare staff's health conditions and job satisfaction and their associated predictors during the epidemic

peak of COVID-19. *Brain Behav Immun*. 2020;87:144-146. doi:10.1016/j.bbi.2020.05.010

27. Preti E, Di Mattei V, Perego G, et al. The Psychological Impact of Epidemic and Pandemic Outbreaks on Healthcare Workers: Rapid Review of the Evidence. *Curr Psychiatry Rep*. 2020;22(8):43. Published 2020 Jul 10. doi:10.1007/s11920-020-01166-z

28. Luo M, Guo L, Yu M, Jiang W, Wang H. The psychological and mental impact of coronavirus disease 2019 (COVID-19) on medical staff and general public - A systematic review and meta-analysis [published online ahead of print, 2020 Jun 7]. *Psychiatry Res*. 2020;291:113190. doi:10.1016/j.psychres.2020.113190

29. Liu Q, Luo D, Haase JE, et al. The experiences of health-care providers during the COVID-19 crisis in China: a qualitative study. *Lancet Glob Health*. 2020;8(6):e790-e798. doi:10.1016/S2214-109X(20)30204-7

30. Sun N, Wei L, Shi S, et al. A qualitative study on the psychological experience of caregivers of COVID-19 patients. *Am J Infect Control*. 2020;48(6):592-598. doi:10.1016/j.ajic.2020.03.018

31. Sterling MR, Tseng E, Poon A, et al. Experiences of Home Health Care Workers in New York City During the Coronavirus Disease 2019 Pandemic: A Qualitative Analysis. *JAMA Intern Med*. Published online August 04, 2020. doi:10.1001/jamainternmed.2020.3930

32. Aughterson H, McKinlay AR, Fancourt D, Burton A. Psychosocial impact on frontline health and social care professionals in the UK during the COVID-19 pandemic: a qualitative interview study. *BMJ Open*. 2021;11(2):e047353. Published 2021 Feb 8. doi:10.1136/bmjopen-2020-047353

33. Vindrola-Padros C, Andrews L, Dowrick A, et al. Perceptions and experiences of healthcare workers during the COVID-19 pandemic in the UK. *BMJ Open* 2020;10:e040503. doi: 10.1136/bmjopen-2020-040503

34. Vera San Juan N, Aceituno D, Djellouli N, et al. Mental health and well-being of healthcare workers during the COVID-19 pandemic in the UK: contrasting guidelines with experiences in practice. *BJPsych Open*. 2020;7(1):e15. Published 2020 Dec 10. doi:10.1192/bjo.2020.148

35. Hörold, M, Drewitz, K, Brunnthaler, V, et al. "This is really like waiting for war and this is not good" – Intertwining between pandemic experiences, and the development of professional action of healthcare professionals in critical care at the beginning of the COVID-19 pandemic in Germany: a qualitative study. *medRxiv*. Preprint posted online Feb 1, 2021. doi: 10.1101/2021.01.29.21250626

36. Hoernke K, Djellouli N, Andrews L, et al. Frontline healthcare workers' experiences with personal protective equipment during the COVID-19 pandemic in the UK: a rapid qualitative appraisal. *BMJ Open*. 2021;11(1):e046199. Published 2021 Jan 20. doi:10.1136/bmjopen-2020-046199

37. Bennett P, Noble S, Johnston S, Jones D, Hunter R. COVID-19 confessions: a qualitative exploration of healthcare workers experiences of working with COVID-19. *BMJ Open*. 2020 Dec 16;10(12):e043949. doi: 10.1136/bmjopen-2020-043949

38. Southwick FS, Southwick SM. The Loss of a Sense of Control as a Major Contributor to Physician Burnout: A Neuropsychiatric Pathway to Prevention and Recovery. *JAMA Psychiatry*. 2018;75(7):665-666. doi:10.1001/jamapsychiatry.2018.0566

39. Freeborn DK. Satisfaction, commitment, and psychological well-being among HMO physicians. *West J Med*. 2001;174(1):13-18.

40. Cervantes L, Richardson S, Raghavan R, et al. Clinicians' Perspectives on Providing Emergency-Only Hemodialysis to Undocumented Immigrants: A Qualitative Study. *Ann Intern Med.* 2018;169(2):78-86. doi:10.7326/M18-0400

41. Hayashi AS, Selia E, McDonnell K. Stress and provider retention in underserved communities. *J Health Care Poor Underserved*. 2009;20(3):597-604. doi:10.1353/hpu.0.0163

42. Dorn AV, Cooney RE, Sabin ML. COVID-19 exacerbating inequalities in the US. *Lancet*. 2020 Apr 18;395(10232):1243-1244. doi: 10.1016/S0140-6736(20)30893-X. PMID: 32305087; PMCID: PMC7162639.

43. Munnangi S, Dupiton L, Boutin A, Angus LDG. Burnout, Perceived Stress, and Job Satisfaction Among Trauma Nurses at a Level I Safety-Net Trauma Center. *J Trauma Nurs*. 2018;25(1):4-13. doi:10.1097/JTN.0000000000000335

44. Fahrenkopf AM, Sectish TC, Barger LK, et al. Rates of medication errors among depressed and burnt out residents: prospective cohort study. *BMJ* 2008; 336: 488–91.

45. West CP, Tan AD, Habermann TM, Sloan JA, Shanafelt TD. Association of resident fatigue and distress with perceived medical errors. *JAMA* 2009; 302: 1294–300.

46. Shanafelt TD, Balch CM, Bechamps G, et al. Burnout and medical errors among American surgeons. *Ann Surg* 2010; 251: 995–1000.

47. Shanafelt T, Ripp J, Trockel M. Understanding and Addressing Sources of Anxiety Among Health Care Professionals During the COVID-19 Pandemic. *JAMA*. 2020;323(21):2133–2134. doi:10.1001/jama.2020.5893

48. Charney RL, Rebmann T, Flood RG. Emergency Childcare for Hospital Workers During Disasters. *Pediatr Emerg Care*. 2015;31(12):839-843. doi:10.1097/PEC.0000000000000629

49. Maunder RG, Leszcz M, Savage D, et al. Applying the lessons of SARS to pandemic influenza: an evidence-based approach to mitigating the stress experienced by healthcare workers. *Can J Public Health*. 2008;99(6):486-488. doi:10.1007/BF03403782

50. Brooks SK, Webster RK, Smith LE, et al. The psychological impact of quarantine and how to reduce it: rapid review of the evidence. *Lancet*. 2020;395(10227):912-920. doi:10.1016/S0140-6736(20)30460-8

51. Brooks, Samantha, Dunn, Rebecca, Amlot, Richard, Rubin, Gideon, Greenberg, Neil. A Systematic, Thematic Review of Social and Occupational Factors Associated With Psychological Outcomes in Healthcare Employees During an Infectious Disease Outbreak. *J Occup Environ Med*. 2018;**60**(**3**):248-257. doi:10.1097/JOM.0000000000001235.

52. Chen Q, Liang M, Li Y, et al. Mental health care for medical staff in China during the COVID-19 outbreak [published correction appears in Lancet Psychiatry. 2020 May;7(5):e27]. *Lancet Psychiatry*. 2020;7(4):e15-e16. doi:10.1016/S2215-0366(20)30078-X

53. Wang C, Chudzicka-Czupała A, Grabowski D, et al. The Association Between Physical and Mental Health and Face Mask Use During the COVID-19 Pandemic: A Comparison

of Two Countries With Different Views and Practices. *Front Psychiatry*. 2020;11:569981. Published 2020 Sep 9. doi:10.3389/fpsyt.2020.569981

54. Pollock A, Campbell P, Cheyne J, Cowie J, Davis B, McCallum J, McGill K, Elders A, Hagen S, McClurg D, Torrens C, Maxwell M. Interventions to support the resilience and mental health of frontline health and social care professionals during and after a disease outbreak, epidemic or pandemic: a mixed methods systematic review. *Cochrane Database Syst Rev.* 2020 Nov 5;11:CD013779. doi: 10.1002/14651858.CD013779. PMID: 33150970.

55. Liu S, Yang L, Zhang C, et al. Online mental health services in China during the COVID-19 outbreak. *Lancet Psychiatry*. 2020;7(4):e17-e18. doi:10.1016/S2215-0366(20)30077-8

Table 1. Patient Characteristics (N=50)

Characteristic	Value (n = 50)
Age, mean (SD), y	40.6 (8.6)
Females, No (%)	32 (64)
Married, No (%)	32 (64)
Dependents, more than 1, No (%)	28 (56)
Clinical experience, mean (SD), y	12.5 (8.4)
At least 2 frontline workers at home, No (%)	6 (12)
Days worked with COVID 19 patients in past month, mean (SD)	11.5 (5.1)
Patients transferred to ICU in last two weeks, mean (SD)	4.3 (4.3)
Code blues during last two weeks, mean (SD)	1.4 (1.7)
Deaths during last two weeks, mean (SD)	1.5 (2.4)
Participants with COVID-19, No (%)	4 (8)
Discipline, n (%)	
Hospital Medicine	
Physician	5 (10)
Nurse	6 (12)
Nurse Practitioner	1 (2)
Pulmonary/Critical Care	
Physician	6 (12)
Nurse	6 (12)
Emergency Medicine	
Physician	4 (8)
Physician Assistant	1 (2)
Nurse Practitioner	1 (2)
Nurse	5 (10)
Emergency Medical Technicians	1 (2)
Nationally Registered Paramedic	4 (8)
Anesthesiology	
Physician	3 (6)
Certified Registered Nurse Anesthetist	1 (2)
Infectious Disease Physician	2 (4)
Respiratory Therapists	2 (4)

Table 2. Selected supporting quotations

Theme	Quotations
Depersonalization and barriers to care	
Impeding rapport and compassion	You don't get to know the patient as a person (Physician, 30s)
	It just feel very impersonal, when you're used to being very close to people… being able to sit with them … they can see your whole face, see your expressions… It's challenging... to give people confidence and compassion and just convey to them that you really do care. (Nurse, female, 40s)
	The depersonalization of medicine… I feel guilty because I'm not engaged with them on the same humanistic level that I typically would with a patient who is clinically worsening. (Physician, male, 30s)
Focusing on infection risk at the expense of high quality care	We had a patient who fell, she was my patient. And because she put her call light on, she called appropriately, she was impulsive, but like we were not able to get into to the room fast enough, because we had to put on our gear and she, she fell, like she fell hard. (Nurse, female 30s)
	He was brought in, he had tombstone EKGs and he had a massive MI. So, you know, before COVID, shortness of breath in a man you, would think cardiac dyspnea, but it's like, we had these terrible COVID blinders on… I saw a man that had just terrible DKA and he was admitted and he had a cardiac arrest right after that and then suffered a terrible anoxic injury. And…. he would have come in earlier if it hadn't been for COVID. (Physician, male, 40s)
Grief from witnessing patients suffer in isolation	Those family members can't be here. That's just really hard to see that when somebody really needs a loving person… So I gave her a great big hug, and I felt her sadness, and that's just something that I will probably carry with me forever. It's just that feeling of loneliness and sadness that you just can't describe... That truly right now is the hardest thing I deal with every day. (Nurse, female, 50s)
	I held a tablet up for a patient who was not alert, responsive, and the family was just like just like we love you, Grandpa, stay strong, and I felt like I was intruding. I was heartbroken watching this like moment take place. (Nurse, female, 30s)
	He basically just spent the last five days of his life alone, delirious, for which normally we treat delirium with patients' family at the bedside, reorientation. We did none of that. We really provided sub-optimal care and he died in isolation. (Physician, female, 30s)
Powerless in uncertainty	
Inescapable awareness of personal risk	And just that kind of reminder that you don't have to be old to get sick, I'm afraid for the patient, I'm afraid for myself. I'm afraid for the people that I care about in my own life. (Nurse, female, 30s)
	Practicing medicine is just difficult and there are uncertainties about supplies and about my own personal safety as a practicing physician (Physician, female, 40s)
Therapeutic doubt in a void of evidence	The fact that a medication wasn't proven. We didn't have good data. This was disconcerting. To not know what we should be recommending… We've learned a lesson that these unproven therapies could be harmful. If you're going to do something that's unproven, you should do it within a trial. We could really be doing more harm than good. That was just a lesson I learned. I was just excited to jump on the bandwagon and offer whatever I could and whatever other institutions were doing. (Physician, female, 30s)
	It's pretty unpredictable compared to a lot of other things we treat. You might feel like your patient is clinically improving or kind of out of the woods and then suddenly, they take a turn for the worse. And that then relates to how you can talk to a patient because you can't, it's difficult to have 100% confidence and say, you're going to be fine. You're improving, you're going to continue to improve because that's all probably not true. (Physician, male, 30s)
	I have a lot of fear that that we don't know what's going to make them better or not better… there's a lot of times when I leave work that I feel really empty. Like I don't know if I made a difference and It's kind of sad, like I have a lot of sadness. (Nurse, female, 50s)
Confronting ethical dilemmas	So this is a patient who comes in, they're full code, but we don't have the resources and I had to decide if the 88 year old grandma on dialysis gets the ventilator or the 44 year old. And even just the weight that you have to carry if that's your decision right? That you just condemned this person to die and not this person. It's something that I worried a lot about for myself and also

	for our trainees; that our residents would have to be exposed to this stuff and carry it with them for the rest of their lives. (Physician, male, 40s)
Struggling with dynamic and unfamiliar challenges	The uncertainty about the future, not being able to know like 6 months ahead what our schedule is going to be like and it feels like things could change on any given day. (Physician, female, 30s)
	I'm constantly out of my comfort zone there's literally like nothing that is routine or second nature for me. My nervous system is like constantly in like flight mode and sweaty when I am running to a patient's room. (Nurse, female, 30)
Overwhelmed and exhausted	
Burden of PPE	It's very different in a nine hour shift with the PPE… it was uncomfortable and that was also fatiguing. That was all new mental energy that had to be expended to do your job. (Physician, male, 40s)
	Some days I feel really claustrophobic in the mask and it like increases my anxiety. (Nurse, female, 30s)
	Just the physical nature of having so many patients prone and flipping them and all of that it's physically hard. (Nurse, female, 50s)
Information overload and confusion	We're just burnt out from the constant changing of policies and expectations. (Nurse, female, 40s)
	Things are literally changing on like a day to day, hour by hour basis. (Physician, male, 40s)
	It was kind of unique part of COVID is that every day you're also kind of battling the news cycle and being aware of that news cycle, you know, so, like getting questions because the president says he takes hydroxychloroquine. (Physician, female, 30s)
Overstretched by additional responsibilities at work	I'm not alone when I'm saying that I'm feeling burnt out and overwhelmed. (Nurse, female, 30s)
	The last week that I was on… come straight home for an hour or two and then write notes until midnight, or 1230 and then get up and do it all over again... It was kind of you know, basic like functioning, eat food and then do more work. (Physician, male, 40s)
	Calling patients families at the end of each day because they couldn't have visitors … and giving them updates for the day and that by itself took a lot of time and was draining and not something that is normally part of our daily routine. (Physician, male, 30s)
Compounded by life stressors	Having to be like quarantined and do homeschooling on top of all that. It's been very difficult. (Nurse, female, 40s)
	Should I separate myself? We ultimately decided that, that would be more traumatic and that this is a marathon and not a spring and that separating myself would be more traumatic… We decided that the risk of this being really upsetting and traumatic for the children would be worse. We had to weigh all of this. (Physician, female, 30s)
Feeling vulnerable and dispensable	It made me feel dispensable…There's very much a sense of us not being part of the conversation and instead we are just told that this is how things are going to happen. (Physician, female, 40s)
	I never felt more vulnerable than this situation has made me feel in healthcare. (Nurse, female, 40s)
	If you want to do sort of a war analogy, it feels like all the generals are making decisions for the people that are dying on the field and nobody, you know, without knowing the reality of it… And so, I mean, I would just, I think it would be eye opening for them to have to come in and see, you know, a prone patient core, you know, and just watch. (Female, nurse, 30s)
	People are being asked to work more but are not compensated more. Taking more risk despite having loved ones. It hurt a lot of feelings and made people feel unappreciated. (Physician, female, 30s)
Compassion fatigue	My patience is less. And my empathy is less. My empathy meter is low. (Physician assistant, female, 30s)
	So the compassion fatigue I've actually experienced has been with the patients that I don't feel need to be there, right? Like, why are you here? Why are you using these resources? You twisted your ankle three weeks ago, you've been walking around fine.... but yeah, there's some compassion fatigue towards those kind of people and I'm trying to save whatever emotional response I have left for the people who I feel like needed it, if that make sense. (Nurse practitioner, female, 30s)
	I've been much better about it trying to save those emotions for when it matters. So I guess I've been stingier with my feelings, if that makes sense. (Nurse, female 30s)

Distress from the disproportionate impact on socially oppressed communities	At one point every single patient in our unit was COVID positive and every single one of them had a Hispanic last name and I just feel a lot of just mixed emotions, probably between sort of anger and just kind of profound sadness. I'm just so saddened by just how unfair it seems. (Nurse, female, 50s)
	I worry a lot about after they leave, sort of depending on their situation, and their ability to either socially distance or remain stay or have access to things like that's a big concern. (Physician, female, 50s)
	I took care of the grandfather or like the father who was 90-something, and his son was on a ventilator, his grandson was in the ICU as well, and I talked to his daughter-in-law… The poor family was just like, totally stressed out; and that was really heartbreaking… There was something about this pandemic in that, three fourths of everyone was Latino. And to know why they were getting it, in that they were probably essential workers, or needing to work, or they were living in homes with multi-generational kind of situations; that was really sad and most of them had nothing. The family, they're barely making it, and how are they going to survive financially? (Physician, female, 40s)
	To be doing the bulk of my interviews through the glass on the phone, particularly with Spanish speakers, it was very unsettling and unsatisfying on a certain level because I just did feel like I was doing my best, which was really hard. You wonder like, did you miss something? (Physician, male, 30s)
Bolstering morale and confidence	
Motivated by community and family support	Community support that's been very touching to me just like the people donating food or like donating masks or create a company like donate goggles, (Nurse, female, 30s)
	It was the fact that like, "Oh, like, people care about us and recognize that what we're doing right now is important" and that lifted spirits. (Physician, male, 40s)
Equipped with data	I feel like I know what's going on and so that's calming. (Physician, female, 30s)
	I think an organized plan for what we will do if there is a surge or whether we will be needed to cover hospital shifts… That communication is important because it gives us an idea of where we are with the curve and our hospital capacity. (Physician, female, 30s)
	We heard the other day we're running low on masks; they're not trying to hide that. They communicate also what this solution is, what the fix is. That's hugely important, that builds trust, we're able to plan for things, know when things are coming. (Nurse, female, 40s)
Driven by moral duty	
Responsibility to patient care and community	A professional obligation that this is what I've trained for. (Female, physician, 30s)
	This has been particularly hard on our…. most vulnerable communities … That kind of gives a little extra motivation to want to like show up and work hard and take really good care of them. (Physician, male, 30s)
Collegial solidarity and collaboration	Specialists, nurses – especially nurses – are a lot more willing to go above and beyond to take care of these people. That collective, all hands on deck, throughout the hospital, is really reassuring – everyone pitching in however they can. (Nurse practitioner, male, 30s)
	I want to support my fellow staff and I don't want to leave them short. (EMT, male, 30s)
Contributing to the greater good	When everything is so negative, I do feel that I can be a good force, I can be at least something positive in all of it. (Nurse, female, 40s)
	To be apart of this illness that nobody really understands. From a scientific background, it is really interesting that we are learning new stuff, day by day, week by week. (Nurse practitioner, male, 30s)

Table 3. Suggested interventions to support frontline clinicians

Strategy	Suggested Actions or Interventions
Acknowledge and address concerns	• Create a clear reporting structure and mechanism to allow frontline clinicians to voice clinical concerns • Communicate acknowledgement and validation of concerns as well as plans to address concerns • Maintain an active presence by administrative leadership on clinical floors to improve communication and better understand frontline clinician challenges • Minimize or consider suspending productivity reports and measurements
Reduce clinical uncertainty	• Establish mechanisms for knowledge sharing and delivering emerging clinical research updates • Create and maintain clinical diagnostic and therapeutic guidelines
Reduce burden of ethical decisions	• Create standardized resource allocation framework to reduce burden of decision making • Standardize processes for discussion of goals of care at admission • Improve access to and staffing for palliative care and chaplain services
Reduce infection risk	• Maintain adequate supplies of PPE • Allow rapid access for employee testing and occupational health support • Provide information and resources on best practices to minimize infection risk for family members of clinicians
Address healthcare disparities	• Allocate testing and access to care fairly with special consideration to communities with preexisting technological and health literacy gaps • Expand respite facilities to allow for greater access to safe social isolation • Ensure that patients have access to robust interpretation services • Develop culture and language concordant educational community outreach programs • Provide cultural humility training
Bolster psychological support	• Validate and communicate understanding of expected psychological distress • Train providers on applying psychological first aid • Establish one on one check-ins with clinicians to screen for severe distress and burnout • Develop programs that allow clinicians reprieve while on clinical shifts • Engage clinicians in counseling by creating opportunities for peer-to-peer support • Increase access to professional psychological counseling
Improve workload management and quality of patient care	• Offer childcare solutions for frontline clinicians • Ensure adequate staffing and create a threshold to hire additional clinicians in anticipation of surging demand • Limit the number of days or consecutives weeks worked • Allow for breaks from COVID-19 wards • Allow and provide adequate training for clinicians to cross-train in units with increasing demand
Improve data transparency	• Deliver information in a simple, coordinated, succinct and consistent matter • Provide transparency on PPE supplies and plans for procurement • Communicate financial and operational plans to address institutional impact of the pandemic

Appendix Table 1. Interview Guide

Motivation

1. What are the reasons you are on service with COVID-19 Patients? What motivates you? Are there any unique or new motivations you feel amid this pandemic?
2. Are there times you feel uncertain or hesitant? If so, why?
3. With a growing number of patients, there may be more clinical shifts that need to be covered. Would you consider volunteering or taking additional shifts? Why or why not?
4. Given some of the unique challenges of these patients, how do you cope after a long day, or several days in a row of caring for these patients? Anything specific you do for yourself or others?

Challenges in the clinical setting

1. What are some challenges you are facing while caring for COVID-19 patients? What impact does this have on you?
2. What kind of emotions or feelings do you have when providing direct care for COVID-19 patients? Does it impact your capacity to provide care, if so, how?
3. What things add to your stress?

Personal/life impact

1. What is life like outside of work on the days you are working? What impact has this had on you and your family?
2. How are the other lifestyle changes (i.e. lock-down, school closures) impacting you?
3. Have you had to make any changes in the way you interact with your family? Protect your family or others in your home?
4. Do you have any specific concerns about the health of any of your family members at home?
5. What has been your biggest challenge outside the hospital during this time? What impact has this had on your clinical work?

Priorities – support for clinicians

1. What do you wish you had known when you first started taking care of patients that has helped you, that you know now?
2. Do you feel supported?
3. What could be done to better support you?
4. What did you find particularly helpful? What was not helpful?
5. Is the way you are receiving information helpful?
6. What could be better? Does the information add or reduce any fears or stress you may have?

Supplementary File. COREQ Checklist

No.	Item	Comment
Domain 1: Research team and reflexivity		
1	Interview/facilitator	HR, DM, LC (page 7, paragraph 1)
2	Credentials	HR (MD), DM (MD), LC (MD) (title page)
3	Occupation	HR, Assistant Professor of Medicine, Hospitalist physician (title page)
		DM, Associate professor of Medicine, Hospitalist Physician (title page)
		LC, Associate professor of Medicine, Hospitalist Physician (title page)
4	Gender	HR (Male) (title page), DM (Female) (title page), LC (Female) (title page)
5	Experience and training	LC has conducted and published qualitative research and lectures in qualitative methods and methodology. (title page)
		HR and DM have undergone training in qualitative research analysis and were mentored by LC
6	Relationship established	Via collegial and professional networks, 35 interviewees were known colleagues of HR, DM and/or LC (Page 6, paragraph 2)
7	Participant knowledge of the interviewer	HR is conducting a study to elicit frontline clinicians' perspectives on caring for patients hospitalized with COVID-19 (page 6 paragraph 2)
8	Interviewer characteristics	HR, DM, and LC are all frontline clinicians caring for patients with COVID-19 (title page)
Study design		
9	Theoretical framework	Qualitative study (using techniques from grounded theory) (Page 7, paragraph 3)
10	Sampling	Purposive (Page 7, paragraph 1)
11	Method of approach	Email (Page 7, paragraph 1)
12	Sample size	N=50 See table 1 (Table 1, Page 24)
13	Non-participation	Two participants who responded to the email were unable to be scheduled for an interview due to schedule conflicts (Page 8, paragraph 1)
14	Setting of data collection	Virtual conferencing using video conferencing software (Page 7, paragraph 2)
15	Presence of non-participants	None (Page 8, paragraph 1)
16	Description of sample	Refer to Table 1, Page 24
17	Interview guide	Provided in Appendix Table 1
18	Repeat interviews	Single interview conducted (Page 7, paragraph 2)
19	Audio/visual recording	Interviews were audio recorded (Page 7, paragraph 2)
20	Field notes	NA
21	Duration	The mean duration of the interviews was 43 minutes (Page 8, paragraph 1)
22	Data saturation	Yes (Page 7, paragraph 2)
23	Transcripts returned	No (Page 7, paragraph 2)
Analysis and findings		
24	Number of data coders	1 (AT) (Page 7, paragraph 3)
25	Description of the coding tree	No – see themes (Pages 8 to 15)
26	Derivation of themes	Inductively derived from data (Page 7, paragraph 3)
27	Software	HyperRESEARCH (Page 7, paragraph 3)
28	Participant checking	Yes (Page 7, paragraph 3)
29	Quotations presented	Refer to Table 2
30	Data and findings consistent	Quotations provided to illustrate each theme.
31	Clarity of major themes	Yes – themes (Pages 8 to 15)
32	Clarity of minor themes	Yes – see subthemes and description of the themes (Pages 8 to 15)

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Frontline Interdisciplinary Clinician Perspectives on Caring for Patients with COVID-19: A Qualitative Study

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Frontline Interdisciplinary Clinician Perspectives on Caring for Patients with COVID-19:

A Qualitative Study

Hassan Rao[1,2], Diana Mancini[1,2], Allison Tong[3,4], Humaira Khan[5], Brissa Santacruz Gutierrez[6],

William Mundo[6], Adriana Collings[7], Lilia Cervantes[1,2,7]

[1]Division of Hospital Medicine, Denver Health, [2]Department of Medicine, University of

Colorado Anschutz Medical Campus, Aurora, Colorado, [3]Sydney School of Public Health, The

University of Sydney, Sydney; [4]Centre for Kidney Research, The Children's Hospital at

Westmead, Westmead, NSW, Australia, [5]Indiana University School of Medicine, [6]University of

Colorado, Anschutz Medical Campus, [7]Office of Research, Denver Health, Denver, Colorado,

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Corresponding author: Hassan Rao, MD

Denver Health

777 Bannock, MC 4000

Hassan.Rao@dhha.org

Telephone: 303-602-6000 (Office)

Fax: 303-602-5056

ABSTRACT

OBJECTIVE: To describe the drivers of distress and motivations faced by interdisciplinary clinicians who were on the frontline caring for patients with COVID-19.

DESIGN: 50 Semi-structured interviews. Transcripts were analyzed using qualitative thematic analysis

SETTING: A safety net hospital in Denver, Colorado.

PARTICIPANTS: Interdisciplinary frontline clinicians including physicians, advance practice providers, nurses, respiratory therapists and paramedics providing inpatient hospital care to patients with hospitalized for COVID-19.

RESULTS: Fifty clinicians (32 women and 18 men) participated. Five themes with respective subthemes (in parentheses) were identified: depersonalization and barriers to care (impeding rapport and compassion, focusing on infection risk at the expense of high quality care, grief from witnessing patients suffer in isolation), powerless in uncertainty (inescapable awareness of personal risk, therapeutic doubt in a void of evidence, confronting ethical dilemmas, struggling with dynamic and unfamiliar challenges), overwhelmed and exhausted (burden of PPE, information overload and confusion, overstretched by additional responsibilities at work, compounded by personal life stressors, feeling vulnerable and dispensable, compassion fatigue, distress from the disproportionate impact on socially oppressed communities), bolstering morale and confidence (motivated by community and family support, equipped with data), and driven by moral duty (responsibility to patient care and community, collegial solidarity and collaboration, contributing to the greater good).

CONCLUSION: Frontline clinicians reported distress due to the challenges of PPE, uncertainty and powerlessness, new responsibilities at work and home, losing control of their schedules, grief from witnessing patients suffer in isolation and witnessing healthcare disparities exacerbated by this pandemic. Clinicians feel supported by their colleagues, families, and community and were driven by a sense of moral duty. Health care system should adopt strategies to minimize distress faced by interdisciplinary clinicians on the frontline of COVID-19.

STRENGTHS AND LIMITATIONS OF THIS STUDY

- This study explored the perspectives of a diverse group of interdisciplinary clinicians including physicians, advance practice providers, nurses, paramedics and respiratory therapists working in a variety of hospital settings including the emergency department, medical/surgical floor, and intensive care unit.

- This study generated comprehensive and detailed insights because interviews were conducted until data saturation.

- This study assessed the perspectives of clinicians only; future studies may assess the perspectives of environmental staff and food services as they also interfaced with patients hospitalized for COVID-19.

- This study included a small sample size and interdisciplinary clinicians were recruited from one safety-net center.

- Transferability of these findings to other hospital settings is uncertain given the unique safety-net patient population, culture, and resources available.

INTRODUCTION

The COVID-19 pandemic has presented unprecedented challenges for the healthcare system. In anticipation of this crisis, healthcare facilities focused on procurement of testing supplies and personal protective equipment (PPE), creating treatment algorithms, ethical resource allocation guidelines, and expanding bed capacity and staffing among other logistics to keep patients and clinicians safe.[1-4] Despite these efforts to protect clinicians, this pandemic has taken a significant toll on the physical, emotional and mental health of frontline clinicians.[2, 5-10] Given epidemic levels of burnout prior to this pandemic, and reports of suicides among frontline clinicians in New York City, it has become increasingly important to understand the driver of clinician distress through this pandemic.[11-13]

While it is clear that frontline responders to public health emergencies are particularly vulnerable to experiencing acute psychological distress, the underlying drivers of distress can be unique in different populations, cultures, clinical settings and with variable extent of impact and time course.[14] During the SARS pandemic, clinicians experienced distress related to uncertainty and fear of the unknown, stigmatization from becoming infected, social isolation and conflicting moral obligations to treat patients yet keep their families safe.[15-17] For some clinicians, this led to long-term mental health problems and burnout.[18-20] The COVID-19 pandemic is unique due to its unpredictable course and widespread global impact.[21] Frontline clinicians across the world have experienced similar challenges with supply constraints, staffing shortages and risk of infection.[22]

Despite cultural, political, and case rate variances, studies have found high rates of psychological symptoms among clinicians during this pandemic.[23-28] However, there is limited qualitative data describing the drivers of distress.[29-37] The aim of this study was to describe the drivers of distress and motivation with the goals of informing local and national strategies to reduce avoidable distress in interdisciplinary clinicians on the frontline of COVID-19.

METHODS

Study Design

50 semi-structured interviews were conducted with frontline clinicians. All study participants provided informed verbal consent and received financial compensation. Participants were assigned a study identification number and were informed all information provided would remain confidential. The University of Colorado multi-Institutional Review Board approved this study (COMIRB #20-0709).

Patient and Public Involvement

It was not appropriate or possible to involve patients or the public in the design of this research.

Setting and Participants

Eligible participants included interdisciplinary frontline clinicians including physicians, advance practice providers, nurses, and paramedics that participated in the care of suspected or confirmed positive COVID-19 patients at Denver Health (DH), a safety-net hospital. Participants were recruited by a standardized, IRB-approved email sent by the study PI. The first participants to respond were included and scheduled for interviews. Purposive sampling was used to capture a diverse sample in terms of demographics (sex, age) and clinical discipline. We capped participants within each clinical category to ensure a balanced proportion of clinician training backgrounds and departments.

Data Collection

Semi-structured interviews were conducted using a telephone or video conferencing platform from April 22 to July 8, 2020 by authors H.R., D.M., and L.C. until data saturation. LC has conducted and published qualitative research and has lectured in qualitative methodology. HR and DM completed training in qualitative research analysis and were mentored by LC. All three of these authors are Internal Medicine trained physicians that participated on the frontline of caring for patients hospitalized with COVID-19. The interview guide was based on the literature and discussion among the research team (Appendix Table 1).[7-10, 15-19] Interviews were recorded and transcribed verbatim.

Data Analysis

Using thematic analysis, authors H.R., D.M., A.T., and L.C. read the transcripts and inductively identified initial concepts. Author A.T. grouped similar concepts into themes and subthemes and coded the data using HyperRESEARCH software (version 4.1.1 ResearchWare Inc. Randolph MA). Authors H.R. and L.C. reviewed and discussed the coding and themes to make sure that the findings reflected the full range and depth of the data.

RESULTS

The 50 participants included 22 physicians, 18 registered nurses, 4 nationally registered paramedics, 2 respiratory therapists, and 4 advance practice providers (2 nurse practitioners, 1 physician assistant, and 1 certified registered nurse anesthetist) and 1 emergency medical technician. There were 32 (64%) females, 32 (64%) were married, and 28 (56%) had children. Twenty-seven (54%) lived with frontline clinicians (Table 1). The duration of the interviews ranged from 28 to 92 minutes.

We identified five themes: depersonalization and barriers to care; powerlessness in uncertainty; physical, emotional and mental exhaustion; bolstering morale and confidence; and driven by moral duty. The subthemes are described below with supporting quotations provided in Table 2.

Depersonalization and barriers to care

Impeding rapport and compassion

The need to use personal protective equipment (PPE) made it difficult for participants to "connect with" and establish trust with patients because they could not communicate properly, were unable to "convey emotion." The PPE stripped away a core dimension of patient care by taking "a lot out of the human experience." Some felt that it was "like a zoo" because they would "look through a glass window and talk about a human being without them being involved."

Focusing on infection risk at the expense of high quality care

To minimize exposure, participants spent less time in patient rooms and assessed patients over the phone. Clinicians acknowledged that this was a "necessary evil," which limited their ability to provide high quality care. Except for in-person physical examination at the time of admission and discharge, clinicians assessed their patients over the phone only: "The hardest part is just having very little to offer out of what I would have considered my strongest toolkit." Some also questioned if they "missed something."

Grief from witnessing patients suffer in isolation

Due to isolation policies, patients were unable to have visitors. Participants felt "indescribable" grief because they could do little to alleviate the terror and loneliness patients suffered. "The family can't be there; it adds to the sadness of the situation where there's so much isolation... Patients are isolated from pretty much all support systems." It was also emotionally difficult

helping patients communicate with their family – "I had her FaceTime her sister so she could see the baby that she'd never held…I don't cry, that's as close as it gets." COVID-19 was also considered by some to be "the worst possible way that someone could die because you're surrounded by air, you cannot breathe."

Powerless in uncertainty

Inescapable awareness of personal risk

Initial concerns about infection dissipated with confidence in PPE. However, this "air of invincibility was easily shattered" as more clinicians became sick and cared for patients that were fit or close to their own age – it's "scary, because when you look at them, you see your own family members and the potential for the people that you care about in your own life" to suffer the same fate. They were constantly processing "terrifying" and "existential questions" that intensified distress. Participants that contracted COVID worried about their own health and their loved ones.

Therapeutic doubt in a void of evidence

Participants were challenged by uncertainty and guilt stemming from the lack of data to inform prognostication and therapies. Many felt "powerless" and humbled by the unpredictability of the disease. Some felt like trainees again, "where everything is new and you think you know what you're doing but you're" unsure and have "self-doubt." They accepted that managing COVID-19 was "a lot of trial and error." Participants worried about medications that "weren't proven" and "that some people ended up on the ventilator that maybe wouldn't have needed to."

Confronting ethical dilemmas

Preparing for decisions about rationing resources was "incredibly stressful." It was horrifying to consider bearing the responsibility of "condemning a person to die" and the possibility of having to "sacrifice a few for the greater good." Conversations around goals of care were challenging without family members at the bedside; "it's just hard to really understand what your loved one is going through." Many clinicians discussed goals of care at the time of admission for all patients regardless of age or comorbidities.

Struggling with dynamic and unfamiliar challenges

Frequent changes in policies, guidelines and conflicting information created a challenging and chaotic environment. They described how "every day was a new day. You really had no idea what was happening." Participants worked in new settings and felt constant anxiety being outside their "comfort zone." The uncertain course of the pandemic was challenging as they lost control over their schedules, cancelled vacations and accepted that they "might be in this for the long haul."

Overwhelmed and exhausted

Burden of PPE

Wearing PPE was exhausting. It was "difficult to breathe," "hot and uncomfortable" and slowed their ability to enter rooms and respond to patient requests for food, water or to use the bathroom. The process of wearing PPE and remembering each step added a new "cognitive load." The "hyper-awareness" of risk added stress – "it's led to me feeling like I made some silly

mistakes, because I had energy devoted to what my hands just did, 'did I just use them to touch my face?'" In making decisions about orderings tests (e.g. imaging or labs), they considered if they would be exposing their colleagues. Some were worried about using the same masks all day - "it says on the box 'one-time use.'"

Information overload and confusion

Some participants felt inundated by information – "it's like drinking out of a fire hydrant". They had "informational burnout" and had difficulty processing new information as it was often changing or conflicting. Even outside of work, information about the pandemic was constantly on the news, social media and in conversations with friends – it was "exhausting".

Overstretched by additional responsibilities at work

Participants took on many new tasks such as coordinating internal communications, creating and managing databases, and following up on discharged patients. Many worked additional shifts – "two more weeks of work crammed into four weeks of work."

Compounded by personal life stressors

Participants were concerned about infecting their family and considered whether to isolate from their families. Participants with children had new, time-consuming challenges at home including homeschooling and coordinating childcare. Many felt "worn out" by these responsibilities – "trying to stay normal, to be the mother and the wife… because they [children] don't deserve to get less of me because of what's happening."

Feeling vulnerable and dispensable

As participants coped with the stress of additional shifts, responsibilities and risk, some began to feel "vulnerable." Some participants felt well supported from their leaders, but others felt a disconnect between clinical and administrative leadership. They felt leaders needed to be more present – "I think it would be eye opening for them to have to come in and see" the unique challenges of providing care in PPE. Some were concerned about the burden of mandatory extra shifts and lack of "hazard pay." Hearing about a "hiring freeze" and seeing colleagues lose their jobs, made them feel expendable.

Compassion Fatigue

As the pandemic progressed, clinicians began feeling emotionally overwhelmed and started developing "compassion fatigue". The grief of caring for COVID patients was further amplified by what some clinicians felt was the psychological impact of quarantine on the community. They described seeing higher rates of patients presenting due to domestic violence, depression and suicides. Over time, clinicians began to feel emotionally exhausted and described symptoms of burnout – "my patience is less. My empathy is less."

Distress from the disproportionate impact on vulnerable communities

The injustice of COVID-19 was traumatic. Witnessing the disproportionate impact of the pandemic on racial and ethnic minorities as well as other vulnerable communities was devastating. It was "heartbreaking" to see multiple members of the same minority family hospitalized and critically ill simultaneously. Many expressed immense grief witnessing the impact on communities that may not have the privilege to isolate, "they were probably essential

workers, or needing to work, or they were living in homes with multi-generational" families.

They noticed "a huge disparity between the rich and the poor."

Bolstering morale and confidence

Motivated by community and family support

Participants appreciated the "outpouring of love and support" from the community who

contributed food and donated PPE. They also relied on support from their families.

Equipped with data

Information could "reduce stress and anxiety" as it provided a "picture of where the hospital's

standing." Communicating "big wins" such as the number of extubations and discharges inspired

optimism. Executives provided transparency around PPE supplies, plans for procurement, and

curated information from clinical trials. This helped many feel safe and informed. They

appreciated clinical updates as they did not have "time or bandwidth to search through articles."

Driven by moral duty

Responsibility to patient care and community

Participants were committed to fulfilling their fundamental responsibility of treating patients

who "deserve good care". They held a "high level of social justice and responsibility" and strived

to care for the "underserved and impoverished" patients that presented with COVID-19.

Collegial solidarity and collaboration

Participants felt "unified around a common goal or a kind of common enemy [SARS-CoV-2]" and were encouraged by "interdisciplinary collaboration" and "sharing of knowledge." They were "in it together" and needed to "have each other's back," particularly given the additional staffing required to manage the crisis: "We lean on each other, we support each other, we expect each other to be there."

Contributing to the greater good

Some believed it was their "responsibility" to contribute to the greater good and to be a "good and positive force." They felt stimulated to understand a novel disease and use their training and skills to "contribute new knowledge" in managing patients with COVID-19 and to be "part of the solution."

DISCUSSION

In this study, we report distress and motivations of interdisciplinary clinicians who provided care to hospitalized patients with COVID-19. Clinicians at the frontline of COVID-19 experienced distress from the emotional and physical burden of PPE, increased responsibilities at work and home, witnessing patients dying in isolation, and the exacerbation of systemic healthcare disparities. Clinicians also reported feeling fear, guilt and powerlessness stemming from the many uncertainties of this pandemic. Many clinicians described how these emotions progressed to compassion fatigue, vulnerability and exhaustion reflected in the qualitative themes. These findings are consistent with high rates of distress described in quantitative studies during the current pandemic. Clinicians' fears related to risk of infection, uncertainties of the disease, and

feelings of exhaustion as well as being driven by a sense of duty and solidarity are consistent

with studies from the SARS pandemic and qualitative data describing experiences of clinicians

in Europe and China during the early stage of this pandemic. However, many clinicians

described how the emotional challenges of caring for patients with PPE and hospital isolation

policies were compounded by the grief of witnessing an exacerbation of systemic healthcare

disparities, which has become more apparent in the COVID-19 pandemic.

Increasing workload and loss of a sense of control have been described as powerful contributors

to distress that may lead to burnout.[38, 39] We identified many facets of uncertainty in the context

of COVID-19 including being unable to prognosticate the course of the illness, lack of evidence

and therapeutics leading to clinical decisional uncertainty, rapidly changing guidelines and

policies, unclear risk of infection, the unknown duration and severity of the pandemic, and a loss

of control to their schedules. Clinicians were also distressed by feeling helpless and distressed

from witnessing patients suffering in isolation. While clinicians adapted to these uncertain

circumstances, there is concern for maintaining this resiliency if long-term solutions around

managing workload are not identified by leadership.

There is also concern of increased distress in clinicians who provide care to patients that face

complex social challenges.[40, 41] Clinicians caring for patients with COVID-19 were dismayed and

frustrated by how vulnerable groups such as impoverished, racial and ethnic minority

communities had disproportionally higher rates of COVID-19 infection than the general

population. While it is possible that this impact may be more noticeable in safety-net institutions,

several studies have confirmed the increased prevalence and mortality associated with COVID-

19 in Latino, Black, and "other" ethnicities.[42] Clinicians felt defeated because there were limited options for safe self-isolation in these communities due to crowded living conditions, use of public transportation, and low-wage service jobs. They were frustrated by barriers that precluded in-person language interpreters owing to the limited availability of PPE and having to resort to telephone language interpreters compounding the difficulties of communicating while wearing PPE.

Higher rates of distress during the COVID-19 pandemic have been found among younger age groups, females, and nurses (compared to physicians).[5-10] This may be because young clinicians with children are burdened by increased responsibilities at work and home compounded by losing control and predictability of their work schedules. Nurses in our study encountered many logistical obstacles as they were required to work additional shifts and often spend more time at the bedside resulting in more time wearing PPE, higher risk of exposure, and more time spent witnessing patients suffer in isolation.

Our study has key implications to prevent or minimize distress and risk of subsequent burnout in clinicians (Table 3). There is an urgent need to address this, as burnout can lead to poor patient outcomes and will impair the ability of the healthcare system to respond to this crisis.[43-46] We suggest that institutional leadership create clear structures for understanding and addressing concerns of frontline clinicians, communicate contingency staffing plans to manage workload and allow frontline clinicians to regain a sense of control of their schedules. Studies have also shown that it is important to support workers' childcare needs during crisis situations.[47, 48] We recognize that clinicians may not engage in psychological services on their own accord, and

therefore suggest that institutions offer proactive psychological counseling and establish peer-to-peer support mechanisms as these provide the most benefit.[49-52] Finally, it is critical to address structural racism and healthcare disparities as this is an important driver of distress highlighted by this pandemic. This includes improving access to testing, equitable resource allocation, enhanced outreach programs for minority communities, improved access to in-person translation services and cultural humility training for all staff.

LIMITATIONS

Our study generated detailed insights on the experiences among frontline clinicians caring for COVID-19 patients. However, our study has some potential limitations. Clinicians were from one academic safety-net hospital in Colorado, thus the transferability of the findings to other settings is uncertain. Studies have shown variances in PPE use among different countries and cultures. Our findings of distress related to the burden of PPE use may not be consistent with clinician experiences in other cultures.[53] As this study was performed at the early phase of the COVID-19 pandemic, it is also possible that clinician experiences have changed with anticipation of new therapies and the possibility of a vaccine.

Future research is needed to assess the effectiveness of strategies to screen for and reduce psychological distress. While it is clear that clinicians experiencing distress will benefit from multifaceted psychological support, ideal implementation strategies to engage and support clinicians is unclear.[54] There is also limited knowledge of the effectiveness of online-based

counseling which can be implemented more readily and have been used to support clinicians in China.[22,55]

CONCLUSION

Frontline clinicians caring for COVID-19 patients experience distress related to challenges of PPE, clinical uncertainty and powerlessness, new responsibilities at work and home, losing control of their schedules, and grief from witnessing patients suffer in isolation and witnessing healthcare disparities exacerbated by this pandemic. Providers feel supported by their colleagues, families, and community and were driven by a sense of moral duty. Institutions should further support frontline clinicians by making efforts to understand and address their challenges, provide proactive mental health support, and advocate vulnerable communities.

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Raw data (full transcriptions of interviews) are stored on an encrypted, secure hospital network

and can be reproduced upon request.

ETHICAL APPROVAL STATEMENT: This study was approved by the University of

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References

1. Liu Y, Li J, Feng Y. Critical care response to a hospital outbreak of the 2019-nCoV infection in Shenzhen, China. *Crit Care*. 2020;24(1):56. Published 2020 Feb 19. doi:10.1186/s13054-020-2786-x

2. Liew MF, Siow WT, MacLaren G, See KC. Preparing for COVID-19: early experience from an intensive care unit in Singapore. *Crit Care*. 2020;24(1):83. Published 2020 Mar 9. doi:10.1186/s13054-020-2814-x

3. Chopra V, Toner E, Waldhorn R, Washer L. How Should U.S. Hospitals Prepare for Coronavirus Disease 2019 (COVID-19)?. *Ann Intern Med*. 2020;172(9):621-622. doi:10.7326/M20-0907

4. Wee LE, Fua TP, Chua YY, et al. Containing COVID-19 in the Emergency Department: The Role of Improved Case Detection and Segregation of Suspect Cases. *Acad Emerg Med*. 2020;27(5):379-387. doi:10.1111/acem.13984

5. Lai J, Ma S, Wang Y, et al. Factors Associated With Mental Health Outcomes Among Health Care Workers Exposed to Coronavirus Disease 2019. *JAMA Netw Open*. 2020;3(3):e203976. doi:10.1001/jamanetworkopen.2020.3976

6. Rossi R, Socci V, Pacitti F, et al. Mental Health Outcomes Among Frontline and Second-Line Health Care Workers During the Coronavirus Disease 2019 (COVID-19) Pandemic in Italy. *JAMA Netw Open.* 2020;3(5):e2010185. doi:10.1001/jamanetworkopen.2020.10185

7. Zhang WR, Wang K, Yin L, et al. Mental Health and Psychosocial Problems of Medical Health Workers during the COVID-19 Epidemic in China. *Psychother Psychosom*. 2020;89(4):242-250. doi:10.1159/000507639

8. Wu W, Zhang Y, Wang P, et al. Psychological stress of medical staffs during outbreak of COVID-19 and adjustment strategy [published online ahead of print, 2020 Apr 21]. *J Med Virol*. 2020;10.1002/jmv.25914. doi:10.1002/jmv.25914

9. Cai H, Tu B, Ma J, et al. Psychological Impact and Coping Strategies of Frontline Medical Staff in Hunan Between January and March 2020 During the Outbreak of Coronavirus Disease 2019 (COVID-19) in Hubei, China. *Med Sci Monit*. 2020;26:e924171. Published 2020 Apr 15. doi:10.12659/MSM.924171

10. Mo Y, Deng L, Zhang L, et al. Work stress among Chinese nurses to support Wuhan in fighting against COVID-19 epidemic. *J Nurs Manag*. 2020;28(5):1002-1009. doi:10.1111/jonm.13014

11. National Academies of Sciences, Engineering, and Medicine. Taking action against clinician burnout: a systems approach to professional well-being. Washington, DC: National Academies Press, 2019

12. Watkins, A., Rothfeld, M., Rashbaum, W. and Rosenthal, B., 2020. *Top E.R. Doctor Who Treated Virus Patients Dies By Suicide*. [online] Nytimes.com. Available at: <https://www.nytimes.com/2020/04/27/nyregion/new-york-city-doctor-suicide-coronavirus.html> [Accessed 8 August 2020].

13. Edelman, S., Moore, T., Narizhnaya, K. and Balsamini, D., 2020. *EMT John Mondello Kills Himself After Less Than Three Months On The Job*. [online] New York Post.

Available at: <https://nypost.com/2020/04/25/nyc-emt-commits-suicide-with-gun-belonging-to-his-dad/> [Accessed 8 August 2020].

14. Belfroid E, van Steenbergen J, Timen A, Ellerbroek P, Huis A, Hulscher M. Preparedness and the importance of meeting the needs of healthcare workers: a qualitative study on Ebola. *J Hosp Infect*. 2018 Feb;98(2):212-218. doi: 10.1016/j.jhin.2017.07.001. Epub 2017 Jul 6. PMID: 28690117; PMCID: PMC7114583.

15. Maunder R, Hunter J, Vincent L, et al. The immediate psychological and occupational impact of the 2003 SARS outbreak in a teaching hospital. *CMAJ*. 2003;168(10):1245-1251.

16. Nickell LA, Crighton EJ, Tracy CS, et al. Psychosocial effects of SARS on hospital staff: survey of a large tertiary care institution. *CMAJ*. 2004;170(5):793-798. doi:10.1503/cmaj.1031077

17. Maunder RG, Lancee WJ, Rourke S, et al. Factors associated with the psychological impact of severe acute respiratory syndrome on nurses and other hospital workers in Toronto. *Psychosom Med*. 2004;66(6):938-942. doi:10.1097/01.psy.0000145673.84698.18

18. Wu P, Fang Y, Guan Z, et al. The psychological impact of the SARS epidemic on hospital employees in China: exposure, risk perception, and altruistic acceptance of risk. *Can J Psychiatry*. 2009;54(5):302-311. doi:10.1177/070674370905400504

19. Maunder RG, Lancee WJ, Balderson KE, et al. Long-term Psychological and Occupational Effects of Providing Hospital Healthcare during SARS Outbreak. *Emerging Infectious Diseases*. 2006;12(12):1924-1932. doi:10.3201/eid1212.060584.

20. Lancee WJ, Maunder RG, Goldbloom DS; Coauthors for the Impact of SARS Study. Prevalence of psychiatric disorders among Toronto hospital workers one to two years after the SARS outbreak. *Psychiatr Serv*. 2008;59(1):91-95. doi:10.1176/ps.2008.59.1.91

21. Wu YC, Chen CS, Chan YJ. The outbreak of COVID-19: An overview. *J Chin Med Assoc*. 2020;83(3):217-220. doi:10.1097/JCMA.0000000000000270

22. Kang L, Li Y, Hu S, Chen M, Yang C, Yang BX, et al. The mental health of medical workers in Wuhan, China dealing with the 2019 novel coronavirus. *Lancet Psychiatry*. 2020;7(3):e14. https://doi. org/10.1016/S2215-0366(20)30047-X

23. Chew NWS, Ngiam JN, Tan BY, et al. Asian-Pacific perspective on the psychological well-being of healthcare workers during the evolution of the COVID-19 pandemic. *BJPsych Open*. 2020;6(6):e116. Published 2020 Oct 8. doi:10.1192/bjo.2020.98

24. Tan YQ, Wang Z, Yap QV, et al. Psychological Health of Surgeons in a Time of COVID-19: A Global Survey [published online ahead of print, 2021 Jan 22]. *Ann Surg*. 2021;10.1097/SLA.0000000000004775. doi:10.1097/SLA.0000000000004775

25. Chew NWS, Lee GKH, Tan BYQ, et al. A multinational, multicentre study on the psychological outcomes and associated physical symptoms amongst healthcare workers during COVID-19 outbreak [published online ahead of print, 2020 Apr 21]. *Brain Behav Immun*. 2020;S0889-1591(20)30523-7. doi:10.1016/j.bbi.2020.04.049

26. Zhang SX, Liu J, Afshar Jahanshahi A, et al. At the height of the storm: Healthcare staff's health conditions and job satisfaction and their associated predictors during the epidemic

peak of COVID-19. *Brain Behav Immun*. 2020;87:144-146. doi:10.1016/j.bbi.2020.05.010

27. Preti E, Di Mattei V, Perego G, et al. The Psychological Impact of Epidemic and Pandemic Outbreaks on Healthcare Workers: Rapid Review of the Evidence. *Curr Psychiatry Rep*. 2020;22(8):43. Published 2020 Jul 10. doi:10.1007/s11920-020-01166-z

28. Luo M, Guo L, Yu M, Jiang W, Wang H. The psychological and mental impact of coronavirus disease 2019 (COVID-19) on medical staff and general public - A systematic review and meta-analysis [published online ahead of print, 2020 Jun 7]. *Psychiatry Res*. 2020;291:113190. doi:10.1016/j.psychres.2020.113190

29. Liu Q, Luo D, Haase JE, et al. The experiences of health-care providers during the COVID-19 crisis in China: a qualitative study. *Lancet Glob Health*. 2020;8(6):e790-e798. doi:10.1016/S2214-109X(20)30204-7

30. Sun N, Wei L, Shi S, et al. A qualitative study on the psychological experience of caregivers of COVID-19 patients. *Am J Infect Control*. 2020;48(6):592-598. doi:10.1016/j.ajic.2020.03.018

31. Sterling MR, Tseng E, Poon A, et al. Experiences of Home Health Care Workers in New York City During the Coronavirus Disease 2019 Pandemic: A Qualitative Analysis. *JAMA Intern Med*. Published online August 04, 2020. doi:10.1001/jamainternmed.2020.3930

32. Aughterson H, McKinlay AR, Fancourt D, Burton A. Psychosocial impact on frontline health and social care professionals in the UK during the COVID-19 pandemic: a qualitative interview study. *BMJ Open*. 2021;11(2):e047353. Published 2021 Feb 8. doi:10.1136/bmjopen-2020-047353

33. Vindrola-Padros C, Andrews L, Dowrick A, et al. Perceptions and experiences of healthcare workers during the COVID-19 pandemic in the UK. *BMJ Open* 2020;10:e040503. doi: 10.1136/bmjopen-2020-040503

34. Vera San Juan N, Aceituno D, Djellouli N, et al. Mental health and well-being of healthcare workers during the COVID-19 pandemic in the UK: contrasting guidelines with experiences in practice. *BJPsych Open*. 2020;7(1):e15. Published 2020 Dec 10. doi:10.1192/bjo.2020.148

35. Hörold, M, Drewitz, K, Brunnthaler, V, et al. "This is really like waiting for war and this is not good" – Intertwining between pandemic experiences, and the development of professional action of healthcare professionals in critical care at the beginning of the COVID-19 pandemic in Germany: a qualitative study. *medRxiv*. Preprint posted online Feb 1, 2021. doi: 10.1101/2021.01.29.21250626

36. Hoernke K, Djellouli N, Andrews L, et al. Frontline healthcare workers' experiences with personal protective equipment during the COVID-19 pandemic in the UK: a rapid qualitative appraisal. *BMJ Open*. 2021;11(1):e046199. Published 2021 Jan 20. doi:10.1136/bmjopen-2020-046199

37. Bennett P, Noble S, Johnston S, Jones D, Hunter R. COVID-19 confessions: a qualitative exploration of healthcare workers experiences of working with COVID-19. *BMJ Open*. 2020 Dec 16;10(12):e043949. doi: 10.1136/bmjopen-2020-043949

38. Southwick FS, Southwick SM. The Loss of a Sense of Control as a Major Contributor to Physician Burnout: A Neuropsychiatric Pathway to Prevention and Recovery. *JAMA Psychiatry*. 2018;75(7):665-666. doi:10.1001/jamapsychiatry.2018.0566

39. Freeborn DK. Satisfaction, commitment, and psychological well-being among HMO physicians. *West J Med*. 2001;174(1):13-18.

40. Cervantes L, Richardson S, Raghavan R, et al. Clinicians' Perspectives on Providing Emergency-Only Hemodialysis to Undocumented Immigrants: A Qualitative Study. *Ann Intern Med.* 2018;169(2):78-86. doi:10.7326/M18-0400

41. Hayashi AS, Selia E, McDonnell K. Stress and provider retention in underserved communities. *J Health Care Poor Underserved*. 2009;20(3):597-604. doi:10.1353/hpu.0.0163

42. Dorn AV, Cooney RE, Sabin ML. COVID-19 exacerbating inequalities in the US. *Lancet*. 2020 Apr 18;395(10232):1243-1244. doi: 10.1016/S0140-6736(20)30893-X. PMID: 32305087; PMCID: PMC7162639.

43. Munnangi S, Dupiton L, Boutin A, Angus LDG. Burnout, Perceived Stress, and Job Satisfaction Among Trauma Nurses at a Level I Safety-Net Trauma Center. *J Trauma Nurs*. 2018;25(1):4-13. doi:10.1097/JTN.0000000000000335

44. Fahrenkopf AM, Sectish TC, Barger LK, et al. Rates of medication errors among depressed and burnt out residents: prospective cohort study. *BMJ* 2008; 336: 488–91.

45. West CP, Tan AD, Habermann TM, Sloan JA, Shanafelt TD. Association of resident fatigue and distress with perceived medical errors. *JAMA* 2009; 302: 1294–300.

46. Shanafelt TD, Balch CM, Bechamps G, et al. Burnout and medical errors among American surgeons. *Ann Surg* 2010; 251: 995–1000.

47. Shanafelt T, Ripp J, Trockel M. Understanding and Addressing Sources of Anxiety Among Health Care Professionals During the COVID-19 Pandemic. *JAMA*. 2020;323(21):2133–2134. doi:10.1001/jama.2020.5893

48. Charney RL, Rebmann T, Flood RG. Emergency Childcare for Hospital Workers During Disasters. *Pediatr Emerg Care*. 2015;31(12):839-843. doi:10.1097/PEC.0000000000000629

49. Maunder RG, Leszcz M, Savage D, et al. Applying the lessons of SARS to pandemic influenza: an evidence-based approach to mitigating the stress experienced by healthcare workers. *Can J Public Health*. 2008;99(6):486-488. doi:10.1007/BF03403782

50. Brooks SK, Webster RK, Smith LE, et al. The psychological impact of quarantine and how to reduce it: rapid review of the evidence. *Lancet*. 2020;395(10227):912-920. doi:10.1016/S0140-6736(20)30460-8

51. Brooks, Samantha, Dunn, Rebecca, Amlot, Richard, Rubin, Gideon, Greenberg, Neil. A Systematic, Thematic Review of Social and Occupational Factors Associated With Psychological Outcomes in Healthcare Employees During an Infectious Disease Outbreak. *J Occup Environ Med*. 2018;**60**(**3**):248-257. doi:10.1097/JOM.0000000000001235.

52. Chen Q, Liang M, Li Y, et al. Mental health care for medical staff in China during the COVID-19 outbreak [published correction appears in Lancet Psychiatry. 2020 May;7(5):e27]. *Lancet Psychiatry*. 2020;7(4):e15-e16. doi:10.1016/S2215-0366(20)30078-X

53. Wang C, Chudzicka-Czupała A, Grabowski D, et al. The Association Between Physical and Mental Health and Face Mask Use During the COVID-19 Pandemic: A Comparison

of Two Countries With Different Views and Practices. *Front Psychiatry*. 2020;11:569981. Published 2020 Sep 9. doi:10.3389/fpsyt.2020.569981

54. Pollock A, Campbell P, Cheyne J, Cowie J, Davis B, McCallum J, McGill K, Elders A, Hagen S, McClurg D, Torrens C, Maxwell M. Interventions to support the resilience and mental health of frontline health and social care professionals during and after a disease outbreak, epidemic or pandemic: a mixed methods systematic review. *Cochrane Database Syst Rev.* 2020 Nov 5;11:CD013779. doi: 10.1002/14651858.CD013779. PMID: 33150970.

55. Liu S, Yang L, Zhang C, et al. Online mental health services in China during the COVID-19 outbreak. *Lancet Psychiatry*. 2020;7(4):e17-e18. doi:10.1016/S2215-0366(20)30077-8

Table 1. Patient Characteristics (N=50)

Characteristic	Value (n = 50)
Age, mean (SD), y	40.6 (8.6)
Females, No (%)	32 (64)
Married, No (%)	32 (64)
Dependents, more than 1, No (%)	28 (56)
Clinical experience, mean (SD), y	12.5 (8.4)
At least 2 frontline workers at home, No (%)	6 (12)
Days worked with COVID 19 patients in past month, mean (SD)	11.5 (5.1)
Patients transferred to ICU in last two weeks, mean (SD)	4.3 (4.3)
Code blues during last two weeks, mean (SD)	1.4 (1.7)
Deaths during last two weeks, mean (SD)	1.5 (2.4)
Participants with COVID-19, No (%)	4 (8)
Discipline, n (%)	
Hospital Medicine	
Physician	5 (10)
Nurse	6 (12)
Nurse Practitioner	1 (2)
Pulmonary/Critical Care	
Physician	6 (12)
Nurse	6 (12)
Emergency Medicine	
Physician	4 (8)
Physician Assistant	1 (2)
Nurse Practitioner	1 (2)
Nurse	5 (10)
Emergency Medical Technicians	1 (2)
Nationally Registered Paramedic	4 (8)
Anesthesiology	
Physician	3 (6)
Certified Registered Nurse Anesthetist	1 (2)
Infectious Disease Physician	2 (4)
Respiratory Therapists	2 (4)

Table 2. Selected supporting quotations

Theme	Quotations
Depersonalization and barriers to care	
Impeding rapport and compassion	You don't get to know the patient as a person (Physician, 30s)
	It just feel very impersonal, when you're used to being very close to people… being able to sit with them … they can see your whole face, see your expressions… It's challenging... to give people confidence and compassion and just convey to them that you really do care. (Nurse, female, 40s)
	The depersonalization of medicine… I feel guilty because I'm not engaged with them on the same humanistic level that I typically would with a patient who is clinically worsening. (Physician, male, 30s)
Focusing on infection risk at the expense of high quality care	We had a patient who fell, she was my patient. And because she put her call light on, she called appropriately, she was impulsive, but like we were not able to get into to the room fast enough, because we had to put on our gear and she, she fell, like she fell hard. (Nurse, female 30s)
	He was brought in, he had tombstone EKGs and he had a massive MI. So, you know, before COVID, shortness of breath in a man you, would think cardiac dyspnea, but it's like, we had these terrible COVID blinders on… I saw a man that had just terrible DKA and he was admitted and he had a cardiac arrest right after that and then suffered a terrible anoxic injury. And…. he would have come in earlier if it hadn't been for COVID. (Physician, male, 40s)
Grief from witnessing patients suffer in isolation	Those family members can't be here. That's just really hard to see that when somebody really needs a loving person… So I gave her a great big hug, and I felt her sadness, and that's just something that I will probably carry with me forever. It's just that feeling of loneliness and sadness that you just can't describe... That truly right now is the hardest thing I deal with every day. (Nurse, female, 50s)
	I held a tablet up for a patient who was not alert, responsive, and the family was just like just like we love you, Grandpa, stay strong, and I felt like I was intruding. I was heartbroken watching this like moment take place. (Nurse, female, 30s)
	He basically just spent the last five days of his life alone, delirious, for which normally we treat delirium with patients' family at the bedside, reorientation. We did none of that. We really provided sub-optimal care and he died in isolation. (Physician, female, 30s)
Powerless in uncertainty	
Inescapable awareness of personal risk	And just that kind of reminder that you don't have to be old to get sick, I'm afraid for the patient, I'm afraid for myself. I'm afraid for the people that I care about in my own life. (Nurse, female, 30s)
	Practicing medicine is just difficult and there are uncertainties about supplies and about my own personal safety as a practicing physician (Physician, female, 40s)
Therapeutic doubt in a void of evidence	The fact that a medication wasn't proven. We didn't have good data. This was disconcerting. To not know what we should be recommending… We've learned a lesson that these unproven therapies could be harmful. If you're going to do something that's unproven, you should do it within a trial. We could really be doing more harm than good. That was just a lesson I learned. I was just excited to jump on the bandwagon and offer whatever I could and whatever other institutions were doing. (Physician, female, 30s)
	It's pretty unpredictable compared to a lot of other things we treat. You might feel like your patient is clinically improving or kind of out of the woods and then suddenly, they take a turn for the worse. And that then relates to how you can talk to a patient because you can't, it's difficult to have 100% confidence and say, you're going to be fine. You're improving, you're going to continue to improve because that's all probably not true. (Physician, male, 30s)
	I have a lot of fear that that we don't know what's going to make them better or not better… there's a lot of times when I leave work that I feel really empty. Like I don't know if I made a difference and It's kind of sad, like I have a lot of sadness. (Nurse, female, 50s)
Confronting ethical dilemmas	So this is a patient who comes in, they're full code, but we don't have the resources and I had to decide if the 88 year old grandma on dialysis gets the ventilator or the 44 year old. And even just the weight that you have to carry if that's your decision right? That you just condemned this person to die and not this person. It's something that I worried a lot about for myself and also

	for our trainees; that our residents would have to be exposed to this stuff and carry it with them for the rest of their lives. (Physician, male, 40s)
Struggling with dynamic and unfamiliar challenges	The uncertainty about the future, not being able to know like 6 months ahead what our schedule is going to be like and it feels like things could change on any given day. (Physician, female, 30s)
	I'm constantly out of my comfort zone there's literally like nothing that is routine or second nature for me. My nervous system is like constantly in like flight mode and sweaty when I am running to a patient's room. (Nurse, female, 30)
Overwhelmed and exhausted	
Burden of PPE	It's very different in a nine hour shift with the PPE… it was uncomfortable and that was also fatiguing. That was all new mental energy that had to be expended to do your job. (Physician, male, 40s)
	Some days I feel really claustrophobic in the mask and it like increases my anxiety. (Nurse, female, 30s)
	Just the physical nature of having so many patients prone and flipping them and all of that it's physically hard. (Nurse, female, 50s)
Information overload and confusion	We're just burnt out from the constant changing of policies and expectations. (Nurse, female, 40s)
	Things are literally changing on like a day to day, hour by hour basis. (Physician, male, 40s)
	It was kind of unique part of COVID is that every day you're also kind of battling the news cycle and being aware of that news cycle, you know, so, like getting questions because the president says he takes hydroxychloroquine. (Physician, female, 30s)
Overstretched by additional responsibilities at work	I'm not alone when I'm saying that I'm feeling burnt out and overwhelmed. (Nurse, female, 30s)
	The last week that I was on… come straight home for an hour or two and then write notes until midnight, or 1230 and then get up and do it all over again... It was kind of you know, basic like functioning, eat food and then do more work. (Physician, male, 40s)
	Calling patients families at the end of each day because they couldn't have visitors … and giving them updates for the day and that by itself took a lot of time and was draining and not something that is normally part of our daily routine. (Physician, male, 30s)
Compounded by life stressors	Having to be like quarantined and do homeschooling on top of all that. It's been very difficult. (Nurse, female, 40s)
	Should I separate myself? We ultimately decided that, that would be more traumatic and that this is a marathon and not a spring and that separating myself would be more traumatic… We decided that the risk of this being really upsetting and traumatic for the children would be worse. We had to weigh all of this. (Physician, female, 30s)
Feeling vulnerable and dispensable	It made me feel dispensable…There's very much a sense of us not being part of the conversation and instead we are just told that this is how things are going to happen. (Physician, female, 40s)
	I never felt more vulnerable than this situation has made me feel in healthcare. (Nurse, female, 40s)
	If you want to do sort of a war analogy, it feels like all the generals are making decisions for the people that are dying on the field and nobody, you know, without knowing the reality of it… And so, I mean, I would just, I think it would be eye opening for them to have to come in and see, you know, a prone patient core, you know, and just watch. (Female, nurse, 30s)
	People are being asked to work more but are not compensated more. Taking more risk despite having loved ones. It hurt a lot of feelings and made people feel unappreciated. (Physician, female, 30s)
Compassion fatigue	My patience is less. And my empathy is less. My empathy meter is low. (Physician assistant, female, 30s)
	So the compassion fatigue I've actually experienced has been with the patients that I don't feel need to be there, right? Like, why are you here? Why are you using these resources? You twisted your ankle three weeks ago, you've been walking around fine.... but yeah, there's some compassion fatigue towards those kind of people and I'm trying to save whatever emotional response I have left for the people who I feel like needed it, if that make sense. (Nurse practitioner, female, 30s)
	I've been much better about it trying to save those emotions for when it matters. So I guess I've been stingier with my feelings, if that makes sense. (Nurse, female 30s)

Distress from the disproportionate impact on socially oppressed communities	At one point every single patient in our unit was COVID positive and every single one of them had a Hispanic last name and I just feel a lot of just mixed emotions, probably between sort of anger and just kind of profound sadness. I'm just so saddened by just how unfair it seems. (Nurse, female, 50s)
	I worry a lot about after they leave, sort of depending on their situation, and their ability to either socially distance or remain stay or have access to things like that's a big concern. (Physician, female, 50s)
	I took care of the grandfather or like the father who was 90-something, and his son was on a ventilator, his grandson was in the ICU as well, and I talked to his daughter-in-law… The poor family was just like, totally stressed out; and that was really heartbreaking… There was something about this pandemic in that, three fourths of everyone was Latino. And to know why they were getting it, in that they were probably essential workers, or needing to work, or they were living in homes with multi-generational kind of situations; that was really sad and most of them had nothing. The family, they're barely making it, and how are they going to survive financially? (Physician, female, 40s)
	To be doing the bulk of my interviews through the glass on the phone, particularly with Spanish speakers, it was very unsettling and unsatisfying on a certain level because I just did feel like I was doing my best, which was really hard. You wonder like, did you miss something? (Physician, male, 30s)

Bolstering morale and confidence	
Motivated by community and family support	Community support that's been very touching to me just like the people donating food or like donating masks or create a company like donate goggles, (Nurse, female, 30s)
	It was the fact that like, "Oh, like, people care about us and recognize that what we're doing right now is important" and that lifted spirits. (Physician, male, 40s)
Equipped with data	I feel like I know what's going on and so that's calming. (Physician, female, 30s)
	I think an organized plan for what we will do if there is a surge or whether we will be needed to cover hospital shifts… That communication is important because it gives us an idea of where we are with the curve and our hospital capacity. (Physician, female, 30s)
	We heard the other day we're running low on masks; they're not trying to hide that. They communicate also what this solution is, what the fix is. That's hugely important, that builds trust, we're able to plan for things, know when things are coming. (Nurse, female, 40s)

Driven by moral duty	
Responsibility to patient care and community	A professional obligation that this is what I've trained for. (Female, physician, 30s)
	This has been particularly hard on our…. most vulnerable communities … That kind of gives a little extra motivation to want to like show up and work hard and take really good care of them. (Physician, male, 30s)
Collegial solidarity and collaboration	Specialists, nurses – especially nurses – are a lot more willing to go above and beyond to take care of these people. That collective, all hands on deck, throughout the hospital, is really reassuring – everyone pitching in however they can. (Nurse practitioner, male, 30s)
	I want to support my fellow staff and I don't want to leave them short. (EMT, male, 30s)
Contributing to the greater good	When everything is so negative, I do feel that I can be a good force, I can be at least something positive in all of it. (Nurse, female, 40s)
	To be apart of this illness that nobody really understands. From a scientific background, it is really interesting that we are learning new stuff, day by day, week by week. (Nurse practitioner, male, 30s)

Table 3. Suggested interventions to support frontline clinicians

Strategy	Suggested Actions or Interventions
Acknowledge and address concerns	• Create a clear reporting structure and mechanism to allow frontline clinicians to voice clinical concerns • Communicate acknowledgement and validation of concerns as well as plans to address concerns • Maintain an active presence by administrative leadership on clinical floors to improve communication and better understand frontline clinician challenges • Minimize or consider suspending productivity reports and measurements
Reduce clinical uncertainty	• Establish mechanisms for knowledge sharing and delivering emerging clinical research updates • Create and maintain clinical diagnostic and therapeutic guidelines
Reduce burden of ethical decisions	• Create standardized resource allocation framework to reduce burden of decision making • Standardize processes for discussion of goals of care at admission • Improve access to and staffing for palliative care and chaplain services
Reduce infection risk	• Maintain adequate supplies of PPE • Allow rapid access for employee testing and occupational health support • Provide information and resources on best practices to minimize infection risk for family members of clinicians
Address healthcare disparities	• Allocate testing and access to care fairly with special consideration to communities with preexisting technological and health literacy gaps • Expand respite facilities to allow for greater access to safe social isolation • Ensure that patients have access to robust interpretation services • Develop culture and language concordant educational community outreach programs • Provide cultural humility training
Bolster psychological support	• Validate and communicate understanding of expected psychological distress • Train providers on applying psychological first aid • Establish one on one check-ins with clinicians to screen for severe distress and burnout • Develop programs that allow clinicians reprieve while on clinical shifts • Engage clinicians in counseling by creating opportunities for peer-to-peer support • Increase access to professional psychological counseling
Improve workload management and quality of patient care	• Offer childcare solutions for frontline clinicians • Ensure adequate staffing and create a threshold to hire additional clinicians in anticipation of surging demand • Limit the number of days or consecutives weeks worked • Allow for breaks from COVID-19 wards • Allow and provide adequate training for clinicians to cross-train in units with increasing demand
Improve data transparency	• Deliver information in a simple, coordinated, succinct and consistent matter • Provide transparency on PPE supplies and plans for procurement • Communicate financial and operational plans to address institutional impact of the pandemic

Appendix Table 1. Interview Guide

Motivation
1. What are the reasons you are on service with COVID-19 Patients? What motivates you? Are there any unique or new motivations you feel amid this pandemic?
2. Are there times you feel uncertain or hesitant? If so, why?
3. With a growing number of patients, there may be more clinical shifts that need to be covered. Would you consider volunteering or taking additional shifts? Why or why not?
4. Given some of the unique challenges of these patients, how do you cope after a long day, or several days in a row of caring for these patients? Anything specific you do for yourself or others?

Challenges in the clinical setting
1. What are some challenges you are facing while caring for COVID-19 patients? What impact does this have on you?
2. What kind of emotions or feelings do you have when providing direct care for COVID-19 patients? Does it impact your capacity to provide care, if so, how?
3. What things add to your stress?

Personal/life impact
1. What is life like outside of work on the days you are working? What impact has this had on you and your family?
2. How are the other lifestyle changes (i.e. lock-down, school closures) impacting you?
3. Have you had to make any changes in the way you interact with your family? Protect your family or others in your home?
4. Do you have any specific concerns about the health of any of your family members at home?
5. What has been your biggest challenge outside the hospital during this time? What impact has this had on your clinical work?

Priorities – support for clinicians
1. What do you wish you had known when you first started taking care of patients that has helped you, that you know now?
2. Do you feel supported?
3. What could be done to better support you?
4. What did you find particularly helpful? What was not helpful?
5. Is the way you are receiving information helpful?
6. What could be better? Does the information add or reduce any fears or stress you may have?

Supplementary File. COREQ Checklist

No.	Item	Comment
Domain 1: Research team and reflexivity		
1	Interview/facilitator	HR, DM, LC (page 7, paragraph 1)
2	Credentials	HR (MD), DM (MD), LC (MD) (title page)
3	Occupation	HR, Assistant Professor of Medicine, Hospitalist physician (title page)
		DM, Associate professor of Medicine, Hospitalist Physician (title page)
		LC, Associate professor of Medicine, Hospitalist Physician (title page)
4	Gender	HR (Male) (title page), DM (Female) (title page), LC (Female) (title page)
5	Experience and training	LC has conducted and published qualitative research and lectures in qualitative methods and methodology. (title page)
		HR and DM have undergone training in qualitative research analysis and were mentored by LC
6	Relationship established	Via collegial and professional networks, 35 interviewees were known colleagues of HR, DM and/or LC (Page 6, paragraph 2)
7	Participant knowledge of the interviewer	HR is conducting a study to elicit frontline clinicians' perspectives on caring for patients hospitalized with COVID-19 (page 6 paragraph 2)
8	Interviewer characteristics	HR, DM, and LC are all frontline clinicians caring for patients with COVID-19 (title page)
Study design		
9	Theoretical framework	Qualitative study (using techniques from grounded theory) (Page 7, paragraph 3)
10	Sampling	Purposive (Page 7, paragraph 1)
11	Method of approach	Email (Page 7, paragraph 1)
12	Sample size	N=50 See table 1 (Table 1, Page 24)
13	Non-participation	Two participants who responded to the email were unable to be scheduled for an interview due to schedule conflicts (Page 8, paragraph 1)
14	Setting of data collection	Virtual conferencing using video conferencing software (Page 7, paragraph 2)
15	Presence of non-participants	None (Page 8, paragraph 1)
16	Description of sample	Refer to Table 1, Page 24
17	Interview guide	Provided in Appendix Table 1
18	Repeat interviews	Single interview conducted (Page 7, paragraph 2)
19	Audio/visual recording	Interviews were audio recorded (Page 7, paragraph 2)
20	Field notes	NA
21	Duration	The mean duration of the interviews was 43 minutes (Page 8, paragraph 1)
22	Data saturation	Yes (Page 7, paragraph 2)
23	Transcripts returned	No (Page 7, paragraph 2)
Analysis and findings		
24	Number of data coders	1 (AT) (Page 7, paragraph 3)
25	Description of the coding tree	No – see themes (Pages 8 to 15)
26	Derivation of themes	Inductively derived from data (Page 7, paragraph 3)
27	Software	HyperRESEARCH (Page 7, paragraph 3)
28	Participant checking	Yes (Page 7, paragraph 3)
29	Quotations presented	Refer to Table 2
30	Data and findings consistent	Quotations provided to illustrate each theme.
31	Clarity of major themes	Yes – themes (Pages 8 to 15)
32	Clarity of minor themes	Yes – see subthemes and description of the themes (Pages 8 to 15)

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