


ORIGINAL ARTICLE

Effects of work conditions and organisational strategies on nurses' mental health during the COVID-19 pandemic

Tin-May Li MD, Psychiatrist^{1,2} | Li-Chung Pien PhD, Assistant Professor³ |
 Ching-Chiu Kao MS, Deputy Superintendent^{4,5} | Tomohide Kubo PhD, Senior Researcher⁶
 | Wan-Ju Cheng MD, PhD, Associate Professor^{2,7,8} 

¹Department of Psychiatry, Taichung Prison Pei-Teh Hospital, Taichung, Taiwan

²Department of Psychiatry, China Medical University Hospital, Taichung, Taiwan

³Post-Baccalaureate Program in Nursing, College of Nursing, Taipei Medical University, Taipei, Taiwan

⁴School of Nursing, College of Nursing, Taipei Medical University, Taipei, Taiwan

⁵Department of Nursing, Wan Fang Hospital, Taipei Medical University, Taipei, Taiwan

⁶Occupational Stress and Health Management Research Group, National Institute of Occupational Safety and Health, Kawasaki, Japan

⁷Department of Public Health, China Medical University, Taichung, Taiwan

⁸Center for Drug Abuse and Addiction, China Medical University Hospital, China Medical University, Taichung, Taiwan

Correspondence

Wan-Ju Cheng, MD, PhD, Psychiatrist, Associate Professor, Deputy Director, Department of Psychiatry, China Medical University Hospital, 2 Yude Road, Taichung 40447, Taiwan.

Email: s871065@gmail.com

Funding information

China Medical University Hospital, Grant/Award Number: DMR-110-237; Ministry of Science and Technology, Taiwan, Grant/Award Numbers: MOST 107-2314-B-039-063-MY3, MOST 110-2314-B-039-022

Abstract

Aims: This study aims to examine coronavirus disease 2019 (COVID-19) pandemic-related work factors for adverse effects on the mental health and whether organisational strategies attenuate these effects.

Background: COVID-19 pandemic has led to increased work burden and mental health risks for nurses.

Methods: A total of 1499 Taiwanese full-time nurses completed a web-based questionnaire between July and December 2020. Pandemic-related work conditions, namely, increased working hours, caring for COVID-19 patients, occupational stigma and redeployment, were assessed. Organisational strategies to combat pandemic-related work stressors including compensation to workers and adequate protection equipment were surveyed. Outcome measures were intention to leave, burnout and depression assessed using validated questionnaires.

Results: Redeployment, increased working hours and occupational stigma were associated with adverse mental health and intention to leave in logistic regression analysis. Caring for COVID-19 patients was negatively associated with depression. Adequate compensation for workers modified the association between redeployment and burnout.

Conclusions: Pandemic-related work conditions were associated with adverse mental health and intention to leave. Organisational strategies attenuated the adverse impact of the pandemic.

Implications for Nursing Management: Efforts to decrease stigma and organisational strategies including compensation for workers and adequate protection equipment provision should be adopted to improve nurses' health during a pandemic.

KEYWORDS

burnout, health care workers, mental health, pandemic, stigma

1 | BACKGROUND

Coronavirus disease 2019 (COVID-19), declared a pandemic by the World Health Organization, has led to a public health crisis. By July 2021, the numbers of infected individuals and deaths were 188 million and 4 million, respectively, in 193 countries globally (Taiwan Centers for Disease Control, n.d.). During the COVID-19 outbreak, the psychosocial considerations for health care workers included work burden, stigmatization and isolation (World Health Organization, 2020), which further put the mental health of the health care workforce and public at risk.

Studies have shown that health care workers are exposed to increased risks of mental health problems, in terms of stress symptoms, depressive and anxiety symptoms, burnout and intention to leave, during a pandemic (Kisely et al., 2020). Cross-sectional studies from China have revealed a high prevalence of depressive symptoms and distress among health care workers during the COVID-19 pandemic (Zhang et al., 2020). A meta-analysis showed that health care workers who were in contact with affected patients, young, junior in terms of their position at work, parenting children and having an infected family member had increased psychological distress during novel viral outbreaks (Kisely et al., 2020). In addition, female and frontline health care workers (physicians and nurses) are at high risks of adverse mental health (Lai et al., 2020).

The sources of psychological distress in health care workplace include inadequate access to personal protective equipment, exposure to COVID-19 at work, unavailability of rapid access to testing, uncertainty of organisational support for personal and family needs, lack of access to childcare during increased work hours and school closures and lack of access to up-to-date information and communication (Shanafelt et al., 2020). In addition, the increased work load and redeployment of health care workers increase work stress and in-hospital infection risk (Adams & Walls, 2020). Researchers have suggested that adequate personal protection, rest and support from organisations and family reduce psychological distress and mental illness morbidity (Kisely et al., 2020). Compared with task-oriented leadership style, studies have recommended relationship-oriented organisation strategies (e.g., support for the workers and their family, transparent communication and compensation for workers) during a pandemic regarding nurses' mental health (Cummings et al., 2018; Rosser et al., 2020).

Organisational strategies may attenuate psychological distress among nurses during the COVID-19 pandemic (Chersich et al., 2020), but little empirical data are available to support this assumption. In this study, we examined (1) pandemic-related work conditions associated with adverse mental health among nurses and (2) whether organisational strategies modify the association (Figure 1).

2 | METHODS

2.1 | Study participants

A web-based questionnaire was disseminated to Taiwanese nurses through occupational associations and snowballing between July

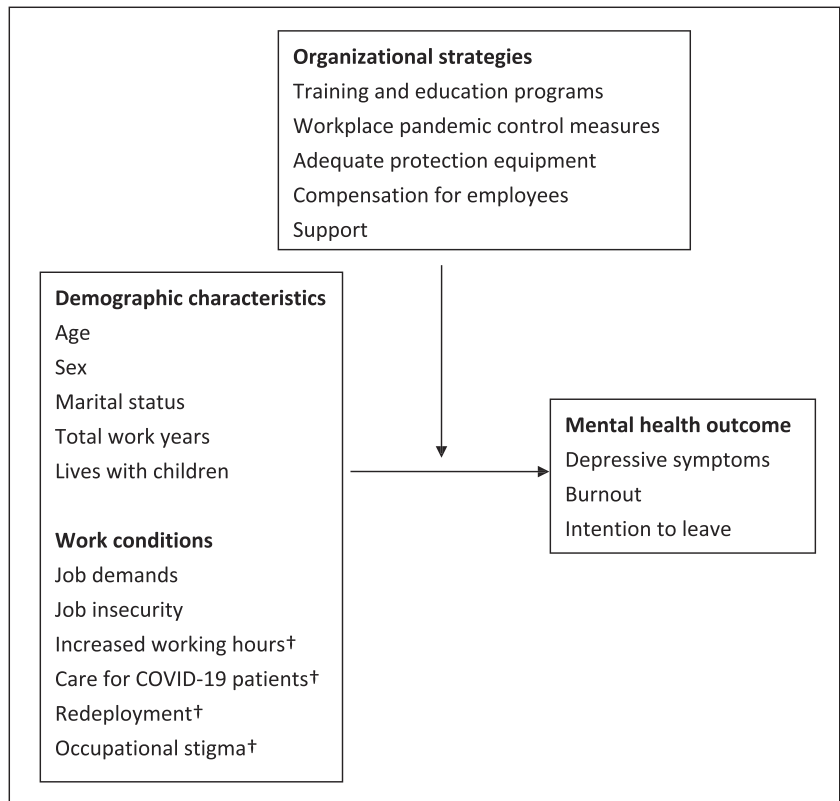
and December 2020. Only on service workers during the study period who worked in medical facilities were invited to participate in this study. The nursing population in Taiwan is around 150,000; therefore, a sample size of 2363 is needed with a confidence level of 95% and confidence interval (CI) of 2. A total of 2239 health care workers completed the online questionnaire anonymously. We further excluded self-employed individuals, employers, workers <20 years old, occupations other than nurses and part-time employees. In total, 1499 participants who had complete data without missing values were included in our final analysis. The data of demographic characteristics, work conditions, organisational strategies and mental health were collected through the questionnaire. This study was approved by the Institutional Review Board of China Medical University Hospital (CMUH109-REC3-100).

2.2 | Work conditions

Work conditions included general psychosocial work conditions relevant to health care workers and pandemic-related work conditions. For general psychosocial work condition assessment, we used the seven-item psychosocial job demands scale derived from the Job Content Questionnaire (Karasek & Theorell, 1990) and one-item job insecurity scale. The Job Content Questionnaire has been reported to be reliable and valid for assessing psychosocial work conditions among Taiwanese workers, with an acceptable test-retest reliability (correlation coefficient = .62) for job demands scale (Y. Cheng et al., 2003). All items were listed as a statement, with the response recorded on a 4-point Likert scale ranging from 1 (*strongly disagree*) to 4 (*strongly agree*). Scores for job demands were summed and standardized. The response for job insecurity was dichotomized as 'agree' and 'disagree'.

Pandemic-related work conditions were (1) caring for COVID-19 patients who were suspected or confirmed to have COVID-19 (yes/no), (2) increased working hours (hours per week), (3) being deployed to a work unit other than the original one (yes/no) and (4) perceived occupational stigma. Perceived occupational stigma was evaluated using the 14-item Stigma Scale (Ho et al., 2015). The original questionnaire was designed to evaluate the stigma of mental disorders, and we replaced the term 'mental disorder' with 'working at medical facilities' in the discriminating and disclosure subscales. Three items irrelevant to health care workers were excluded (telling people I receive treatment, scared of how others react if they find out about my mental disorder and being discriminated by health professionals). These three items showed the lowest factor loading in the original questionnaire. The remaining six statements were rated on a 5-point Likert scale, and the scores were summed and standardized. Higher scores indicate high levels of occupational stigma. The internal consistency of the revised questionnaire was high (Cronbach's alpha = .93). In regression models, occupational stigma was dichotomized into high and low occupational stigma based on the median (33.3).

FIGURE 1 Analytic framework for demographic characteristics, work conditions and modifying factors for adverse mental health among health care workers during the COVID-19 pandemic



† Pandemic-related work conditions.

2.3 | Organisational strategies

We investigated five organisational strategies that have been commonly reported in response to the COVID-19 pandemic in the literature, based on participants' subjective report: (1) did the employer provide adequate personal protection equipment (yes/no), (2) did the employer provide adequate infection control measures (yes/no [e.g., body temperature detection, isolation and ward and route layout]), (3) did the employer provide adequate education and training concerning the COVID-19 pandemic (yes/no), (4) were you compensated for being called for service related to the COVID-19 pandemic (yes/no) and (5) did you feel supported by the employer. The last question was assessed using a 5-point Likert scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*); the outcomes for the last question were dichotomized into 'disagree' (from 1 to 2) and 'agree' (from 3 to 5).

2.4 | Outcome measures

Burnout was assessed using the five-item scale for personal burnout in the Copenhagen Burnout Inventory. This scale has been validated and shown a high internal consistency (Cronbach's alpha = .86) among Taiwanese workers (Yeh et al., 2007). The responses were recorded on a 5-point scale: *always* (score of 100), *often* (75), *sometimes* (50), *rarely* (25) and *never* (0). A mean score

was obtained by averaging the five subscale scores, and a mean score of ≥ 50 indicates burnout. In addition, the Patient Health Questionnaire (PHQ) was used to evaluate participants' depressive symptoms, and it has a sensitivity of 88% and a specificity of 88% for major depression (Kroenke et al., 2001). The PHQ has a good internal consistency (Cronbach's alpha = .80) and test-retest reliability (correlation coefficient = .87) and has been validated against other depressive symptom scales (Liu et al., 2011). The score of each of the nine items of the PHQ was 0 (*not at all*) to 3 (*nearly every day*). The summed score was used to identify participants with depression (≥ 10).

In addition to mental conditions, we also assessed the intention to leave by asking the participants whether they intend to leave their current job during the pandemic in comparison with that before the pandemic. The responses were recorded on a scale of 1 (*strongly disagree*) to 5 (*strongly agree*) (Labrague & de Los Santos, 2021). This scale has been validated and is relevant in the context of health care labour force shortage during the pandemic (Lavoie-Tremblay et al., 2016). We dichotomized the responses as intention to leave (scores of 4 and 5) and no intention to leave (scores of 1 to 3).

2.5 | Statistical analysis

We used multivariate logistic regression analysis to examine the association between pandemic-related work conditions as well as

organisational strategies and mental health outcomes. General work conditions (i.e., psychosocial job demands and job insecurity) were included as covariates. Other covariates included age, sex, marital status, living with young children, work unit and work tenure based on self-report. The sample size needed for this logistic regression model with 17 independent variables is 950, according to the rule of event per variable (Bujang et al., 2018).

We examined the modifying effect of organisational strategies on pandemic-related work conditions through the addition of interaction terms in adjusted logistic models. Separate models were established to examine the interaction between four pandemic-related work conditions and five organisational strategies for three outcome variables (burnout, depression and intention to leave) (Figure 1). If the interaction effect was statistically significant, we further examined the simple effects for pandemic-related work conditions at each level (present or absent) of organisational strategies. The models were adjusted for all demographic characteristics and work conditions. SAS 9.4 (SAS Institute, Cary, NC, USA) was used for all the analyses, and significance was set at $p < .05$.

3 | RESULTS

3.1 | Study sample description

Among 1499 participants, 96% were women, and their average work tenure was 9.9 years (Table 1). Regarding level of medical facilities, 35%, 40%, 16% and 9% of the participants worked at medical centres, regional hospitals, local hospitals and primary care facilities, respectively. Regarding working units, 49% worked at general wards, 27% at the outpatient department and 17% at intensive care units. Fifty-five per cent of the participants reported burnout, and 18% had depression according to PHQ scores. Twenty-three per cent of the participants reported increased intention to leave during the pandemic.

The participants reported an increase of 2.3 working hours per week during the pandemic (Table 1). Moreover, 21% and 41% of the participants experienced redeployment and were required to care for COVID-19 patients, respectively. More than 70% of the participants reported adequate protective equipment provision, infection control measures, education and training and support from their organisations. However, less than half of the participants were compensated for increased service related to the COVID-19 pandemic.

3.2 | Work conditions, organisational strategies and mental health

After adjustment for demographic characteristics and general work conditions, redeployment and occupational stigma were associated with burnout, depression and intention to leave (Table 2). Increased working hours was associated with burnout and intention to leave. By

TABLE 1 Demographic characteristics and work conditions of study participants ($N = 1499$)

	N	(%)
Demographic characteristics		
Age (mean and SD)	36.2	(9.4)
Sex (female)	1444	(96.3)
Marital status (married)	755	(50.4)
Work tenure (year, mean and SD)	10.3	(8.5)
Lives with children	664	(44.3)
Level of medical facility		
Medical centre	525	(35.0)
Regional hospital	592	(39.5)
Local hospital	244	(16.3)
Primary care facilities	138	(9.2)
Work unit		
Intensive care	249	(16.6)
General ward	727	(48.5)
Outpatient department	407	(27.2)
Emergency department	71	(4.7)
Operation room	45	(3.0)
Work conditions		
Psychosocial job demands score (mean and SD)	66.4	(14.8)
Job insecurity	491	(32.8)
Caring COVID-19 patients	617	(41.2)
Working hours (mean and SD)	2.3	(5.2)
Redeployment	311	(20.8)
Occupational stigma score (mean and SD)	35.8	(23.6)
Organisational strategies		
Protection equipment provision	1128	(75.3)
Infection control measures	1329	(88.7)
Education and training	1143	(76.3)
Compensation	722	(48.2)
Support	1325	(88.4)
Mental health		
Burnout	824	(55.0)
Depression	263	(17.6)
Intention to leave	341	(22.8)

Abbreviation: SD, standard deviation.

contrast, caring for COVID-19 patients was negatively associated with depression.

Adoption of organisational strategies was negatively associated with adverse mental health and intention to leave (Table 2). Protection equipment provision was negatively associated with burnout. Education and training and support from employers were negatively associated with depression and intention to leave. Compensation was negatively associated with depression.

TABLE 2 Adjusted odds ratio (OR) and 95% confidence interval (CI) of pandemic-related work conditions and organisational strategies for mental health in logistic regression models

	Outcome variables					
	Burnout		Depression		Intention to leave	
	OR	95% CI	OR	95% CI	OR	95% CI
Pandemic-related work conditions						
Care for COVID-19 patients	0.81	(0.63, 1.04)	0.70	(0.51, 0.97)	0.98	(0.74, 1.30)
Being redeployed	1.51	(1.11, 2.04)	1.89	(1.34, 2.65)	1.54	(1.13, 2.10)
Increased working hours	1.38	(1.05, 1.80)	1.26	(0.91, 1.74)	1.55	(1.16, 2.07)
Occupational stigma	1.58	(1.25, 2.01)	1.61	(1.18, 2.19)	1.60	(1.22, 2.10)
Organisational strategies						
Protection equipment provision	0.60	(0.44, 0.82)	0.78	(0.55, 1.11)	0.75	(0.55, 1.03)
Infection control measures	0.77	(0.50, 1.18)	1.11	(0.70, 1.72)	0.93	(0.62, 1.39)
Education and training	0.96	(0.70, 1.32)	0.67	(0.47, 0.95)	0.61	(0.45, 0.84)
Compensation	0.88	(0.69, 1.12)	0.69	(0.51, 0.94)	0.93	(0.70, 1.220)
Support	0.83	(0.53, 1.30)	0.58	(0.38, 0.88)	0.54	(0.36, 0.81)

Note: Bold fonts indicate $p < .05$. Models are adjusted for age, sex, marital status, lives with children, work tenure, work unit, psychosocial job demands and job insecurity.

3.3 | Interaction between protective factors and risk factors

For burnout, compensation modified the effect of being redeployed (p for interaction term was .002). The simple odds ratios (ORs) and 95% CIs of being redeployed without and with compensation were 2.60 (1.64–4.11) and 1.01 (0.67–1.52), respectively. For depression and intention to leave, we did not find any interaction effect between organisational strategies and pandemic-related work conditions.

4 | DISCUSSION

In this study, we found that pandemic-related work conditions were associated with an increased risk of adverse mental health, but caring for COVID-19 patients was negatively associated with depression. Organisational strategies were negatively associated with adverse mental health and intention to leave. Among these strategies, compensation modified the association of pandemic-related work conditions with burnout.

On the basis of the experience of severe acute respiratory syndrome (SARS) epidemic in 2003 (Chen et al., 2006), the Taiwanese government rapidly implemented infection control policies, including border control, case identification and containment (Wang et al., 2020). All these actions contributed to the well-controlled epidemic and prevented health care system breakdown. Nevertheless, work condition changes caused increased stress among health care workers because of the threat of being exposed to COVID-19 at work, deployment and increased work load (Shanafelt et al., 2020). Our findings suggest that redeployment and increased working hours are associated with burnout and intention to leave. One of our novel findings is that providing compensation to nurses, such as extra pay or

additional paid leaves, ameliorates the effect of redeployment on burnout. In previous epidemics, adequate compensation was provided in some countries. For example, during the Ebola epidemic in Sierra Leone, risk allowance was provided to health care workers to increase their motivation to work in the facilities (Raven et al., 2018). Compensating workers is considered as a strategy based on relationship-oriented leadership style. Although strategies based on task-oriented leadership style (e.g., education and training) are crucial for pandemic control, they are less significant in modifying the effect of pandemic-related work stressors on nurses' mental health in this study. However, the compensation type provided to health care workers was not specified. Further studies are needed to examine the effect of different compensation strategies on workers' burnout.

The need for protective equipment, including face masks, goggles and protective suits, increased rapidly during the pandemic. Through resource allocation, the Taiwanese government ensured medical equipment supply during the COVID-19 pandemic (Wang et al., 2020). Our finding that protective equipment provision was associated with lower risk of burnout suggests that resource allocation must be ensured through national and organisational policies during a new pandemic. Education and training and perceived support from employers were negatively associated both with depression and intention to leave during the pandemic. This finding highlighted the importance of providing knowledge in time to reduce fear and anxiety, which would in turn stabilize the health care workforce.

Stigmatization of health care workers during the COVID-19 pandemic has been reported worldwide (Bagcchi, 2020; Singh & Subedi, 2020), but few empirical studies have explored occupational stigma among health care workers during a pandemic. Social stigmatization was reported by high percentages of health care workers in Singapore during the SARS outbreak of 2003 and in Sierra Leone during the Ebola epidemic (Koh et al., 2005; McMahon et al., 2016). Our

finding is consistent with those of earlier studies that social stigmatization is associated with not only adverse mental health (Kisely et al., 2020; Xiao et al., 2020) but also low motivation to continue working (Schwartz et al., 2020; Su et al., 2007), which may exacerbate the instability of the health care workforce during pandemics. To address such stigma during pandemics, governmental and community actions to control the spread of infection, prevent misinformation through fact-checking and public education about sharing false information are vital (Chopra & Arora, 2020; Singh & Subedi, 2020).

In this study, we found that caring for COVID-19 patients is associated with decreased risks of depression, which is inconsistent with the findings of previous studies (Kisely et al., 2020). One possible explanation for this discrepancy is that the survey was performed in the latter half of 2020, 5 months after the first imported case in Taiwan. A study in Taiwan during the 2003 SARS pandemic found that within 1 month, health care workers caring for SARS patients had significant reductions in mood ratings and perceived negative feelings, indicating gradual psychological adaptation (Su et al., 2007). The study participants who cared for COVID-19 patients may have adapted to changes in their work routine and therefore did not experience mental health problems. In addition, after adjustment for work load and redeployment in the current study, the participants who cared for COVID-19 may be those who are confident in and capable of caring for COVID-19 patients. The healthy worker effect should be re-examined in future studies. Nevertheless, the finding implies that caring for infected or suspected patients during pandemics per se is not necessarily associated with adverse mental health if other work conditions are improved.

4.1 | LIMITATIONS

The limitations of this study should be considered. First, this was a cross-sectional study, and convenience sampling was used. The causal relationship cannot be determined, and the study participants may not be representative of all nurses. Nurses who had cared for COVID-19 patients may be more interested in participating in this survey than those who did not. In addition, Taiwan has a low COVID-19 infection rate compared with most developed countries (H. Y. Cheng et al., 2020), service burden on health care system is lower and may have less impact on nurses' mental health. Although the prevalence of mental health problems may not be representative, the findings for pandemic-related risk factors and organisational strategies provide implications for medical facilities and governmental health departments. Second, we did not assess anxiety symptoms, which are common among nurses during the pandemic, and correlate with depressive mood and intention to leave (Kisely et al., 2020). In addition, other factors that may have contributed to mental health were missing in the survey, such as workplace justice and participants' mental illness history. Third, we relied on subjective reports for organisational strategies, which may be biased by personal preference and expectations. Several important organisational strategies mentioned in the literature were not included in our analysis, such as

transparent communication and psychological service accessibility. In addition to organisational strategies, national- and global-level policies should be included in a multilevel model to evaluate their effect on nurses' mental health.

5 | CONCLUSIONS

This study showed that increased working hours, redeployment and occupational stigma were associated with adverse mental health and intention to leave for nurses, whereas caring for COVID-19 patients was associated with a lower risk of adverse mental health after adjustment for other work conditions. The government and health care organisations should generate careful plans for resource allocation, including protection equipment and manpower. To decrease occupational stigma, organisations should recognize health care workers' efforts and inform the public the challenges that health care workers are encountering. Tackling misinformation proactively is also crucial to avoid fear of health care workers in the community. More importantly, organisational strategies in response to the COVID-19 pandemic lowered the risk of adverse mental health and modified the association between work conditions and mental health. Organisations should provide compensation for health care workers during a pandemic, and future studies are needed to evaluate the effect of different types and forms of compensation.

6 | IMPLICATIONS FOR NURSING MANAGEMENT

We suggest that organisational and national policies should be established to maintain a healthy health care workforce; in addition, more empirical evidence is needed for policymakers to timely respond to pandemics.

ACKNOWLEDGEMENTS

This work was supported by the Ministry of Science and Technology, Taiwan (Grant MOST 107-2314-B-039-063-MY3 and MOST 110-2314-B-039-022) and China Medical University Hospital, Taiwan (Grant DMR-110-237). The funders have no role in study design; in the collection, analysis and interpretation of data; in the writing of the report; and in the decision to submit the article for publication.

CONFLICT OF INTEREST

None.

ETHICS STATEMENT

This study was approved by the Institutional Review Board of China Medical University Hospital (CMUH109-REC3-100).

DATA AVAILABILITY STATEMENT

The data underlying this article will be shared on reasonable request to the corresponding author.

ORCID

Wan-Ju Cheng  <https://orcid.org/0000-0003-4510-7584>

REFERENCES

- Adams, J. G., & Walls, R. M. (2020). Supporting the health care workforce during the COVID-19 global epidemic. *JAMA*, 323(15), 1439–1440. <https://doi.org/10.1001/jama.2020.3972>
- Bagcchi, S. (2020). Stigma during the COVID-19 pandemic. *The Lancet Infectious Diseases*, 20(7), 782. [https://doi.org/10.1016/S1473-3099\(20\)30498-9](https://doi.org/10.1016/S1473-3099(20)30498-9)
- Bujang, M. A., Sa'at, N., Sidik, T., & Joo, L. C. (2018). Sample size guidelines for logistic regression from observational studies with large population: Emphasis on the accuracy between statistics and parameters based on real life clinical data. *Malaysian Journal of Medical Sciences*, 25(4), 122–130. <https://doi.org/10.21315/mjms2018.25.4.12>
- Chen, R., Chou, K. R., Huang, Y. J., Wang, T. S., Liu, S. Y., & Ho, L. Y. (2006). Effects of a SARS prevention programme in Taiwan on nursing staff's anxiety, depression and sleep quality: A longitudinal survey. *International Journal of Nursing Studies*, 43(2), 215–225. <https://doi.org/10.1016/j.ijnurstu.2005.03.006>
- Cheng, H. Y., Jian, S. W., Liu, D. P., Ng, T. C., Huang, W. T., Lin, H. H., & Taiwan COVID-19 Outbreak Investigation Team. (2020). Contact tracing assessment of COVID-19 transmission dynamics in Taiwan and risk at different exposure periods before and after symptom onset. *JAMA Internal Medicine*, 180(9), 1156–1163. <https://doi.org/10.1001/jamainternmed.2020.2020>
- Cheng, Y., Luh, W. M., & Guo, Y. L. (2003). Reliability and validity of the Chinese version of the Job Content Questionnaire in Taiwanese workers. *International Journal of Behavioral Medicine*, 10(1), 15–30. https://doi.org/10.1207/s15327558ijbm1001_02
- Chersich, M. F., Gray, G., Fairlie, L., Eichbaum, Q., Mayhew, S., Allwood, B., English, R., Scorgie, F., Luchters, S., Simpson, G., Haghghi, M. M., Pham, M. D., & Rees, H. (2020). COVID-19 in Africa: Care and protection for frontline healthcare workers. *Globalization and Health*, 16(1), 46. <https://doi.org/10.1186/s12992-020-00574-3>
- Chopra, K. K., & Arora, V. K. (2020). Covid-19 and social stigma: Role of scientific community. *The Indian Journal of Tuberculosis*, 67(3), 284–285. <https://doi.org/10.1016/j.ijtb.2020.07.012>
- Cummings, G. G., Tate, K., Lee, S., Wong, C. A., Paananen, T., Micaroni, S. P. M., & Chatterjee, G. E. (2018). Leadership styles and outcome patterns for the nursing workforce and work environment: A systematic review. *International Journal of Nursing Studies*, 85, 19–60. <https://doi.org/10.1016/j.ijnurstu.2018.04.016>
- Ho, A. H., Potash, J. S., Fong, T. C., Ho, V. F., Chen, E. Y., Lau, R. H., Yeung, F. S. A., & Ho, R. T. (2015). Psychometric properties of a Chinese version of the Stigma Scale: Examining the complex experience of stigma and its relationship with self-esteem and depression among people living with mental illness in Hong Kong. *Comprehensive Psychiatry*, 56, 198–205. <https://doi.org/10.1016/j.comppsy.2014.09.016>
- Karasek, R., & Theorell, T. (1990). *Healthy work: Stress, productivity, and the reconstruction of working life*. Basic Books.
- Kisely, S., Warren, N., McMahon, L., Dalais, C., Henry, I., & Siskind, D. (2020). Occurrence, prevention, and management of the psychological effects of emerging virus outbreaks on healthcare workers: Rapid review and meta-analysis. *BMJ*, 369, m1642. <https://doi.org/10.1136/bmj.m1642>
- Koh, D., Lim, M. K., Chia, S. E., Ko, S. M., Qian, F., Ng, V., Tan, B. H., Wong, K. S., Chew, W. M., Tang, H. K., Ng, W., Muttakin, Z., Emmanuel, S., Fong, N. P., Koh, G., Kwa, C. T., Tan, K. B. C., & Fones, C. (2005). Risk perception and impact of Severe Acute Respiratory Syndrome (SARS) on work and personal lives of healthcare workers in Singapore: What can we learn? *Medical Care*, 43(7), 676–682. <https://doi.org/10.1097/01.mlr.0000167181.36730.cc>
- Kroenke, K., Spitzer, R. L., & Williams, J. B. (2001). The PHQ-9: Validity of a brief depression severity measure. *Journal of General Internal Medicine*, 16(9), 606–613. <https://doi.org/10.1046/j.1525-1497.2001.016009606.x>
- Labrague, L. J., & de Los Santos, J. A. A. (2021). Fear of COVID-19, psychological distress, work satisfaction and turnover intention among frontline nurses. *Journal of Nursing Management*, 29(3), 395–403. <https://doi.org/10.1111/jonm.13168>
- Lai, J., Ma, S., Wang, Y., Cai, Z., Hu, J., Wei, N., Wu, J., Du, H., Chen, T., Li, R., Tan, H., Kang, L., Yao, L., Huang, M., Wang, H., Wang, G., Liu, Z., & Hu, S. (2020). Factors associated with mental health outcomes among health care workers exposed to coronavirus disease 2019. *JAMA Network Open*, 3(3), e203976. <https://doi.org/10.1001/jamanetworkopen.2020.3976>
- Lavoie-Tremblay, M., Fernet, C., Lavigne, G. L., & Austin, S. (2016). Transformational and abusive leadership practices: Impacts on novice nurses, quality of care and intention to leave. *Journal of Advanced Nursing*, 72(3), 582–592. <https://doi.org/10.1111/jan.12860>
- Liu, S. I., Yeh, Z. T., Huang, H. C., Sun, F. J., Tjeng, J. J., Hwang, L. C., Shih, Y. H., & Yeh, A. W. (2011). Validation of Patient Health Questionnaire for depression screening among primary care patients in Taiwan. *Comprehensive Psychiatry*, 52(1), 96–101. <https://doi.org/10.1016/j.comppsy.2010.04.013>
- McMahon, S. A., Ho, L. S., Brown, H., Miller, L., Ansumana, R., & Kennedy, C. E. (2016). Healthcare providers on the frontlines: A qualitative investigation of the social and emotional impact of delivering health services during Sierra Leone's Ebola epidemic. *Health Policy and Planning*, 31(9), 1232–1239. <https://doi.org/10.1093/heapol/czw055>
- Raven, J., Wurie, H., & Witter, S. (2018). Health workers' experiences of coping with the Ebola epidemic in Sierra Leone's health system: A qualitative study. *BMC Health Services Research*, 18(1), 251. <https://doi.org/10.1186/s12913-018-3072-3>
- Rosser, E., Westcott, L., Ali, P. A., Bosanquet, J., Castro-Sanchez, E., Dewing, J., McCormack, B., Merrell, J., & Witham, G. (2020). The need for visible nursing leadership during COVID-19. *Journal of Nursing Scholarship*, 52(5), 459–461. <https://doi.org/10.1111/jnu.12587>
- Schwartz, J., King, C. C., & Yen, M. Y. (2020). Protecting healthcare workers during the coronavirus disease 2019 (COVID-19) outbreak: Lessons from Taiwan's severe acute respiratory syndrome response. *Clinical Infectious Diseases*, 71(15), 858–860. <https://doi.org/10.1093/cid/ciaa255>
- Shanafelt, T., Ripp, J., & Trockel, M. (2020). Understanding and addressing sources of anxiety among health care professionals during the COVID-19 pandemic. *Journal of the American Medical Association*, 323, 2133–2134. <https://doi.org/10.1001/jama.2020.5893>
- Singh, R., & Subedi, M. (2020). COVID-19 and stigma: Social discrimination towards frontline healthcare providers and COVID-19 recovered patients in Nepal. *Asian Journal of Psychiatry*, 53, 102222. <https://doi.org/10.1016/j.ajp.2020.102222>
- Su, T. P., Lien, T. C., Yang, C. Y., Su, Y. L., Wang, J. H., Tsai, S. L., & Yin, J. C. (2007). Prevalence of psychiatric morbidity and psychological adaptation of the nurses in a structured SARS caring unit during outbreak: A prospective and periodic assessment study in Taiwan. *Journal of Psychiatric Research*, 41(1–2), 119–130. <https://doi.org/10.1016/j.jpsy.2005.12.006>
- Taiwan Centers for Disease Control (2021). Attention! COVID-19. Retrieved from <https://www.cdc.gov.tw/En>
- Wang, C. J., Ng, C. Y., & Brook, R. H. (2020). Response to COVID-19 in Taiwan: Big data analytics, new technology, and proactive testing. *JAMA*, 323(14), 1341–1342. <https://doi.org/10.1001/jama.2020.3151>
- World Health Organization. (2020). Mental health and psychosocial considerations during the COVID-19 outbreak, 18 March 2020. Geneva:

- WHO. Retrieved from: <https://extranet.who.int/iris/restricted/handle/10665/331490>
- Xiao, H., Zhang, Y., Kong, D., Li, S., & Yang, N. (2020). The effects of social support on sleep quality of medical staff treating patients with coronavirus disease 2019 (COVID-19) in January and February 2020 in China. *Medical Science Monitor*, 26, e923549. <https://doi.org/10.12659/MSM.923549>
- Yeh, W. Y., Cheng, Y., Chen, C. J., Hu, P. Y., & Kristensen, T. S. (2007). Psychometric properties of the Chinese version of Copenhagen burnout inventory among employees in two companies in Taiwan. *International Journal of Behavioral Medicine*, 14(3), 126–133. <https://doi.org/10.1007/BF03000183>
- Zhang, W. R., Wang, K., Yin, L., Zhao, W. F., Xue, Q., Peng, M., Min, B. Q., Tian, Q., Leng, H. X., Du, J. L., Chang, H., Yang, Y., Li, W., Shanguan, F. F., Yan, T. Y., Dong, H. Q., Han, Y., Wang, Y. P., Cosci, F., & Wang, H. X. (2020). Mental health and psychosocial problems of medical health workers during the COVID-19 epidemic in China. *Psychotherapy and Psychosomatics*, 89, 1–9. <https://doi.org/10.1159/000507639>

How to cite this article: Li, T.-M., Pien, L.-C., Kao, C.-C., Kubo, T., & Cheng, W.-J. (2022). Effects of work conditions and organisational strategies on nurses' mental health during the COVID-19 pandemic. *Journal of Nursing Management*, 30(1), 71–78. <https://doi.org/10.1111/jonm.13485>