RESEARCH ARTICLE

Psychological effects and physical symptoms among healthcare workers during first wave COVID-19 outbreak in Kangar, Perlis

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Abstract:

Infectious disease outbreak is known to have a psychological impact on healthcare workers as well as the general population. With Malaysia now in a war against a global pandemic, the national healthcare system is on the verge of collapse, affecting not just the patients, but also the healthcare worker. As part of the effort to explore this issue, a retrospective cross-sectional study was conducted in Kangar District Health Office and Kangar Health Clinic to assess the psychological effects and physical symptoms of healthcare worker during COVID-19 outbreak. A survey on healthcare workers was conducted by a using self-administered questionnaire. The questionnaire was divided into four main sections; 1] demographic characteristic, 2] medical history, 3] symptom prevalence and 4] Depression Anxiety Stress Scale (DASS-21). Scoring system was used to assess Stress, Anxiety and Depression. The data was analyzed descriptively and using linear regression. Overall, the majority of the health care workers experienced normal psychological disturbance during this pandemic. All three physical symptoms (insomnia, headache and neck stiff) are also significantly associated with stress, anxiety and depression ($p<0.01$). While the reported COVID cases in Perlis have always been lower than national average, this study nevertheless recommends the provision for timely psychological support and interventions for healthcare workers who present with physical symptoms of stress and depression.

Keywords: COVID-19, healthcare worker, psychological effects

1. INTRODUCTION

Novel Coronavirus or COVID-19 was first discovered in Wuhan City of Hubei province. On 31 December 2019, the World Health Organization office in China was notified with one case of pneumonia of unknown etiology, then termed as coronavirus disease 2019 (COVID-19) (Chew et al., 2020). In depth investigations were conducted immediately, as the number of cases increased each day (Shah et al., 2020). On 1 January 2020, the World Health Organization had set up a Management Incident Support Team (MIST) at all three levels of the organization, declaring emergency level management to battle the outbreak (Gralinski & Menachery, 2020). COVID-19 had been declared as pandemic on 11 March 2020 due to the rapid spread (Chew et al., 2020). The separation of the virus affected many countries such as China, Japan, Italy and Malaysia.

COVID-19 is an infectious disease that can cause respiratory illness with symptoms such as cough, fever, sore throat and more severe cases is difficulty breathing that can lead to death. According to (Ahmad et.al, 2020) the first case of COVID-19 in Malaysia was reported on 25 January 2020. Rapid infection rate in society exponentially increases the number of positive cases in Malaysia. The total cumulative COVID-19 case reported in Malaysia are 751979 case and 5170 deaths, as of 30 June 2021 (Ministry of Health Malaysia, 2020). Meanwhile in Perlis, the first COVID-19 case reported on 11 March 2020, as of 30 June 2021 the latest number is 594 cases (Ministry of Health Malaysia, 2020).

Infectious diseases outbreak is known to have a psychological impact on healthcare workers as well as the general population (Chew et al., 2020). One example is stress. Stress is defined as an adverse relationship between the working environment and a person influenced by jobs that exceed the ability, knowledge and skills, resulting in psychological and physical problems. Meanwhile, data has shown that depression is the most common mental health problem among healthcare workers (Shechter et al., 2020). In China, more than 50% of healthcare workers reported stress and more than 70% had reported some form of distress during COVID-19 pandemic (Shechter et al., 2020). Mental health problems lead to severe issues such as loss of focus on tasks, reduction of work productivity and

even the manifestation of physical illness. Thus, the aim of this study is to determine the association between physical symptoms and psychological distress amongst healthcare workers in Kangar, Perlis during COVID-19 outbreak. This is carried out by first determine psychological effects among healthcare workers during COVID-19 pandemic and followed by identify the physical symptom experienced by healthcare workers during COVID-19 pandemic and finally determine the association between psychological effect and physical symptom experience by healthcare workers during COVID-19 pandemic.

2. MATERIALS AND METHODS

2.1. Study Location

There are 47 health facilities in Perlis including hospitals, health clinics, and international border checkpoint and district health office. This study was conducted in Kangar District Health Office and Kangar Health Clinic. These two health facilities were selected as they are currently the main screening, investigation and contact tracing center during COVID-19 pandemic. Healthcare workers Kangar District Health Office carry out investigation and contact tracing. Kangar Health Clinic performs COVID-19 health screening.

2.2. Study Design

The study design is a cross-sectional study focusing on the psychological effects and physical symptom experienced by healthcare worker during COVID-19 pandemic.

2.3. Study Population

The study populations are healthcare workers involved in COVID-19 treatment and prevention activities. This involved two main healthcare facilities in Kangar, which are Kangar District Health Office and Kangar Health Clinic. There are 150 staff from all, sectors of healthcare such as doctors, assistant environmental health officer, nurse and medical assistant officer. The respondents will be healthcare workers who are directly involved in screening, case investigation and contact tracing related to COVID-19.

2.4. Sampling Method

The sampling method for this research was purposive sampling. Respondents were chosen among the group of healthcare workers that are involved in COVID-19 tasks. This purposive sampling method was chosen in order to reduce the time constraints that the researcher face during data collection, especially in light of COVID-19 pandemic. Respondents were approached personally and asked to answer all the given self-administered questionnaires once consent was given.

2.5. Sample Size

Sample size was calculated based on the most conservative expected rate of 50% and margin error of 3% with a 95% confidence level. Sample size required for 150 healthcare workers for accuracy level of 0.95 with a margin error 5.0% is 192 as shown below.

n = where,

n =Z*Z [P (1-P) / (D*D)]

n = 1.960 * 1.960 [0.5 (1-0.5) / (0.05 * 0.05)]

n = 1.960 * 1.960 [0.5 (0.5) / (0.00025)]

n = 192

Adjustment for the size of the population,

S = n / [1+ (n / population)]

S = 192 / [1 + (192 / 150] = 84.11

The total sample size for this study was rounded off to 84 respondents.

2.6. Data Collection

The data collection (refer to Figure 1) was conducted from 7 September 2020 until 28 September 2020. The data collection took place on working days (Monday – Friday) at 8.00 am until 11.00 am.

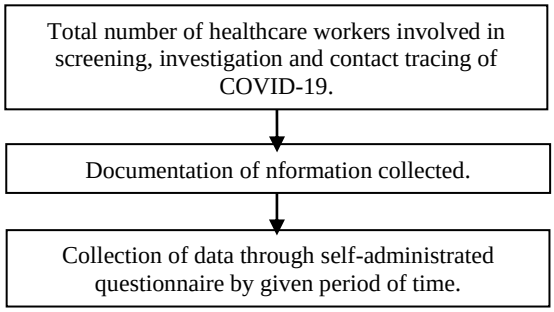

Figure 1. The workflow of data collection.

2.7. Questionnaire

The research data was collected using a self-administrated questionnaire. The questionnaire was obtained from the previous studies related to psychological outcome and associated physical symptoms among healthcare workers (Chew et al., 2020). The structured questionnaires consist of questions on psychological and physical effects. The questionnaire was divided into four main sections; 1] demographic characteristic, 2] medical history, 3] symptom prevalence and 4] Depression Anxiety Stress Scale (DASS-21). In part A, the demographic data of respondents were collected including age, gender, marital status, ethnicity and occupation. For part B, the medical history of respondents was recorded. In Part C, respondents indicated their experience of any of the 16 listed physical

symptoms. Lastly for part D, mental health status was recorded through the DASS-21.

2.8. Data Analysis

The scoring for each 21 questions in the questionnaire were calculated with the scale from 0-4. The rating scales were shown in Table 1:

Table 1. The scoring for DASS-21 questionnaire.

No	Classification	Score
1.	Did not apply to me at all	0
2.	Applied to me to some degree, or some of the time.	1
3.	Applied to me to a considerable degree or a good part of time.	2
4.	Applied to me very much or most of the time.	3

The total score for Stress was sum-up from the scores from Q1, Q6, Q8, Q11, Q12, Q14 and Q18 from the DASS-21. Meanwhile, the total score for Anxiety was sum-up from the scores from Q2, Q4, Q7, Q9, Q15, Q19 and Q20 from the DASS-21. Thus. the total score for Depression was sum-up from the scores from Q3, Q5, Q10, Q13, Q16, Q17 and Q21 from the DASS-21. The data collected was analyzed by using SPSS 21.0 for Windows. Descriptive statistics such as, frequency, percentage, mean and standard deviation were used to summarize and describe the socio-demographic of respondents. Relationship between psychological effects and physical symptoms were obtained using linear regression analysis.

2.9. Reliability Analysis

To ensure the reliability of the scales, internal consistency confirmation of the scales was performed by checking the Cronbach's alpha coefficient. The cut-off points for measuring the reliability for this study is coefficient alpha of above 0.70 as recommended by Nunnally and Berntein (1994) and Nunnally (1978).

Table 2 exhibits the Cronbach coefficient alpha of the variables that id DASS-21 scale. DASS scale demonstrate the high Cronbach's alpha that were greater than 0.80.

Table 2. Reliability coefficients for variables

Variables	N of Item	Cronbach's Alpha
Stress	7	0.849
Anxiety	7	0.882
Depression	7	0.833

3. RESULTS AND DISCUSSION

This chapter discusses the data analyses and reports on the statistical testing results. Firstly, the profile of the respondents is described. This is followed by the presentation of the analysis of independent and dependent variables. Lastly, it is followed by the results of descriptive analysis and correlation analysis. This section discusses the data screening procedures, which includes the detection of missing data and detection of outliers.

3.1. Detection of Missing data

Missing data for this study was reduced by checking for errors in all the variables at the point of time they were collected. For the surveys, any unanswered questions were referred back to the respondent. To ensure that all the data were cleaned, frequency distribution and missing value analysis for each variable were conducted. There was no missing data reported

3.2. Outliers

Outliers are cases that have data values that are very different from the data values for the majority of cases in the data set. Outliers are important because they can change the results of our data analysis. Whether we include or exclude outliers from a data analysis depends on the reason why the case is an outlier and the purpose of the analysis. This study employed the Mahalanobis D2 to detect outliers. Mahalanobis D2 is a multidimensional version of a z-score. It measures the distance of a case from the centroid (multidimensional mean) of a distribution, given the covariance (multidimensional variance) of the distribution. A case is a multivariate outlier if the probability associated with its D2 is 0.001 or less. D2 follows a chi-square distribution with degrees of freedom equal to the number of variables included in the calculation. Data in this study shows that no cases with D2 score probability (p) less than 0.001. Thus, no is treated as outliers and none of them were deleted from the data.

3.3. Background of the Respondents

A total of 84 respondents answered the questionnaire. Table 3 characterizes the respondents according to their demographic background. From the total of 84 respondents, 45.2 percent each were aged between 20 to 30 and 31 to 40 years old. Most of them were male (57.1%). The healthcare workers participating in this study were doctors (14.3%), assistant environmental health officers (44.0%), medical assistant officers (17.9%) and nurses (23.8%). All of the respondents were Malays and the majority of them were married (76.2%).

Table 4 establishes the medical history of the respondents. Table 4 revealed that almost all of the respondents have no comorbidity (90.5%). Only a small percentage of the respondents indicated that they have diabetes history (2.4%) and hyper-tension (7.1%). This could be due to the relatively young mean age of respondent most of whom below 40 years old.

Table 3. Demographic background of the respondents

Sociodemographic Variable	Frequency	Percentage
Age (Years)		
20-30	38	45.2
31-40	38	45.2
41-50	6	7.1
51-60	2	2.4
Gender		
Male	48	57.1
Female	36	42.9
Occupation		
Doctor	12	14.3
Assistant Environmental Health Officer	37	44.0
Medical Assistant Officer	15	17.9
Nurse	20	23.8
Ethnic		
Malay	84	100.0
Chinese	-	-
Indian	-	-
Marital Status		
Single	20	23.8
Married	64	76.2
Divorced	-	-

Table 4. Medical history of the respondents

Comorbidity	Frequency	Percentage
No History	76	90.5
Diabetes	2	2.4
Hyper tension	6	7.1

Table 5. Physical symptom experienced by respondents

Symptoms	Frequency	Percentage
Throat pain	-	-
Nausea/vomiting	-	-
Anxiety	-	-
Insomnia	21	25.0
Poor appetite	-	-
Headache	43	51.2
Neck stiff	11	13.1
Cough	-	-
Sputum	-	-
Breathlessness	-	-
Coryza	-	-
Joint muscle	-	-
Rashes	-	-
Itching	-	-
Watery eyes	-	-

3.4. Physical Symptom

Based on the question regarding physical symptoms experienced by the respondents, it indicates that the respondents only experience insomnia (25.0%), headache (51.2%) and neck stiff (13.1%) (refer to the Table 5). The respondents have never experienced another physical symptom.

Table 6 summarized the physical symptoms experienced by respondents according to gender and occupation. Most of male respondents experienced insomnia and headache, while neck stiffness was mostly experienced by female respondents. Data also indicated that the physical symptoms were experienced mainly by assistant environmental health officers.

Table 6. Physical symptom by demographic background

Demographic Background	Insomnia	Headache	Neck Stiff
Gender			
Male	11	29	4
Female	10	14	7
Occupation			
Doctor	4	5	1
Assistants Environmental Health Officer	14	25	10
Medical Assistant Officer	0	5	0
Nurse	3	8	0

3.5. Psychological Effect among Healthcare Workers

Psychological effect was measured using 21 items of the Depression Anxiety Stress Scale (DSS). The total score of the scale was computed and categorized into five categories: 1] normal, 2] mild, 3] moderate, 4] severe and 5] extremely severe. Table 7 summarized the psychological effect experienced by all the respondents

The majority of the respondents experienced a normal level of stress (48.8%), anxiety (56.0%) and depression (48.8%). A smaller percentage reported mild levels of stress (26.2%), anxiety (32.1%) and depression (32.1%). Meanwhile, very few respondents experienced moderate stress (10.7%), anxiety (11.9%) and depression (1.2%). However, 12 respondents reported severe level of stress and 1 had severe symptoms of depression.

Table 7. Psychological effect experienced by healthcare workers

	Frequency (Percentage)		
	Stress	Anxiety	Depression
Normal	41 (48.8%)	47 (56.0%)	41 (48.8%)
Mild	22 (26.2%)	27 (32.1%)	27 (32.1%)
Moderate	9 (10.7%)	10 (11.9%)	15 (17.9%)
Severe	12 (14.3%)	-	1 (1.2%)
Extremely Severe	-	-	-

3.6. Association between Physical Symptom and Psychological Effect

Linear regression was carried out to examine the relationship between physical symptom and psychological effects. Results of linear regression were summarized in Table 8. Out of 15 physical symptoms listed, only three of them were experienced by the respondents. Hence, only these three physical symptoms were taken as the indicator to affect the psychological effect. As established in Table 8, physical symptom significant relation were 96.2 % of stress (R^2 = 96.2, F = 667.328, $p<0.01$), 81.3 % of anxiety (R^2 = 0.813, F = 116.149, $p<0.01$) and 91.4 % of depression (R^2 = 91.4, F = 285.105, $p<0.01$). All three physical symptoms (insomnia, headache and neck stiff) were also established to be associated with stress, anxiety and depression ($p<0.01$).

Table 8. Association between physical symptom and psychological effect

	Stress		Anxiety		Depression	
	B	t	B	t	B	t
Insomnia	0.523	15.772**	0.667	9.126**	0.544	11.00**
Headache	0.465	17.509**	0.522	8.928**	0.628	15.874**
Neck Stiff	0.162	5.488**	-0.300	-4.590**	-0.154	-3.491**
R^2	96.2		0.813		0.914	
Adjusted R^2	0.960		0.816		0.611	
F	667.328		116.149		285.105	

3.7. Psychological Effect

The first objective was to identify psychological effects, including stress, anxiety and depression experienced by healthcare workers during pandemic. This study found that the majority of the respondents only experience the normal psychological disturbance during this pandemic. This finding contradicted a previously reported study that indicated psychological impact (stress, anxiety and depression) was more common among healthcare workers especially physicians during COVID-19 pandemic (Elbay et al., 2020).

Perlis recorded the lowest number of COVID-19 cases in the country. The number of healthcare workers experiencing the psychological effects were less as the state of Perlis recorded the lowest number of COVID-19 cases. As in the previous study, healthcare workers in Wuhan province reported a higher number of stress and depression compared to healthcare workers in Hubei province (Lai et al., 2020).

3.8. Physical Symptoms

The second objective was to identify the physical symptoms experienced by healthcare workers during pandemic. The study found that the healthcare workers especially in Perlis only experienced three physical symptoms: 1] insomnia, 2] headache and 3] stiff neck. The most prevalent symptom reported in this research was headache. A recent research on usage of personal protective equipment (PPE) among healthcare professionals during the COVID-19 pandemic found that 81% of respondents experienced PPE-related headaches, with a prior main headache diagnosis being an independent predictor of PPE-related (Ong et al., 2020). In the research, insomnia also reported. The poor quality of sleep among frontline especially nurse during COVID-19 pandemic (Cai et al., 2020). Apart from that, neck stiffness was also the most commonly reported symptom among *Severe Acute Respiratory Syndrome SARS* survivors in both healthcare workers and the general population in previous investigations (Lam., 2017). Neck stiffness was one of the most frequently reported symptoms among healthcare workers in the survey.

3.9. Relationship between Physical Symptom and Psychological Effect

The study found a significant relationship between physical symptoms with psychological effect among healthcare workers. The association of psychological distress and physical symptoms is parallel to the recent studies of psychological impact of COVID-19 (Li et al., 2020; Kang et al., 2020). 12 respondents were experiencing severe stress disorder. Stress common physical symptom were headache, muscle tension, teeth grinding and stomach problem (Hassan & Asaad, 2020). As the previous study reported that posttraumatic headache PTH is significantly associated with the present of posttraumatic stress disorder PTSD (Roper et al., 2017).

3.10. Implications of the study

From a management perspective, this research offers valuable insight to the Ministry of Health; the entity who should concentrate their efforts on the causes of physical symptoms and psychological effects on healthcare workers during this outbreak. This is very important as

healthcare's in the frontlines to fight against the pandemics. They are also easily exposed to the virus that will endanger their family, friends and themselves.

3.11 Limitations and Suggestions for Future Research

This study has several limitations, and one of the limitations is that the study was correlational and not causal. As a result, the true cause-and-effect relationship could not be ascertained. Future research may wish to employ an experimental design to establish causality in which data can be collected several times during the research period. In this way, changes in physical symptoms and psychological effects can be better understood.

Another limitation relates to the generalizability of the findings due to the setting and sample selection. Since this study was conducted in the Health Facilities in Kangar, the findings may not be generalizable to other locations in Malaysia. Also, the study might suffer from the bias of acquiescence where participants tend to agree with the questions asked.

As this study focused on physical symptoms and psychological effects, demographic factors were not emphasized. Future research should take demographic factors into consideration. Previous studies on mobile phone indicated that the demographic factors affected physical symptoms and psychological effects. Hence, this study used these factors, as the controlled variables.

4. CONCLUSION

During the ongoing COVID-19 outbreak, healthcare workers had experienced a wide range of physical symptoms, according to this study. There is a strong association between physical symptoms and psychological distress. The study recommends the provision for timely psychological support and interventions for healthcare workers who present with physical symptoms once an infection has been excluded. This study also contributes to current knowledge on physical symptoms and the prevalence of psychological distress.

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