

Original Article

Lockdown Stress and Burnout of Public Health Personnel During the Coronavirus Disease 2019 Outbreak in Southern Thailand

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ABSTRACT

Background: The coronavirus disease 2019 (COVID-19) pandemic has affected people around the world. Therefore, this situation has caused stress and burnout among the people and public health staff in Thailand. **Objective:** This study aimed to compare the stress and burnout levels among public health personnel during the lockdown and un-lockdown periods of the COVID-19 pandemic in Thailand. The secondary objective was to identify the factors associated with stress and burnout. **Methods:** This research was a cross-sectional survey study with online self-rated questionnaires. The sample size was 158 participants. Using convenience sampling, participants who worked in 12th health region, Southern Thailand took the questionnaire twice. The first time was during May–June 2020, which was the lockdown period from the COVID-19 outbreak in Thailand, and the participants completed the questionnaires again during July–August in the same year, which was the un-lockdown period. The non-parametric sign test, Spearman's correlation, and logistic regression analyses were performed for testing the hypotheses. **Results:** The average total scores for stress during the lockdown and un-lockdown periods were 4.139 ± 3.534 and 3.398 ± 3.344 , respectively. Moreover, the average total scores for burnout during the lockdown and un-lockdown periods were 1.573 ± 0.777 and 1.519 ± 0.702 , respectively. The stress scores during the lockdown period were significantly higher than those during the un-lockdown period (sign test, $P = 0.02$). The stress correlated with the burnout by using Spearman's correlation ($P < 0.001$). Binary logistic regression showed that the stress score (odds ratio 1.75; 95% confidence interval 1.41–2.91) was a risk factor for burnout. **Conclusion:** During the outbreak, the stress and burnout were high; the health organizations should have interventions or activities to reduce stress and burnout.

KEYWORDS: Burnout, Coronavirus disease 2019 outbreak, COVID-19, Stress

INTRODUCTION

The coronavirus disease 2019 (COVID-19) pandemic has affected people around the world. The disease has caused severe infections and deaths; thus, the outbreak has resulted in stress and burnout for both the public and the staff involved in the situation.^[1,2] The prevalence of COVID-19 in Thailand has increased to more than 10,000 subjects as of January 2021.^[3]

Under pressure and expectation from many sectors to service many people, public health personnel have

worked continuously for numerous hours and been separated from their families. The public health personnel are also at a higher risk of infection than others and feel insecure about working.^[4] Thus, stress

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and burnout problems originating from continuously working long hours would affect their health, including the physical condition. For example, the amounts of neurotransmitters and hormones, especially cortisol hormones as a stress hormone, will increase.^[5] If these problems occur for a long period of time, public health personnel would have a significantly higher risk to get depression^[6,7] or cardiovascular disease.^[8,9] Consequently, it is important to assess the personnel stress and burnout to prevent them from developing chronic diseases in the future.^[10]

Based on the previous studies, Gallego-Gómez *et al.*^[11] reported that the prevalence of emotional problems had significantly increased from 39.1% to 50.7% after a 40-day lockdown. Wang *et al.*^[12] studied about healthcare workers' stress in Wuhan, China and found that about 60% of the participants developed moderate and severe stress. Studies also found prevalence of psychological distress ranging between 25.1% and 52.1%.^[13-16] Likewise, a growing body of literature has addressed the factors affecting stress in health workers. One study reported that the positive predictors affecting nurses' stress were having children, the stigma of having COVID-19, fears of infection, the workplace, fear of transmission infection to the family, and the nurse-to-patient ratio, whereas the negative predictors were training for COVID-19, availability of specialized equipment, educational level, and attention of the hospital administration.^[12] Other studies also found that the fear of being infected, concern for the family, the discomfort caused by wearing protective equipment, working in an emergency department, being treated differently, and negative coping style were significantly affecting the health workers' stress level.^[12,16,17]

Additionally, the prevalence of burnout during the COVID-19 pandemic period ranged between 13% and 39%.^[18] Factors significantly associated with COVID-19-related burnout were employment status, experience of taking care of patients confirmed or suspected with COVID-19 infection, hospital resources, and job stress.^[19,20]

The pandemic period caused psychological distress in people, especially public health personnel. However, no study has compared the healthcare workers' stress and burnout between the lockdown and un-lockdown periods.

Objectives

The present study aimed to compare the frontline healthcare workers' average stress and burnout levels between the lockdown and un-lockdown periods in

Thailand. In addition, the secondary objective was to identify the factors associated with stress and burnout among public health personnel in Thailand.

METHODS

Study design

This research was designed as a cross-sectional survey study using a convenience sampling method. The survey was conducted via online questionnaires in the 12th health region, Southern Thailand.

According to the primary objective, the sample size was calculated using the following formula^[21]:

$$n1 = \frac{\left(Z_{1-\frac{\alpha}{2}} + Z_{1-\beta} \right)^2 \sigma^2}{\Delta^2}$$

where $Z_{1-\alpha}$ equals 1.96 (confidence level of 95%), $Z_{1-\beta}$ equals 0.84 (power of 80%), Δ denotes the different data between the two groups, and σ denotes the standard deviation (SD) of the data. Using data from the study of Kolokotroni *et al.*,^[22] the Perceived Stress Scale-14 scores after lockdown rose 3 scores compared with that before lockdown period and SD was assigned to 12. The sample size comprised at least 126 participants for testing the hypothesis.

The inclusion criteria consisted of being Thai public health personnel who worked in the 12th health region, Southern Thailand, aged between 25 and 60 years. After receiving the research approval from the Ethics Research Committee, the authors announced the research project for accepting participants via e-mail to public health personnel who worked in the aforementioned region. Using convenience sampling, all subjects obtained the informed consent electronically according to the inclusion criteria. Additionally, only subjects who chose "yes" were taken to the questionnaire page, and subjects could leave the process at any time. The survey was a self-rated questionnaire and consisted of two parts. The first section was general information, and the second section assessed stress and burnout. The participants took the questionnaire two times for comparing stress and burnout between the lockdown and un-lockdown periods. The first time was carried out during May–June 2020, which was the lockdown period of the COVID-19 outbreak in Thailand. Then, the participants were asked again to complete the questionnaire during July–August of the same year, which was the un-lockdown period. The questionnaires which were completed in only one time period were excluded.

The instruments

Stress assessment was performed using the stress-5 test of the Department of Mental Health, Ministry of Public Health, which had five items (available from <https://www.dmh.go.th/covid19/pnews/files/MCATUpdate.pdf>).^[23] Each item had a score of 0–3 points, so the total stress scores equaled 15. The stress levels were divided into four levels. Scores of 0–4, 5–7, 8–9, and 10–15 were considered as low, moderate, high, and the highest stress, respectively. The risk group was the one with more stress (the scores equaled to 8 points or more). For the interpretation of burnout, the authors employed the burnout questionnaire of the Department of Mental Health, Ministry of Public Health. The burnout scores were 1–4, in which risk groups were those with scores of 3 or more.^[23] The reliability of the previous survey was carried out, and Cronbach's alpha of each item of the questionnaire is shown in Table 1.^[24]

Ethics consideration

The study was approved by the Ethics Review Committee of Faculty of Nursing, Prince of Songkla University (Approval No. PSU IRB 2020-PSU-st010). The study objective and purpose were informed to the participants via e-mail. Therefore, electronic informed consent was obtained from all voluntary participants. Ethical principles were also followed throughout the study.

Data analysis

The demographic data were calculated from the descriptive statistics, which were reported as the percentages for the categorical data and mean \pm SD for the continuous variables. The continuous variables were tested for normality with the Shapiro–Wilk test. The correlations of the stress score, burnout scores, and other continuous variables were determined using Spearman's correlation. Hence, the sign test, which is a non-parametric test for the consistent differences between the pairs of observations, was used to estimate the difference of the average stress score and burnout score between the lockdown and un-lockdown periods in the same participants. The relationship between the stress score and burnout score was analyzed using simple linear regression analysis. Moreover, the total stress scores were dichotomized into the risk and non-risk groups of stress (total stress scores 8 points or more and less than 8 points, respectively). In contrast, the burnout scores were dichotomized into the risk and non-risk of the burnout groups (burnout score 3–4 and 1–2, respectively) for binary propose. Finally, the binary logistic regression was performed to estimate which

Table 1: Items of the stress-5 test and burnout score

Stress-5 test ^a	Score	Cronbach's alpha ^b
1. Sleep problems (insomnia or hypersomnia)	Rarely (0) Sometimes (1) Very often (2) Completely (3)	0.923
2. Concentration problems	Rarely (0) Sometimes (1) Very often (2) Completely (3)	0.901
3. Anxiety	Rarely (0) Sometimes (1) Very often (2) Completely (3)	0.942
4. Feeling of boredom	Rarely (0) Sometimes (1) Very often (2) Completely (3)	0.890
5. Feelings of not wanting to meet people	Rarely (0) Sometimes (1) Very often (2) Completely (3)	0.895
Burnout score ^c		
You have emotional exhaustion during the past week, feeling depleted, hopeless, wasted, or psychologically wasted energy	Rarely (1) Sometimes (2) Very often (3) Completely (4)	0.911

^aThe risk group of stress defined the stress scores of 8 points or more

^bCronbach's alpha of each item from the previous survey^[24]

^cThe risk group of burnout defined the burnout scores of 3 points or more

variables were associated with the stress and burnout scores. A $P < 0.05$ was accepted as being statistically significant. The statistical analysis was performed using the R program, version 3.6.2 software (R Foundation, Vienna, Austria).

RESULTS

One hundred and fifty-eight participants completed the questionnaire during both periods. The baseline characteristics of the participants are shown in Table 2. The average age of the participants was 44.3 ± 10.58 years. Of them, 56.3% were female, more than half were married, and 32.3% earned US\$ 644.33–966.50 a month, whereas one-third had income of between US\$ 311.14 and 622.22 per month.

The majority of participants were frontline health personnel (71.5%) who screened people at the COVID-19 screening stations. During the lockdown, the Emergency Operation Center (EOC) group was established for operation, and more than two-thirds of

the participants performed the EOC operating team's orders, as shown in Table 3.

Table 4 shows the average scores and SD of the stress and burnout scores during the lockdown and un-lockdown periods. The average stress scores during the lockdown and un-lockdown periods were 4.139 ± 3.534 and 3.398 ± 3.344 , respectively. The mean burnout score in the lockdown period was 1.573 ± 0.777 , whereas 1.519 ± 0.702 was the mean burnout score in the un-lockdown period.

The authors observed that 18.4% of the total number of participants were in the risk group of stress during the COVID-19 outbreak, which inferred that they had a stress score of 8 or more. In the un-lockdown period, the risk group of stress decreased to 10.8%. The risk group of burnout was defined as a person who had a burnout score of 3 or more. Like the stress scores, the authors found that the risk groups of burnout during the COVID-19 outbreak and un-lockdown period were 12.7% and 8.2%, respectively. Because the *P*-value of the normality tests of scores was less than 0.05 from both the Shapiro–Wilk and Kolmogorov–Smirnov tests ($P < 0.001$ and $P < 0.001$, respectively), the authors had to choose the non-parametric test for estimating the differences between the pairs of observations.

The mean overall stress scores during the COVID-19 outbreak were higher than those during the un-lockdown period ($P = 0.02$). However, the average

Table 2: Basic characteristics of the participants (n=158)

Factor	N (%)
Gender	
Male	69 (43.7)
Age group (years)	
Less than 31 years	24 (15.2)
31–40	32 (20.3)
41–50	45 (28.5)
51–60	57 (36.1)
Marriage status	
Married	89 (56.3)
Single	51 (32.3)
Widowed/divorced/separated	18 (11.4)
Income per month (baht)	
Less than 10,000	6 (3.8)
10,001–20,000	46 (29.1)
20,001–30,000	51 (32.3)
30,001–40,000	28 (17.7)
More than 40,000	27 (17.1)
Expense per month (baht)	
Less than 10,000	16 (10.1)
10,001–20,000	54 (34.2)
20,001–30,000	48 (30.4)
30,001–40,000	16 (10.1)
More than 40,000	24 (15.2)

Table 3: Occupational characteristics of the participants (n=158)

Factor	N (%)
Personnel type	
Frontline public health personnel	113 (71.5)
Nurse	22 (13.9)
Laboratory scientist	19 (12.0)
Doctor	3 (1.9)
Pharmacist	1 (0.6)
EOC Group Directive Compliance	
Volunteers did not comply with EOC group directives	39 (24.7)
Volunteers comply with operating group	28 (17.7)
Volunteers comply with following the order of the human resources working group	19 (12)
Volunteers comply with following the order of the disease control working group	14 (8.9)
Volunteers comply with the instructions of the laboratory working group	11 (7)
Volunteers comply with following the order of the secretary working group and the coordinate working group	10 (6.3)
Volunteers comply with following the orders of the department of resources and pharmaceutical support	8 (5.1)
Volunteers comply with following the orders of the budget finance committee, clerical, and vehicle	7 (4.4)
Volunteers comply with the instructions of the strategic working group	6 (3.8)
Volunteers comply with the orders of the risk communication and public relations committee	5 (3.2)
Volunteers comply with the orders of the faculty to realize the incident	5 (3.2)
Volunteers comply with the following orders of the International Communicable Disease Control Committee	3 (1.9)
Volunteers comply with duties following the orders of the directorate and commanders	2 (1.3)
Volunteers comply with the orders of the law working group	1 (0.6)

EOC = The Emergency Operation Center

burnout scores between the two periods did not show any differences (sign test, $P = 0.47$).

Furthermore, the stress and burnout levels were significantly correlated ($r = 0.70$, $P < 0.001$) when calculating this correlation during the COVID-19 outbreak [Figure 1A]. Simultaneously, Spearman's correlation between the stress and burnout levels was 0.74 ($P < 0.001$) when calculating it during the un-lockdown period [Figure 1B]. Additionally, other variables that correlated with the stress or burnout

scores were evaluated; however, the results revealed that none significantly correlated with the stress or burnout scores.

As a result, the authors hypothesized that increased stress levels led to increased burnout from the correlation between the stress and burnout levels. Therefore, the relationship between the stress score and burnout score was analyzed using a simple linear regression analysis, and it was found that the two factors had a statistically significant relationship [Table 5]. Furthermore, the authors dichotomized the burnout score into the risk and non-risk of the burnout groups (burnout score 3–4 and 1–2, respectively), and binary logistic regression analysis was performed. The stress score was found to be significantly associated with the risk of the burnout group (odds ratio 1.75; 95% confidence interval 1.41–2.91).

Table 4: The average scores and SD of stress and burnout during lockdown and un-lockdown periods

Scores	Mean score \pm SD
Lockdown period	
The stress scores during lockdown period	
(1) Sleep problems	0.803 \pm 0.760
(2) Concentration problems	0.822 \pm 0.786
(3) Anxiety	0.816 \pm 0.788
(4) Feeling of boredom	0.955 \pm 0.832
(5) Feelings of not wanting to meet people	0.740 \pm 0.868
The stress total score	4.139 \pm 3.534
The burnout score during lockdown period	1.573 \pm 0.777
Un-lockdown period	
The stress score during un-lockdown period	
(1) Sleep problems	0.689 \pm 0.721
(2) Concentration problems	0.670 \pm 0.708
(3) Anxiety	0.670 \pm 0.752
(4) Feeling of boredom	0.740 \pm 0.791
(5) Feelings of not wanting to meet people	0.626 \pm 0.761
The stress total score	3.398 \pm 3.344
The burnout scores during un-lockdown period	1.519 \pm 0.702

DISCUSSION

In the present study, the results demonstrated that the risk groups of stress and burnout during the COVID-19 outbreak were 18.4% and 12.7%, respectively. The results were higher than those from the previous survey of mental health conditions in Thailand. The results from the previous survey found that people infected with COVID-19, who were public health personnel, had a high risk of stress and burnout with a score of 5.08% and 3.15%, respectively.^[24] This was potentially explained by the different demographics. The previous survey was performed in a general population, whereas the population in the present study comprised only public health personnel working directly on the COVID-19 outbreak. Thus, the results revealed greater stress and burnout.

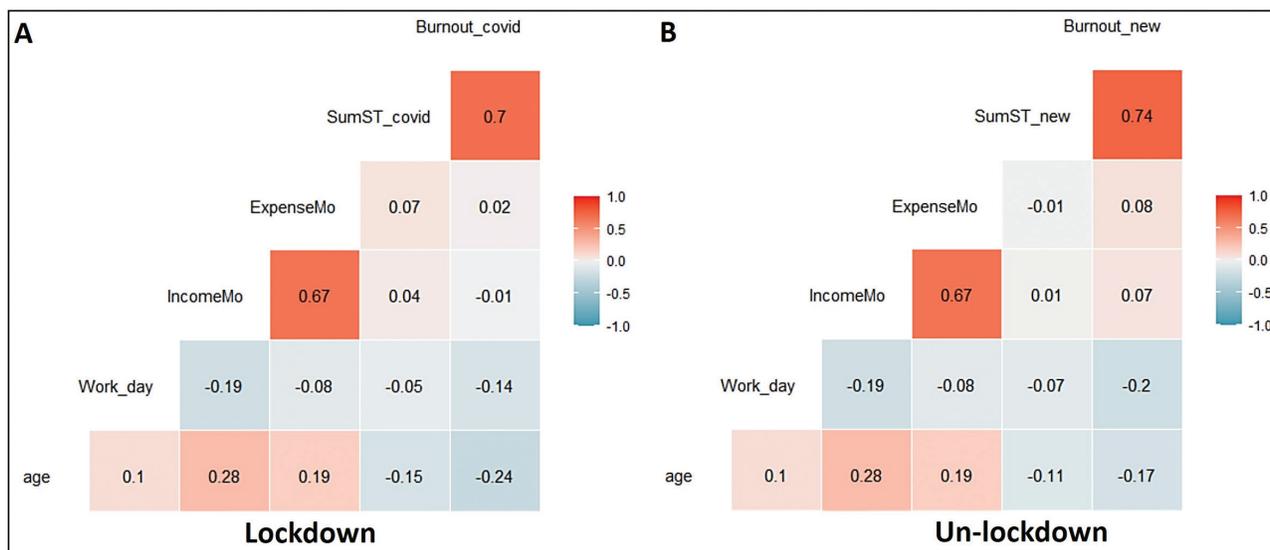


Figure 1: The correlation analysis of the variables in the lockdown period (A) and un-lockdown period (B)

Table 5: The analysis of the linear regression equation for predicting the burnout scores originated from the stress scores

Period	Coefficient	P-value	95% CI of coefficient
Lockdown period			
Constant	0.932		0.796–1.069
Total stress score	0.154	<0.001	0.129–0.179
Un-lockdown period			
Constant	0.988		0.882–1.094
Total stress score	0.156	<0.001	0.134–0.178

When comparing the COVID-19 outbreak with the un-lockdown period, the stress levels were significantly lower due to the reduced and controllable situation of the outbreak. Consequently, the stress levels in public health personnel displayed a decrease. When focussing on the risk group of burnout, they pretended to reduce the burnout from 12.7% to 8.2% during the un-lockdown period; however, the percentages between the two periods were insignificantly different. The authors thought that this was a result of the limitations of the burnout rating system. The questionnaire had only one item consisting of four levels, so there were limitations to show the difference when the burnout changed.^[23]

Furthermore, the results showed a statistically significant relationship between the stress and burnout levels, which was in agreement with the results of Chirico.^[25] The author reported that the source of burnout resulted from high stress that had accumulated over a long period of time; as a consequence, there could be physical pain for no known reason such as dizziness and muscular pain.^[25] Previous studies demonstrated a significant positive relationship between stress and burnout during the COVID-19 outbreak.^[26-28] Yıldırım and Solmaz^[26] proposed the structural model indicating the relationship of COVID-19-related stress and burnout. COVID-19-related stress also had a direct effect on COVID-19-related burnout. As a result, there was a statistically significant association between stress and burnout, so the authors thought that the stress levels were the first condition of subsequent burnout. For the implications, the healthcare workers who became the risk group of stress should receive interventions for reducing stress and for preventing burnout by undertaking various activities to reduce stress, such as limitation of the number of working hours, exercise after work, leisure activities, and psychological support services.^[29]

The present study also demonstrated that psychological distress during the COVID-19 pandemic significantly affected public health personnel. For the implications, modification of stress would be a crucial step to prevent the development of the burnout syndrome in

these populations in the future. Moreover, when the pandemic was resolved, the stress level in public health personnel would also decrease, too.

Nevertheless, some limitations need to be acknowledged. First, the number of participants may be limited; that would be a challenge to increase the sample size to test the correlation in the future. Secondly, the burnout questionnaire in the present study had only one item,^[23] which might lead to a ceiling effect. A standard burnout questionnaire should be conducted in the future. However, there is no standard questionnaire for use at the current time. For future research directions, a multicenter study should be conducted to compare other regions or countries that have differences in healthcare systems and cultures.

CONCLUSIONS

During the COVID-19 pandemic, stress has been high among hospital staff causing a risk factor for burnout. Problems that would originate from stress and burnout could possibly cause physical and mental illness in the future. Accordingly, if these risk factors occurred, public health personnel with a high risk would need to be promptly supervised. Thus, the related organizations should have activities such as working-from-home, vacation, and routine mental health surveys to reduce stress and burnout according to the new standard guidelines.

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Conflicts of interest

There are no conflicts of interest.

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