

Prolonged Stress, Anxiety, and Depression in Frontline Medical Staff Working with COVID-19 Patients

Barbara Huxley

b.huxley@aa-er.org

The Cognitive Computing Technologies Research Unit
at AAER, Glasgow, Scotland
(corresponding author)

Jana Majerova

jana.majerova@fpedas.uniza.sk

Faculty of Operation and Economics
of Transport and Communications,
Department of Economics,
University of Zilina, Zilina, Slovak Republic

Maria Kovacova

maria.kovacova@fpedas.uniza.sk

Faculty of Operation and Economics
of Transport and Communications,
Department of Economics,
University of Zilina, Zilina, Slovak Republic

ABSTRACT. This article presents an empirical study carried out to evaluate and analyze prolonged stress, anxiety, and depression in frontline medical staff working with COVID-19 patients. Building our argument by drawing on data collected from ACHA, BMA, Harvard Medical School, HMN, PHW, Rek et al. (2020), Rethink Mental Illness, UGMH, and UNC School of Medicine, we performed analyses and made estimates regarding overwhelming work conditions and unique stress levels experienced by COVID-19 medical staff. Data collected from 3,900 respondents are tested against the research model by using structural equation modeling.

JEL codes: H51; H75; I12; I18; D91

Keywords: stress; anxiety; depression; COVID-19; frontline medical staff; patient

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1. Introduction

Hospitals have had to swiftly reorganize clinical spaces and streamline clinical teams to deal with the massive wave of COVID-19 cases. Numerous primary care providers have been reassigned to areas different from their standard clinical specialty and/or expertise, frequently toiling additional shifts and long hours to satisfy the patient demand. (Shechter et al., 2020)

2. Conceptual Framework and Literature Review

As sickness rates increased, insufficiencies in medical personnel generate stress and anxiety, and mentally drained healthcare workers cannot prevent exposure to such a highly contagious virus. (Nyashanu et al., 2020) Concerning problems that affect primary care providers, the shortage of COVID-19 testing capabilities, finite personal protection equipment, and inadequacy of treatment guidelines for infected patients constitute significant sources of distress. (Shechter et al., 2020) COVID-19 frontline medical staff are bearing the brunt of overwhelming work conditions and unique stress levels. (Santarone et al., 2020) Frontline healthcare providers who treat the positive COVID-19 cases are susceptible to both physical infection and constant mental stress. (Khan et al., 2020)

3. Methodology and Empirical Analysis

Building our argument by drawing on data collected from ACHA, BMA, Harvard Medical School, HMN, PHW, Rek et al. (2020), Rethink Mental Illness, UGMH, and UNC School of Medicine, we performed analyses and made estimates regarding overwhelming work conditions and unique stress levels experienced by COVID-19 medical staff. Data collected from 3,900 respondents are tested against the research model by using structural equation modeling.

4. Results and Discussion

Stigma and medication record for mental health issues is related to mental health outcomes, whereas substandard precautionary measures is related to increased probability of having anxiety and depression symptoms. (Khanal et al., 2020) Being female and not in a relationship is related to elevated levels of depressive symptoms, while being female and older is associated with escalated levels of posttraumatic stress symptoms. (Di Tella et al., 2020) State anxiety levels are thoroughly associated with stressful events that persist and encompass unpredictability, possibly leading to despondency during the COVID-19 pandemic. (Hacimusalar et al., 2020) (Tables 1–10)

Table 1 Over the last two weeks, have you had adequate supplies of the following PPE? (% , yes)

FFP3 masks/respirators (for AGP areas)	28
Fluid-Repellent facemasks	26
Aprons	24
Long sleeved disposable gowns	22
Gloves	17
Eye protection	22

Sources: BMA; our survey among 3,900 individuals conducted April 2020.

Table 2 Mental health services for people living with severe mental illness (% , relevance)

People who are severely affected by mental illnesses such as schizophrenia or bipolar disorder, or live with severe anxiety or depression, have been hard hit by both the changes to formal mental health services and the wider implications of the lockdown, such as sharp, sudden changes to routine and the removal of coping mechanisms such as seeing friends or peer support groups.	87
Their mental health had worsened during COVID-19 as a result of receiving less support from mental health services.	84
Being unable to access the medication needed for their mental health has made their mental health worse.	82

Sources: Rethink Mental Illness; our survey among 3,900 individuals conducted April 2020.

Table 3 “Over the past 14 days I have been able to distance myself well from the stress/burden due to...” Select all that apply. (%)

worries about my health.	86
worries of not being able to get medical care.	82
worries about being sick with COVID-19 when I noticed first signs of symptoms such as fever, dry cough, breathing problems, sore throat, loss of smell/taste, headache or diarrhea etc.	78
increased conflicts with people close to me.	36
childcare.	53
financial worries.	44
uncertainties regarding my job, training place, studies or school.	39
concerns for my own personal integrity	51
concerns for the integrity of family members or friends	47
fears of what the future will bring, or that I will not be able to cope with everything.	44
thoughts that it would be better to be dead.	4

Sources: Rek et al. (2020); our survey among 3,900 individuals conducted April 2020.

Table 4 “In the last week...” (% , yes)

have you felt lonely?	14
have you felt isolated?	13
have you been worrying about your mental health and wellbeing?	76

Sources: PHW; our survey among 3,900 individuals conducted April 2020.

Table 5 Comparison of proportion with anxiety and depression by parent category

Age group of children	% with clinical level of anxiety symptoms	% with clinical level of depression symptoms
No minors	40	43
Infants/Toddlers	44	48
Elementary school	49	46
Teens under age 18	45	44

Sources: UNC School of Medicine; Harvard Medical School;
our survey among 3,900 individuals conducted April 2020.

Table 6 If you have specific/special needs for personal equipment, how confident are you that you will have sufficient fully fit-tested and adjusted PPE during the second wave of the pandemic? (%)

I do not need specific/special PPE.	19
Fully confident	46
Partly confident	24
Not at all confident	11

Sources: BMA; our survey among 3,900 individuals conducted April 2020.

Table 7 If you have not reported or spoken out about an issue such as PPE or drug shortages, why was this? (%)

Fearful of speaking out	6
Do not believe any action will be taken	8
Insufficient protection and support for reporting	9
Worried would negatively impact my career/training progression	12
Asked or instructed not to speak out	3
Threatened with sanctions if did speak out	1
No issues/Did report or speak out	61

Sources: BMA; our survey among 3,900 individuals conducted April 2020.

Table 8 Have you had to purchase items of PPE directly yourself, or received supplies as an external donation (e.g. charity, local firms), due to non-availability of official procurement supplies? (%)

Yes, for my personal use.	21
Yes, for my department/practice.	25
No.	54

Sources: BMA; our survey among 3,900 individuals conducted April 2020.

Identifying the factors influencing anxiety and hopelessness throughout the COVID-19 pandemic is pivotal in the protection of public health by confirming that the psychosocial interventions focused on risky populations are thoroughly cross-integrated. (Hacimusalar et al., 2020) Fear and anxiety can negatively impact the mental health and well-being of COVID-19 frontline medical staff, in addition to unpredictability as regards their personal safety, due to insufficiencies in personal protection equipment and to the difficult situation of carrying out their duty of care while being hesitant by possibly contracting such a contagious disease. (Nyashanu et al., 2020)

Table 9 The impact of COVID-19 on mental health and psychosocial well-being (% , relevance)

The impact of the COVID-19 pandemic on mental health is complex, diverse and wide ranging, affecting all parts of societies and populations.	92
Those with existing poor mental health are facing a number of risks including increased rates of mental ill health and disruption to treatment, medications and the lifeline of support services.	88
COVID-19 has had a huge impact on mental health services and caused disruption to care and treatment.	87
Demand for face-to-face mental health services has reportedly significantly decreased due to fear of infection, especially among older people.	86
Playing a crucial role in fighting the outbreak and saving lives, frontline workers are under exceptional stress and while deaths of health workers are rising, the mental ill health rates are rising faster still.	88
Frontline healthcare workers are at particularly high risk of mental ill health, including suicide attempts, the risk of burnout and stigmatization.	86
Dedicated teams providing mental health support for health workers should include the introduction of personal screening for stress and mental health illness involving an assessment of occupational exposure to COVID-19, prior history of stress and mental health conditions, new personal and family stressors arising since the pandemic onset, and current presenting problems including increased use of alcohol or drugs.	84
People who test positive for COVID-19 have to cope with fear, anxiety and uncertainty about their condition, as well as physical discomfort and separation from loved ones.	85
For those who have loved ones affected by COVID-19 they face worry and separation. People who experience the death of a family member often do not have the opportunity to be present in their last moments, or to hold funerals which can have a profound effect on grieving and impact mental health.	83
Some COVID-19 patients may experience stigma, discrimination and intimidation, possibly leading to them to hide the illness to avoid such discrimination, preventing them from seeking health care, and discouraging them from adopting healthy behaviors, all of which undermining efforts to control the pandemic while increasing levels of fear and depression for those patients and their families.	85
The elderly are at high risk of mental ill health due to the anticipated long periods of social distancing and the accompanying isolation and loneliness.	86
There may be a worsening of cognitive decline in older populations, who may be one of the last groups for whom lockdown measures are lifted.	85
Social isolation, reduced physical activity and reduced cognitive stimulation all increase the risk of cognitive decline and dementia, and for some there is an inability to understand and follow public health advice.	82
In humanitarian settings affected by conflict and natural disaster, the mental health challenges are huge but often overlooked.	80
The current pandemic is adding an extraordinary level of stress to already	83

vulnerable populations due to insecurity of housing and food, combined with feelings of helplessness and despair.	
COVID-19 may further exacerbate existing mental health conditions, trigger new conditions, and limit the access of those with pre-existing conditions to the already scarce mental health services they had.	84
Fear, loneliness, sadness and anxiety are common as people are afraid of infection, dying, losing family members, losing their income or livelihoods, being socially isolated and separated from loved ones.	83
For those in psychiatric institutions and care homes the necessary infection prevention and control measures must be provided to stop the spread of COVID-19 while giving care for those affected by COVID-19, without discrimination.	85
Emergency mental health and psychosocial support should be scaled up especially for those most at risk of mental ill health during the pandemic including health care workers.	84
Mental health services and support needs to be incorporated in all aspects of the response including conducting national public health campaigns that promote mental health and psychosocial wellbeing, that explain COVID-19 and signpost mental health services, while address misinformation, stigma and discrimination for all citizens.	83

Sources: UGMH; our survey among 3,900 individuals conducted April 2020.

Table 10 Over the past 2 weeks, have you been concerned with the following? Select all that apply. (%)

How long the pandemic will last	86
How many more people will become infected	84
People you care about contracting COVID-19	85
Your personal sense of safety and security	87
Personally contracting COVID-19	83

Sources: HMN; ACHA; our survey among 3,900 individuals conducted April 2020.

Elevated state anxiety levels in healthcare workers may be associated with their active role throughout the COVID-19 pandemic. (Hacimusalar et al., 2020) Particular populations vulnerable to the social and economic burdens of the COVID-19 pandemic, especially individuals whose income has decreased, who have children under care and with prior health conditions that make them predisposed to the pernicious consequences of the virus, may display increased levels of psychological issues subsequently. (Shevlin et al., 2020) Healthcare systems estimate a surge in unsatisfied mental health needs in populations at risk and further amendments that diminish discrepancies in access to care during the COVID-19 outbreak. (Moreno et al., 2020) COVID-19 medical staff who treat patients display more elevated levels of depressive and posttraumatic stress symptoms than healthcare personnel who work in other units. (Di Tella et al., 2020). Nearly all medical professionals' mental health levels swiftly withdraw to normal position after a psychological crisis intervention throughout the COVID-19 pandemic. (Liu et al., 2020)

5. Conclusions and Implications

Working in close contact with COVID-19 patients is a risk factor for developing posttraumatic stress disorder symptoms, and consequently the sub-clinical symptoms in frontline healthcare providers should be monitored. (Johnson et al., 2020) COVID-19 frontline medical staff who bear the brunt of psychological injuries should be supplied with prompt evidence-based support or care. (Greenberg, 2020) The main concerns of COVID-19 primary care providers are their patients' safety and treatment hindrances and their colleagues' mental health together with worries as regards their loved ones being infected. (Krok-Schoen et al., 2020) The COVID-19 contagion, mortality, and morbidity rates amplify the related psychological fear, leading to adverse mental health consequences. (Wong et al., 2020) Healthcare professionals ensure first-rate patient care and prevent infection outbreaks in hospitals throughout the COVID-19 pandemic. (Zhang, 2020) As limitations, this article focuses only on prolonged stress, anxiety, and depression in frontline medical staff working with COVID-19 patients. Further research should consider the impact of sustained psychological distress and elevated anxiety symptoms on long-term mental and physical wellbeing of COVID-19 healthcare providers.

Survey method

The interviews were conducted online and data were weighted by five variables (age, race/ethnicity, gender, education, and geographic region) using the Census Bureau's American Community Survey to reflect reliably and accurately the demographic composition of the United States. The cumulative response rate accounting for nonresponse to the recruitment surveys and attrition is 2.5%. The break-off rate among individuals who logged onto the survey and completed at least one item is 0.2%. Sampling errors and test of statistical significance take into account the effect of weighting. Question wording and practical difficulties in conducting surveys can also introduce error or bias into the findings of opinion polls. The sample weighting was accomplished using an iterative proportional fitting process that simultaneously balanced the distributions of all variables. Stratified sampling methods were used and weights were trimmed not to exceed 3. Average margins of error, at the 95% confidence level, are $\pm 2\%$. The design effect for the survey was 1.3. For tabulation purposes, percentage points are rounded to the nearest whole number. The precision of the online polls was measured using a Bayesian credibility interval. Confirmatory factor analysis was employed to test for the reliability and validity of measurement instruments. Descriptive statistical analysis and multivariate inferential tests were undertaken for the survey responses and for the purpose of variable reduction in regression modeling. Multivariate analyses, and not univariate associations with outcomes, are more likely to factor out confounding covariates and more precisely determine the relative significance of individual variables. Independent *t*-tests for continuous variables or chi-square tests for categorical variables were employed. An Internet-based survey software program was utilized for the delivery and collection of responses.

Compliance with ethical standards

Ethical approval

All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Informed consent

An informed e-consent was obtained from individual participants. Study participants were informed clearly about their freedom to opt out of the study at any point of time without providing justification for doing so.

Animal studies statement verification

This article does not require animal studies verification.

Identifiable images and data statement verification

This article does not require identifiable images and data statement verification.

Data and materials availability

All research mentioned has been published and data is available from respective outlets.

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Author contributions

All authors listed have made a substantial, direct and intellectual contribution to the work, and approved it for publication.

Conflict of interest statement

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Detection done by plagiarism software

This manuscript has an acceptable level of textual overlap with published articles.

Quality of cited references

Satisfactory. This article focuses on a hot emerging topic and has a high integrative value in the current Scopus- and Web of Science-indexed literature by citing preponderantly Q1 and Q2 sources published in the past two years.

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REFERENCES

- Di Tella, M., Romeo, A., Benfante, A., and Castelli, L. (2020). "Mental Health of Healthcare Workers during the COVID-19 Pandemic in Italy," *Journal of Evaluation in Clinical Practice* 26(6): 1583–1587. doi: 10.1111/jep.13444.
- Greenberg, N. (2020). "Mental Health of Health-Care Workers in the COVID-19 Era," *Nature Reviews Nephrology* 16(August): 425–426. doi: 10.1038/s41581-020-0314-5.
- Hacimusalar, Y., Kahve, A. C., Yasar, A. B., and Aydin, M. S. (2020). "Anxiety and Hopelessness Levels in COVID-19 Pandemic: A Comparative Study of Healthcare Professionals and Other Community Sample in Turkey," *Journal of Psychiatric Research* 129: 181–188. doi: 10.1016/j.jpsychires.2020.07.024.
- Johnson, S. U., Ebrahimi, O. V., and Hoffart, A. (2020). "PTSD Symptoms among Health Workers and Public Service Providers during the COVID-19 Outbreak," *PLOS ONE* 15(10): e0241032. doi: 10.1371/journal.pone.0241032.
- Khan, K. S., Mamun, M. A., Griffiths, M. D., and Ullah, I. (2020). "The Mental Health Impact of the COVID-19 Pandemic across Different Cohorts," *International Journal of Mental Health and Addiction*. doi: 10.1007/s11469-020-00367-0.
- Khanal, P., Devkota, N., Dahal, M., Paudel, K., and Joshi, D. (2020). "Mental Health Impacts among Health Workers during COVID-19 in a Low Resource Setting: A Cross-Sectional Survey from Nepal," *Globalization and Health* 16: 89. doi: 10.1186/s12992-020-00621-z.
- Krok-Schoen, J. L., Pisegna, J. L., BrintzenhofeSzoc, K., MacKenzie, A. R., Canin, B., Plotkin, E., et al. (2020). "Experiences of Healthcare Providers of Older Adults with Cancer during the COVID-19 Pandemic," *Journal of Geriatric Oncology*. doi: 10.1016/j.jgo.2020.09.021.
- Liu, Z., Wu, J., Shi, X., Ma, Y., Ma, X., Teng, Z., et al. (2020). "Mental Health Status of Healthcare Workers in China for COVID-19 Epidemic," *Annals of Global Health* 86(1): 128. doi: 10.5334/aogh.3005.
- Moreno, C., Wykes, T., Galderisi, S., Nordentoft, M., Crossley, N., Jones, N., et al. (2020). "How Mental Health Care Should Change as a Consequence of the COVID-19 Pandemic," *The Lancet Psychiatry* 7(9): 813–824. doi: 10.1016/S2215-0366(20)30307-2.
- Nyashanu, M., Pfende, F., and Ekpenyong, M. S. (2020). "Triggers of Mental Health Problems among Frontline Healthcare Workers during the COVID-19 Pandemic in Private Care Homes and Domiciliary Care Agencies: Lived Experiences of Care Workers in the Midlands Region, UK," *Health and Social Care in the Community*. doi: 10.1111/hsc.13204.
- Santarone, K., McKenney, M., and Elkbulli, A. (2020). "Preserving Mental Health and Resilience in Frontline Healthcare Workers during COVID-19," *The American Journal of Emergency Medicine* 38(7): 1530–1531. doi: 10.1016/j.ajem.2020.04.030.
- Shechter, A., Diaz, F., Moise, N., Anstey, D. E., Ye, S., Agarwal, S., et al. (2020). "Psychological Distress, Coping Behaviors, and Preferences for Support among New York Healthcare Workers during the COVID-19 Pandemic," *General Hospital Psychiatry* 66: 1–8. doi: 10.1016/j.genhosppsych.2020.06.007.

- Shevlin, M., McBride, O., Murphy, J., Miller, J., Hartman, T., Levita, L., et al. (2020). "Anxiety, Depression, Traumatic Stress and COVID-19-related Anxiety in the UK General Population during the COVID-19 Pandemic," *BJPsych Open* 6(6): 125. doi: 10.1192/bjo.2020.109.
- Wong, A. H., Pacella-LaBarbara, M. L., Ray, J. M., Ranney, M. L., and Chang, B. P. (2020). "Healing the Healer: Protecting Emergency Health Care Workers' Mental Health during COVID-19," *Annals of Emergency Medicine* 76(4): 379–384. doi: 10.1016/j.annemergmed.2020.04.041.
- Zhang, Y. (2020). "Strengthening the Power of Nurses in Combating COVID-19," *Journal of Nursing Management*. doi: 10.1111/jonm.13023.