Cite as: Htay MNN, Marzo RR, AlRifai A, Kamberi F, El-Abasiri RA, Nyamache JM, Hlaing HA, Hassenein M, Moe S, Su TT, Abas AL. Immediate impact of COVID-19 on mental health and its associated factors among healthcare workers: A global perspective across 31 countries. J Glob Health 2020;10:020382.

Title page

Author Information

Mila Nu Nu Htay[a], Roy Rillera Marzo[b], Ayesha AlRifai[c], Fatjona Kamberi[d], Radwa Abdullah El-Abasiri[e], Jeldah Mokeira Nyamache[f], Htet Aung Hlaing[g], Mayada Hassanein[h], Soe Moe[a], Tin Tin Su[i], Adinegara Lutfi Abas[a]

[a]Department of Community Medicine, Melaka-Manipal Medical College, Manipal Academy of Higher Education (MAHE), Melaka, Malaysia

[b]Department of Public Health, Faculty of Medicine, Asia Metropolitan University, Johor, Malaysia

[c]School of Medicine, Washington University of Health and Science, Palestine Regional Office, West Bank. Palestine

[d]Research Center of Public Health, Faculty of Public Health, University of Vlore"Ismail Qemali", Vlore, Albania

[e]Department of Pharmacy Practice and Clinical Pharmacy, Faculty of Pharmaceutical Sciences and Pharmaceutical Industries, Future University in Egypt, Cairo, Egypt

[f]North Star Alliance, Kenya, Uganda, Tanzania, Zimbabwe, Mozambique, and South Africa

[g]Pun Hlaing Siloam Hospital, Yangon, Myanmar

[h]Maternal and Child Health Unit, Alexandria Fever Hospital, Alexandria, Egypt

[i] South East Asia Community Observatory (SEACO) & Global Public Health, Jeffery Cheah School of Medicine and Health Sciences, Monash University Malaysia, Bandar Sunway, Malaysia

Correspondence

Dr. Mila Nu Nu Htay

Department of Community Medicine, Melaka-Manipal Medical College, Manipal Academy of Higher Education (MAHE), Melaka, Malaysia

Email: drmlnnh@gmail.com

Phone: 0060175655684

Immediate impact of COVID-19 on mental health and its associated factors among healthcare workers: A global perspective across 31 countries

Key messages

1. Among 2097 healthcare workers from 31 countries, the prevalence of anxiety was 60% and depression was 53%, mainly mild and moderate levels, meanwhile, only one out of four respondents reported the availability of mental health support team at the workplace.

2. Mental health support for the healthcare workers should be available and accessible, especially for those who are staying alone, single, working in ICU, and those who have a shorter duration of working experience in their professions.

Photo: Frontline healthcare workers working at a village in Myanmar during COVID-19 pandemic (used with permission)

The emerging infectious disease, novel coronavirus (COVID-19) outbreak began in December 2019 and spread worldwide [1]. Coronaviruses are known to cause respiratory tract infection among humans, similar to the previous outbreak of Middle East respiratory syndrome coronavirus (MERS-CoV) [3] and Severe Acute Respiratory Syndrome (SARS) [4]. Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) was unknown to be an infectious agent for humans before the outbreak in December 2019. The patients may mainly be present with fever, dry cough, and respiratory problems, while 80% of the infected cases are mild or asymptomatic [5].

The increasing numbers of infectious cases overwhelmed the workload in healthcare sectors in different countries. Although the social distancing and stay at home advice are recommended in the community, the healthcare workers were continuing to work in the respective areas [6]. During the pandemic, healthcare workers were at high risk of infection, having physical exhaustion, and an impact on their mental health due to the loss of the infected patients, personal safety, concern of passing infections to family members [6].

Although a few studies have been conducted in China, little is known about the worldwide situation and comparison on mental health impact among healthcare workers due to the COVID-19 pandemic and its associated factors. This study aimed to investigate the immediate impact of COVID-19 pandemic on the mental health of healthcare workers in terms of anxiety, depression, and associated factors with mental health issues.

Methods

We conducted a cross-sectional, web-based study between 20 April 2020 and 21 May 2020. The respondents were recruited from various healthcare professions, including doctors, nurses, midwives, medical assistants, laboratory technicians, medical educators, public health

practitioners, who were working at either government or private sectors. The country representative researchers from Albania, Egypt, Iraq, Kenya, Mozambique, Myanmar, Palestine, Philippines, South Africa, Tanzania, Uganda, and Zimbabwe spread the web-based questionnaire. Our study investigated the mental health impact of COVID-19 especially in the low- and middle-income countries, where the healthcare systems had limited resources to tackle the current pandemic, and mental health support could be sparse. On the first day of data collection, the COVID-19 situation in those countries was at the beginning stage of spread [7]. Although there are representative countries, respondents were not limited by nationalities but were allowed to participate from all countries around the world. The respondents were recruited with non-random convenience sampling method. Participation was voluntary and informed consent was obtained from the respondents. Ethical approval was granted from the Research Ethics Committee from Asia Metropolitan University (AMU), Malaysia, Project Ref No: AMU/MREC/FOM/NF/03/2020.

Study instrument

The demographic information on nationality, sex, age, religion, marital status, living status during COVID-19 pandemic, and work-related questions were included in the survey. The outcome measures were assessed by using the Generalized Anxiety Disorder (GAD-7) scale [8], and the Patient Health Questionnaire (PHQ-9) [9]. The GAD-7 is a brief instrument to screen the generalized anxiety disorder, which demonstrated good psychometric properties [8]. The validity and reliability of the GAD-7 had been proven across the various population [10-12]. To measure the severity of depression, the PHQ-9 was used in this study, which is relevant to apply in both clinical and research contexts [9, 13]. The PHQ-9 had been proven its validity and reliability across the population [14-15, Ref S1]. Both GAD-7 and PHQ-9 were valid, reliable and short scales to assess the mental health issues of anxiety and depression, and therefore, these measures were selected as study instruments for data collection.

The original English version of the questionnaire was used for data collection. The decision was made based on consultation with the contact person of each country concerning English language competency of health care workers in the respective country. However, exception was made for Albania where the questionnaire was translated to the Albanian language by forward- and backward-translation following the method of linguistic validation [Ref S2].

Statistical analysis

The data from four surveys were polled into a combined data set and analysed by using SPSS (IBM SPSS Statistics for Windows, Version 23.0. Armonk, NY: IBM Corp.). The descriptive analysis was carried out, the frequency and percentage of demographic and occupational-related variables were presented in the tables. The prevalence of the outcomes was analysed. To identify the factors associated with anxiety among health workers, bivariate and multivariate analyses were performed. The χ^2 (Chi-square test) was used to examine the nature of the association between the anxiety and depression with occupation, sex, health provider treating Cvoid-19 cases and availability of mental health support team at workplace. The logistic regression analysis was applied to investigate the factors that explained and predicted the anxiety and depression. Instead of the linear probability model, the logistic regression function is preferable to fit some kinds of sigmoid curves when the response variable is dichotomous, and that reasonably portrays the reality of outcome events [Ref S3]. In the present study, the respondents were experienced any anxiety and depression during Covid-19. The cutoff score of having generalized anxiety disorder symptoms is 10 [8] and depression symptoms is 10 [9]. The response score was coded dichotomically, i.e., those who had used anxiety and depression were coded as "1" and those who had not as "0." The odds ratios and their 95 percent CI were calculated. $P<0.05$ was considered to be statistically significant.

Results

A total of 2166 respondents from 31 countries worldwide responded to the survey. Among them, 69 respondents' data were incomplete and therefore, were excluded from the analysis. A total of 2097 respondents were included in the analysis. The participant's geographic distributions were described in Table 1. Approximately half of them were living in the Eastern Mediterranean Region (EMRO) (52.0%), and a quarter was from the Western Pacific Region (WPRO) (25.4%) [Ref S4]. The majority of the respondents, 79.2%, were from the lower-middle-income countries according to the world bank classification [Ref S5] (Table 1).

Table 1. Respondents' geographic location according to the World Health Organization Regions and World Bank country classification on income (n=2097)

	List of countries and territories of respondents	**n (%)**
World Health Organization Regions [Ref S4]		
Eastern Mediterranean Region (EMRO)	Cyprus, Egypt, Iraq, Lebanon, Pakistan, Palestine, Syria,	1091 (52.0)
Western Pacific Region (WPRO)	Japan, Philippines, Republic of Korea	532 (25.4)
European Region (EURO)	Albania, Germany, Italy, Sweden, United Kingdom	337 (16.1)
South-East Asian Region (SEARO)	Bangladesh, India, Myanmar, Nepal, Thailand	88 (4.2)
African Region (AFRO) and Region of the Americas (PAHO)	Ethiopia, Kenya, Lesotho, Mozambique, Nigeria, Rwanda, South Africa, Suriname, Tanzania, Uganda, Zimbabwe	49 (2.3)
World bank country classification by income [Ref S5]		
Low-income countries	Ethiopia, Mozambique, Nepal, Rwanda, Syria, Tanzania, Uganda	30 (1.4)
Lower-middle-income countries	Bangladesh, Egypt, India, Kenya, Lesotho, Myanmar, Nigeria, Pakistan, Palestine, Philippines, Zimbabwe,	1661 (79.2)
Upper-middle-income countries	Albania, Iraq, Lebanon, South Africa, Suriname, Thailand	391 (18.7)

High-income countries	Cyprus, Germany, Italy, Japan, Republic of Korea, Sweden, United Kingdom	15 (0.7)

Table S1 represents the socio-demographic characteristics and occupations of respondents. In the present study, the respondents' ratio for different occupation was not pre-determined. Occupation was and categorised into three categories: doctors, nurses, and others during analysis. Approximately one third of respondents were doctors (36.72%), meanwhile, 22.84% were nurses and 40.44% were other healthcare workers (Table S1 in the Online Supplementary Document).

Table S2 in the Online Supplementary Document presents the prevalence of anxiety and depression among healthcare workers. The present study had used the GAD-7 to measure anxiety, and internal consistency was assessed by using Cronbach's α. The internal reliability of the GAD7 for the present study was found to be 0.885. Overall, the prevalence of anxiety among study respondents was 60%.

Table S2 also presents the prevalence of depression. The present study used the PHQ-9 to measure depression. The internal reliability of the PHQ-9 for the present study was found to be 0.892. Overall, the prevalence of depression among study respondents was 53%.

Table S3 in the Online Supplementary Document describes the relationship between risk factors for anxiety and adjustment for age, sex, religion, marital status, occupation, work experience, staying 'alone or with family/friends or colleagues,' and working in the ICU and current workplace. The logistic regression analysis shows that respondents who practice Christianity (AOR 2.953, 95% CI 1.451-6.008) were at a higher risk of anxiety than those who practiced Buddhism. The analysis also showed that respondents staying with family (AOR 0.546, 95% CI 0.372-0.800) and friends (AOR 0.481, 95% CI 0.277-0.836) were at lower risk

of anxiety compared to those who stayed alone. Also, those respondents working in the laboratory (AOR 0.376, 95% CI 0.163-0.867) and other workplaces (AOR 0.654, 95% CI 0.465-0.920) were at a lower risk of anxiety than those working in a hospital.

Table S3 describes the relationship between risk factors for anxiety and adjustment for age, sex, religion, marital status, occupation, work experience, staying 'alone or with family, friends or colleagues', and working in the ICU and current workplace. The logistic regression analysis shows that female respondents were at a lower risk of depression than male respondents (AOR 0.708, 95% CI 0.561-0.892). The study also showed respondents who practiced Islam (AOR 2.887, 95% CI 1.280-6.513) and Christianity (AOR 3.110, 95% CI 1.369-7.064) were at a higher risk of depression compared to those who practiced Buddhism. Furthermore, respondents who had working experience for more than ten years were at a lower risk of depression than those working for less than two years (AOR 0.462, 95% CI 0.292-0.733).

Discussion

To the best of our knowledge, this is the first study investigating the immediate impact of COVID-19 pandemic on the mental health of healthcare workers from the six WHO regions. The data presented in this study provide evidence of a high prevalence of anxiety (60%) and depression symptoms (53%) among the healthcare workers across the regions. Similar findings for the symptoms of depression were reported among the healthcare workers in China as 50.4% [1]. Meanwhile, the prevalence of the symptoms of anxiety is higher in our study compared to the study conducted in China (44.6%) [1]. Our findings highlighted that healthcare workers from different regions have a substantial burden on mental health and warranted effective mental health support interventions. Diverse nature and workload of healthcare workers might have an influence on their psychological burden. However, the occupation was not associated with the anxiety and depression after adjusting all the demographic factors in the logistic

regression model. This contrasts with the findings in China, where nurses were reported of having more severe symptoms compared to other professionals [1]. Working in the ICU and different workplaces were associated with the anxiety, suggesting that workplace might influence on the mental health impact among healthcare workers.

Healthcare workers who are staying alone during the COVID-19 pandemic, of Christian religion, and working in ICU are associated with more severe symptoms of anxiety. Our study further indicated that females, of Buddhist religion, and longer working experience (>10 years) were inversely associated with more severe symptoms of depression. This finding is in contrast to other works conducted in China [1] and Italy [Ref S6], where the female was more likely to report severe anxiety and depressive symptoms. In our study, males represented a higher proportion of doctors, working in hospitals, and having contact with COVID-19 confirmed or suspected cases compared to female healthcare workers, that might contribute to having a psychological burden. The junior healthcare workers with less than 2 years of working experience had higher depressive symptoms compared to those who were in the professional field for a longer duration (>10 years). This finding could be correlated with experience from Turkey, where the junior medical doctors were the main workforce during the COVID-19 pandemic [Ref S7]. This situation might impose junior healthcare workers to be vulnerable, stressful, and had an impact on their mental health.

In terms of spirituality, human beings increased the tendency of returning to religion in the midst of a pandemic [Ref S8]. Dramatic increment on Google search for “prayer” [Ref S8], increment in the number of people praying to end the pandemic, including those who seldom or never prayed before, those who had no religious affiliation in American [Ref S9], and the practice of online worship were reported during the COVID-19 pandemic [Ref S10-S11]. Future research should be conducted to explore the role of religion in coping with the psychological burden during the health crisis or pandemic.

The importance of mental health support for the healthcare workers during the COVID-19 pandemic has been emphasised by the WHO [Ref S12]. Although the importance of mental health support for healthcare workers has been emphasised in different regions [Ref S13- S15], only one out of four healthcare workers in this study reported the availability of mental health support team at the workplace. Undoubtedly, an availability of a mental health support team is significantly associated with a lower prevalence of moderate to severe anxiety among the respondents. This finding can be related to the study conducted among healthcare workers in China, where the mental health support services curbed the acute psychological disturbances during COVID-19 [Ref S16].

The healthcare systems could address the urgent need for mental healthcare for healthcare workers through different innovative ways. Some interventions have been proposed to support the mental health of frontline healthcare workers such as quality-assured tele-counselling [Ref S17], or hotline mental health support from the external organizations. Meanwhile, interventions have been implemented, including digital mental health support packages, established for the front-line healthcare workers in the UK [Ref S18] and peer support project led by the mental health professionals by using the social media online chat groups [Ref S19]. In our study, the majority of the respondents who had symptoms of anxiety and depression were of a mild to moderate severity category. Meanwhile, severe symptoms were reported in approximately 7% for anxiety, 3% for depression. Although the percentage is less, it is crucial to screen and provide support to severe cases to prevent adverse consequences. Further studies should investigate coping strategies among healthcare workers during the pandemic and the effectiveness of different mental health support strategies, that could provide valuable information for the organizations to set up an effective mental health support system.

Limitations of the study

In this study, the respondents were recruited with non-random convenience sampling method, and there might be a limitation in generalization of the findings. The questionnaire was distributed in English (except for Albania) and therefore, there is a potential bias of missing the respondents with low English-fluency. Other limitation pertains to the study instruments, GAD 7 and PHQ 9, that are self-administered instruments and therefore, further assessment by the clinician is beyond the scope of our study.

Conclusion

During the COVID-19 pandemic, healthcare systems should address the psychological burden among healthcare workers. Mental health support for the healthcare workers should be available and accessible. Meanwhile, attention is needed for those who are staying alone, single, working in ICU, and those who have a shorter duration of working experience in their professions.

Acknowledgement

We would like to acknowledge ‘North Star Alliance' which is a Non-Governmental Organization providing essential primary healthcare along transport corridors and across borders in Sub-Saharan Africa for their support during the data collection. We would like to thank to Dr. Kyaw Zin Lynn and Dr. Phyo Kyaw for their permission to use the photos of frontline healthcare workers. We are grateful to the respondents from different healthcare sectors.

Funding

This research received no grant or funding from any funding agency.

Authorship contributions

All authors contributed to conceptualizing, data collection, and writing the manuscript.

Conflict of interest

The authors completed the Unified Competing Interest form at

www.icmje.org/coi_disclosure.pdf (available upon request from the corresponding author),

and declare no conflicts of interest.

References

1. Lai J, Ma S, Wang Y, Cai Z, Hu J, Wei N, et al. Factors Associated With Mental Health Outcomes Among Health Care Workers Exposed to Coronavirus Disease 2019. JAMA Netw Open. 2020;3(3):e203976.

2. WHO. Coronavirus disease (COVID-19) Pandemic: World Health Organization; 2020 [Available from: https://www.who.int/emergencies/diseases/novel-coronavirus-2019.]

3. WHO. Middle East respiratory syndrome coronavirus (MERS-CoV): World Health Organization; 2020 [Available from: https://www.who.int/emergencies/mers-cov/en/.]

4. WHO. Severe Acute Respiratory Syndrome (SARS): World Health Organization; 2020 [Available from: https://www.who.int/csr/sars/en/.]

5. WHO. Q&A on coronaviruses (COVID-19): World Health Organization; 2020 [Available from: https://www.who.int/news-room/q-a-detail/q-a-coronaviruses.]

6. The Lancet. COVID-19: protecting health-care workers. Lancet. 2020;395(10228):922.

7. WHO. WHO Coronavirus Disease (COVID-19) Dashboard 2020 [Available from: https://covid19.who.int/.]

8. Spitzer RL, Kroenke K, Williams JB, Löwe B. A brief measure for assessing generalized anxiety disorder: the GAD-7. Arch Intern Med. 2006;166(10):1092-7.

9. Kroenke K, Spitzer RL, Williams JB. The PHQ-9: validity of a brief depression severity measure. J Gen Intern Med. 2001;16(9):606-13.

10. Hinz A, Klein AM, Brähler E, Glaesmer H, Luck T, Riedel-Heller SG, et al. Psychometric evaluation of the Generalized Anxiety Disorder Screener GAD-7, based on a large German general population sample. J Affect Disord. 2017;210:338-44.

11. Löwe B, Decker O, Müller S, Brähler E, Schellberg D, Herzog W, et al. Validation and standardization of the Generalized Anxiety Disorder Screener (GAD-7) in the general population. Med Care. 2008;46(3):266-74.

12. Sousa TV, Viveiros V, Chai MV, Vicente FL, Jesus G, Carnot MJ, et al. Reliability and validity of the Portuguese version of the Generalized Anxiety Disorder (GAD-7) scale. Health Qual Life Outcomes. 2015;13:50.

13. Udedi M, Muula AS, Stewart RC, Pence BW. The validity of the patient health Questionnaire-9 to screen for depression in patients with type-2 diabetes mellitus in non-communicable diseases clinics in Malawi. BMC Psychiatry. 2019;19(1):81.

14. Nallusamy V, Afgarshe M, Shlosser H. Reliability and validity of Somali version of the PHQ-9 in primary care practice. Int J Psychiatry Med. 2016;51(6):508-20.

15. Kocalevent RD, Hinz A, Brähler E. Standardization of the depression screener patient health questionnaire (PHQ-9) in the general population. Gen Hosp Psychiatry. 2013;35(5):551-5.

Description of the photos

Photo 1: Frontline healthcare workers working at a village in Myanmar during COVID-19 pandemic (used with permission)

Photo 2: Frontline healthcare workers working at a village in Myanmar during COVID-19 pandemic (used with permission)