

# Psychological impact amongst patients with COVID-19 in Perak state

Tsui Huei Loo, MMed Psych<sup>1</sup>, Arvinder-Singh HS, MSc Health Research<sup>2</sup>, Yit Chiang Ang, MBBS<sup>1</sup>, Yik Hoe Kong<sup>1</sup>, Vikram S Suarn, MMed Psych<sup>1</sup>, Rakesh Sharma, MRC Psych<sup>1</sup>

<sup>1</sup>Department of Psychiatry and Mental Health, Hospital Raja Permaisuri Bainun, Ipoh, Malaysia, <sup>2</sup>Department of Community Health, Faculty of Medicine, Universiti Kebangsaan Malaysia, Selangor, Malaysia

## ABSTRACT

**Introduction:** Psychological distress had been documented since the beginning of the COVID-19 outbreak in 2019. The aim of the study is to describe the psychological impact among those who were hospitalized for COVID-19 infection within 6 months after being discharged from the hospital. The psychological impact in this study is defined as depression, anxiety, and stress.

**Materials and methods:** This was a cross-sectional study conducted from July 2020 till August 2021 in a regional state hospital, north of Malaysia. All patients requiring hospitalization for COVID-19 were approached within the first 2 weeks after admission to administer the Depression, Anxiety and Stress Scale – 21 Items (DASS-21) scale. Follow-up phone calls were made within 3 months of discharged to enquire about the DASS-21 items as well as the Impact of Event Scale-Revised (IES-R) scale items. Participants above the age of 18 and technology savvy to answer an online questionnaire were recruited for the study. We excluded participants with a known history of psychotic disorder from the study. We utilised the DASS-21 to screen for depression, anxiety, and stress, as well as the IES-R to identify symptoms of post-traumatic stress disorder. Participants could answer the questionnaires in either English or Bahasa Malaysia. For comparison of two categorical data, a chi-square was applied. A univariate analysis was first conducted and all variables with a  $p \leq 0.3$  was then entered into the multivariate analysis for the final output. Other than the univariate analysis, all other  $p$  values  $< 0.05$  were considered to be statistically significant. All data collected were tabulated and analysed in the SPSS v21.0 system.

**Results:** A total of 306 out of 696 COVID-19 patients responded. The mean age for the participants was 31.69 (SD:11.19) years old. From the total, 54.2% were ladies, 78.8% were Malay, 50.7% were unmarried, 55.2% had higher education, and 67.6% were employed at the time of the survey. We found 20.5% of the participants were depressed, 38.9% had moderate anxiety, and 17.3% were stressed. From the total, 31.7% of the participants were deemed to have had some symptoms of post-traumatic stress disorder (PTSD) ranging from mild to severe. From the final multivariate analysis, it was found that depression ( $p=0.02$ ) had a 2.78 times likeliness of having PTSD, anxiety ( $p<0.001$ ) had a 3.35 times likeliness of having PTSD and stressed patients ( $p=0.02$ ) 2.86 times likeliness of having PTSD when compared to those without PTSD.

**Conclusion:** Patients reported to suffer from symptoms of PTSD and might benefit from psychological interventions to mitigate the impact in the long run.

## KEYWORDS:

COVID-19, mental health, anxiety, depression, stress, PTSD

## INTRODUCTION

The World Health Organization (WHO) declared COVID-19 as a Public Health Emergency of International Concern on 30 January 2020 and a pandemic on 11 March 2020 when the life-threatening coronavirus disease (COVID-19), caused by the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) spread rapidly from China to more than 222 countries and territories since December 2019.<sup>1</sup> Over time, there are also emerging new variants which have been observed to be more infectious, contagious, and more likely to cause breakthroughs or even re-infections to those who have been vaccinated or have been infected previously. Till now, Malaysia has reported a total of 2,754,513 local cases (as of 31 December 2021), with recovered 2,677,406 patients and 31,462 deaths due to COVID-19 infections.<sup>2</sup> In the state of Perak, a total of 128,864 (as of 31 December 2021) patients were diagnosed with COVID-19 infection with 108,396 recovered and 1,393 deaths (<http://COVID-19.moh.gov.my/>).<sup>3</sup> Patients with Category 3 and above were admitted to COVID-19 hospitals within the state of Perak, whilst those with mild or no symptoms were quarantined at home.

The COVID-19 pandemic has been found to be associated with psychological distress and symptoms of mental illness.<sup>4</sup> Implementation of movement control orders to control the spread of virus had a profound impact on people's daily activities. People are forced to live in isolation, leading to changes in their daily lives, loss of jobs, financial difficulties, and grief over death of loved ones. Similarly, the psychological impact of being infected with COVID-19 itself has also affected the mental health and well-being of many. The majority of the published research focused on the psychological response during the COVID-19 outbreak among healthcare workers,<sup>5</sup> the general public<sup>6</sup> and the vulnerable groups like elderly people, pregnant mothers, underlying medical condition, children, and migrants. There is more evidence of post-traumatic stress symptoms following COVID-19 infection. Online surveys conducted by Sun et al<sup>7</sup> found the prevalence of post-traumatic stress symptoms (PTSS) 1 month after the COVID-19 outbreak was 4.6% and

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Corresponding Author: Tsui Huei Loo

Email: tsuihuei@gmail.com

7% reported in China's hardest-hit areas.<sup>8</sup> A recent review among the 236 379 survivors of COVID-19 found the estimated incidence of a neurological or psychiatric diagnosis in the following 6 months was 33.62% (95% CI 33.17-34.7) with 17.39% (95% CI 17.04-17.74) fulfilled the diagnosis of anxiety disorder.<sup>9</sup> However, studies on mental health of hospitalized patients with COVID-19 after being discharged from the hospital, particularly on post-traumatic stress disorders (PTSDs) are still scarce.

Psychological factors, particularly among those who were hospitalized for COVID-19, such as fear of their illness progression, disability, and even stigma are valuable information to mitigate the impact of mental health in longer terms. Thus, it is vital to investigate the related factors of depression, anxiety, stress, and even PTSD (within 6 months) and delayed onset PTSD (6 months after exposure of an event) among patients infected with COVID-19. Evidence has shown that the initial phase of the pandemic, prevalence of significant post-traumatic stress symptoms in the patients discharged from the quarantine facilities was at a staggering high 96.2%.<sup>10</sup>

The objective of this study was to understand the psychological impact through evaluation on COVID-19 patients who were hospitalized in the state hospital of Hospital Raja Permaisuri Bainun, Ipoh.

The study defines psychological impact as depression, anxiety, and stress.

The findings may assist in providing a holistic intervention, including psychological intervention, in improving the physical and mental health of the patients during the COVID-19 pandemic. It may also enable policymakers and mental health care providers to tailor the needs of the survivors.

## MATERIALS AND METHODS

### Study design

This is a cross-sectional study which was conducted over 13 months from July 2020 till August 2021 in the northern regional state hospital, Hospital Raja Permaisuri Bainun Ipoh, Perak. All patients who required hospitalization for COVID-19 and subsequently discharged were approached for the study. The study was approved by the Malaysia medical research and ethics committees on the 9 July 2020 with NMRR-20-1053-54983.

Participants were informed about the research through telephone when they were contacted by the Mental Health Psychosocial and Support team from the Department of Psychiatry and Mental Health of the hospital for psychological first aid within the first 2 weeks after their admission (DASS-21 scale items were used). Follow-up phone calls were made within 3 months of discharge to enquire about the DASS-21 items as well as the Impact of Event Scale-Revised (IES-R) scale items. To be eligible, participants had to be 18 years or above and were literate to answer online questions in either language, i.e., Bahasa Malaysia and English. The questions took approximately 10 minutes to complete. Participants who had a recent diagnosis of

psychotic disorder 4 weeks prior to recruitment were excluded from the study and was confirmed through electronic medical record.

### Study tool

The DASS-21 and Impact of Event Scale were used. DASS-21 Item is a self-report scale designed to measure the emotional states of depression, anxiety, and stress. Each score will provide a mild, moderate, or severe result. It consists of three 7-item subscales: anxiety (items 2, 4, 7, 9, 15, 19, and 20), stress (1, 6, 8, 11, 12, 14, and 18), and depression (items 3, 5, 10, 13, 16, 17, and 21). Subjects are asked to use 4-point severity/frequency scales ranging from 0 (Did not apply to me at all) to 3 (Applied to me very much, or most of the time) to rate the extent to which they have experienced each state over the past 1 week. Scores for Depression, Anxiety, and Stress are calculated by summing the scores for the relevant items. The subscales scores can be allocated on one of five levels of severity, for depression, normal (0–9), mild (10–13), moderate (14–20), severe (21–27), and extremely severe (28+); for anxiety, normal (0–7), mild (8–9), moderate (10–14), severe (15–19), and extremely severe (20+); and for stress, normal (0–14), mild (15–18), moderate (19–25), severe (26–33), and extremely severe (34+).<sup>11</sup> The DASS-21 has been previously used in COVID-19-related research<sup>15</sup> and has shown high internal consistency.

The IES-R has been one of the most widely used self-report scales within the trauma literature.<sup>12</sup> It was not developed as a diagnostic tool for PTSD; however, its discriminative validity suggests that the measure can differentiate between individuals with and without PTSD. Both scales are validated in Bahasa Malaysia (BM).

Data on PTSD were collected using the 22-items IES-R (English version) or 19-item (BM version). The IES-R is a 22-item self-administered questionnaire designed to assess subjective distress caused by traumatic events in the past 7 days. Items are rated on 5-point scale ranging from 0 (not at all or hardly ever) to 4 (extremely). Scale scores are formed for the three subscales that measure the three main symptoms of PTSD: intrusion (items 1, 2, 3, 6, 9, 14, 16, and 20), avoidance (items 5, 7, 8, 11, 12, 13, 17, and 22), and hyperarousal (items 4, 10, 15, 18, 19, and 21). The IES-R yields a total score (ranging from 0 to 88) and subscale scores can also be calculated for the Intrusion, Avoidance, and Hyperarousal subscales. It does not serve as a diagnostic tool for PTSD.<sup>13</sup> The Bahasa Malaysia IES-R has 19 items and shows good model fit (RMSEA=0.056, SRMR=0.058, CFI=0.933, TLI=0.923) and composite reliability (Psychological=0.89, Behavioural=0.83). The English IES-R cut off points are as follows:

**24 or more:** PTSD is a clinical concern. Those with scores this high who do not have full PTSD will have partial PTSD or at least some of the symptoms

**33 and above:** This represents the best cut-off for a probable diagnosis of PTSD

**37 or more:** This is high enough to suppress your immune system's functioning (even 10 years after an impact event)

### Sampling

For the time period stated, Perak had witnessed 37,421 cases in total (hospitalised and unhospitalised). Using the Raosoft

Calculator (available free at: <http://www.raosoft.com/samplesize.html>), we calculated a sample size based on the proportion to population. Setting the margin of error at 5%, the confidence interval at 95%, the population size as 37,421 and the distribution at 50%, the sample size needed for this study was 381. The researchers could not identify from the records in total how many patients were admitted in the hospital specifically for COVID-19 as it was done based on availability. However, the researchers chose the total number (37,421) for the sample size calculation (an obvious overestimate).

### Data collection

The patient information sheet was shared with participants using a google form with an informed consent form attached. Patient information sheet was shared with participants using an e-form and google form with an informed consent form appended to it. Participants who indicated "YES" on consent section were directed to the two sets of self-report questionnaires: DASS-21 to assess the psychological impact of the disease and IES-R. Participants were encouraged to answer the questionnaires within 3 months of discharge from the hospital. The responses were captured in the excel sheet and later imported into SPSS v21.0 for final analysis. The data were collected and were analysed by the principal investigator and two co-authors.

### Statistical analysis

Data were initially collated into an Excel spreadsheet and were later imported into the SPSS v21.0 software for final analysis. We analysed the categorical data as frequencies and percentages whilst the continuous data as mean and standard deviation (for parametric data) or median and inter-quartile range (for nonparametric data). The Chi-square test was used to compare two categorical data and for further advanced analyses of the relationship between PTSD and relevant demographic details. A univariate analysis was first conducted and all variables with a  $p \leq 0.3$  was then entered into the multivariate analysis for the final output. Other than the univariate analysis, all other  $p$  values  $< 0.05$  were considered to be statistically significant.

In this study, score of 24 and above was considered as having PTSD for the binary regression analysis (both for the English and BM questionnaire).

## RESULTS

### Response rate

The researchers approached 696 individuals who fulfilled the inclusion criteria, and the final number recruited into the study was 306, with a response rate of 43.97%. This response rate provided 80% of the intended sample size. Two hundred and forty-one respondents (78.8%) were Malay, 155 (50.7%) were single, 169 (55.2%) had higher education, and 207 (67.6%) were employed at the time of the survey.

### Demography

From the total of 306 participants, 89.2% of them answered the questionnaire in Bahasa Melayu. The mean age for the participants was 31.69 (SD:11.19) years old. There was a near equal breakdown of both genders with the females edging out the males by being 54.2% of the sample population. From the

total, 241 (78.8%) were Malay, 155 (50.7%) of them were single, 169 (55.2%) of them had higher education, and 207 (67.6%) of them were employed at the time of the survey. The only continuous variable in the demography was the variable "age" and it was distributed normally. Thus, it was reported as mean and SD (standard deviation). Details of the demographic characteristics of the participants are shown in Table I.

### Measurement of the DASS-21 and IES-R scales

Table II describes the results obtained from the DASS-21 and IES-R scales. From the total, 63 (20.5%) of the participants were depressed, 119 (38.9%) had anxiety with moderate in severity and 53 (17.3%) were stressed. From the total, one-third (31.7%) of the participants were deemed to have some amount of PTSD (ranging from mild to severe).

### Analytical analysis

For the analysis of the DASS-21 scale, the researchers clumped the "Normal and Mild" symptoms together as it was clinically relevant that these participants were observed without further treatment. Participants with "Moderate to Extremely Severe" were given treatment.

### Depression compared to PTSD

Table III displays the relationship between depression and PTSD. From the table, we can see that 27.0% of those with depression did not suffer from PTSD. The largest proportion of those with extreme depression (89.5%) also had suffered from PTSD, and it is statistically significant ( $p < 0.001$ ). When a chi-square was conducted amongst the two groups, it yielded a statistically significant difference ( $p < 0.001$ ). From the eye-ball method, we can be assured that there is an 79.0% (sensitivity) chance of not having PTSD and if there is depression, there is a 73.0% (specificity) chance of having PTSD. An receiver operating characteristic (ROC) analysis done showed a 69.6% area under the curve (AUC) making the depression scale a moderate to good predictor of PTSD. Details of the analyses are shown in Tables III and IV.

### Anxiety compared to PTSD

Table III also compares the results of the anxiety status with the PTSD status. The clumped analysis shows that 50 (42.0%) suffered from anxiety and had no PTSD. From the fragmented analysis of anxiety (Table 5), 34 (75.6%) with extremely severe anxiety also had PTSD. Chi-square analysis demonstrated a statistically significant difference between the 2 groups ( $p < 0.001$ ). From the eye-ball method, we can see that the sensitivity of the anxiety scale is 85.0% and the specificity is 58.0%. The ROC analysis yielded an AUC of 73.6% which was moderate to good PTSD predictor using the anxiety scale. Full details of the results can be shown in Tables V and VI.

### Stress compared to PTSD

When comparing the category "Stress" to PTSD utilising the DASS-21 scale, we found that 22.6% of those with PTSD had no stress and 81.9% of those who were extremely stressed had PTSD. The sensitivity analysis showed that the stress scale was 77.9% sensitive and 77.4% specific. The AUC was 68.3% which was a moderate to good predictor of PTSD. Full details of the results are listed in the Table IV.

Table I: Demography of the participants in the study

Variable		n (%) N=306
Answered in		
BM		273 (89.2)
English		33 (10.8)
Age	mean (SD)	31.69 (11.19)
Gender		
Male		140 (45.8)
Female		166 (54.2)
Race		
Malay		241 (78.8)
Chinese		27 (8.8)
Indian		35 (11.4)
Others		3 (1.0)
Marital status		
Single		155 (50.7)
Married		138 (45.1)
Separated/ Divorced		11 (3.6)
Widowed		2 (0.7)
Highest education attained		
No formal education		6 (2.0)
Primary school		6 (2.0)
Secondary school		125 (40.8)
Higher education		169 (55.2)
Employment status		
Employed		207 (67.6)
Self-employed		26 (8.5)
Retired		6 (2.0)
Unemployed		67 (21.9)

Table II: The analysis of the DASS-21 Scale measuring Depression, Anxiety, and Stress with the IES-R scale measuring for the presence of PTSD

Variable		n (%) N=306
Depression		
Normal- Mild		243 (79.5)
Depressed		63 (20.5)
Moderate		31 (10.1)
Severe		13 (4.2)
Extremely severe		19 (6.2)
Anxiety		
Normal- Mild		187 (61.1)
Anxious		119 (38.9)
Moderate		50 (16.3)
Severe		24 (7.8)
Extremely severe		45 (14.7)
Stress		
Normal- Mild		253 (82.7)
Stressed		53 (17.3)
Moderate		25 (8.2)
Severe		17 (5.6)
Extremely severe		11 (3.6)
IESR		
Normal		209 (68.3)
PTSD		97 (31.7)

**Table III: The comparison of Depression and Anxiety status (fragmented and clumped) and the PTSD status**

Variable	Depression N (%)					p value
	Normal	Mild	Moderate	Severe	Extremely severe	
IESR						
Normal	177 (82.3)	15 (53.6)	12 (38.7)	3 (23.1)	2 (10.5)	<0.001
PTSD	38 (17.7)	13 (46.4)	19 (61.3)	10 (76.9)	17 (89.5)	
Variable	Normal to Mild		Moderate to Extremely severe			p value
IESR						
Normal	192 (79.0)		17 (27.0)			<0.001
PTSD	51 (21.0)		46 (73.0)			
Variable	Anxiety N (%)					p value
	Normal	Mild	Moderate	Severe	Extremely severe	
IESR						
Normal	139 (88.0)	20 (69.0)	32 (64.0)	7 (29.2)	11 (24.4)	<0.001
PTSD	19 (12.0)	9 (31.0)	18 (36.0)	17 (70.8)	34 (75.6)	
Variable	Normal to Mild		Moderate to Extremely severe			p value
IESR						
Normal	159 (85.0)		50 (42.0)			<0.001
PTSD	28 (15.0)		69 (58.0)			

**Table IV: The comparison of Stress status (fragmented) and the PTSD status**

Variable	Stress N (%)					p value
	Normal	Mild	Moderate	Severe	Extremely severe	
IESR						
Normal	184 (81.4)	13 (48.1)	7 (28.0)	3 (17.6)	2 (18.2)	<0.001
PTSD	42 (18.6)	14 (51.9)	18 (72.0)	14 (82.4)	9 (81.9)	
Variable	Normal to Mild		Moderate to Extremely severe			p value
IESR						
Normal	197 (77.9)		12 (22.6)			<0.001
PTSD	56 (22.1)		41 (77.4)			

**Table V: The binary logistic regression (univariate and multivariate analysis) of those with PTSD with the relevant demographic variables**

Variable	OR (95%CI)	p value	AOR (95%CI)	p value
Age	0.97 (0.95–1.00)	0.03	0.99 (0.96–1.03)	0.62
Gender				
Male	Ref	0.12	Ref	0.44
Female	1.48 (0.91–2.42)		1.27 (0.70–2.28)	
Race				
Malay	>1000	0.73		
Chinese	>1000			
Indian	>1000			
Others	Ref			
Marital status				
Single	1.76 (1.06–2.91)	0.16	1.09 (0.51–2.36)	0.90
Married	Ref		Ref	
Separated/ Divorced	1.10 (0.28–4.39)		0.58 (0.11–2.99)	
Widowed	2.94 (0.18–48.31)		1.43 (0.03–61.39)	
Employment status				
Employed	1.00 (0.56–1.80)	0.95		
Self-employed	0.75 (0.27–2.06)			
Retired	<0.001			
Unemployed	Ref			
Highest education attained				
No formal education	0.54 (0.06–4.75)	0.41		
Primary school	1.34 (0.23–7.64)			
Secondary school	Ref			
Higher education	1.47 (0.89–2.44)			
Depression				
Normal-Mild	Ref	<0.001	Ref	0.02
Moderate- Extremely severe	10.19 (5.39–19.25)		2.78 (1.21–6.36)	
Anxiety				
Normal-Mild	Ref	<0.001	Ref	<0.001
Moderate- Extremely severe	7.84 (4.56–13.48)		3.35 (1.74–6.46)	
Stress				
Normal-Mild	Ref	<0.001	Ref	0.02
Moderate- Extremely severe	12.02 (5.92–24.41)		2.86 (1.16–7.02)	

### Binary logistic regression

A binary logistic regression with the outcome of comparing those with PTSD and those who did not have PTSD with demographic variables. A univariate analysis was done first including all demographic variables with a comparison to the IES-R (to detect PTSD). Variables that had a  $p$  value of  $\leq 0.3$  were included into the final multivariate analysis. Demographic variables of age ( $p=0.03$ ), gender ( $p=0.12$ ), marital status ( $p=0.16$ ), depression ( $p<0.001$ ), anxiety ( $p<0.001$ ), and stress ( $p<0.001$ ) were the variables included into the multivariate analysis. Based on the final analysis, the likelihood of having PTSD is 2.78 times in depression ( $p=0.02$ ), 3.35 times in anxiety ( $p<0.001$ ), and 2.86 times in stressed patients ( $p=0.02$ ) compared to those without PTSD. The final model yielded a Nagelkerke R square 34.9% (meaning the model was 66.1% fit- moderate) and a Hosmer and Lemeshow Test  $p=0.61$  (not significant indicating a fit model). The full details are listed in Table V.

### DISCUSSION

Psychological responses towards the COVID-19 pandemic and its impact in every member in the society have been documented in many parts of the world since the outbreak.<sup>14</sup> In China, Wang et al<sup>15</sup> reported 53.8% of the respondents ( $N=1210$ ) rated the psychological impact of the outbreak as moderate or severe with 16.5% depressive symptoms, 28.8% anxious symptoms and 8.1% stress categorised under moderate to severe in severity. Italy, which was the first European country to implement a national lockdown to control the spread of virus found that out of 501 subjects, 35.33% of university students classified as anxious and 72.93% as depressed.<sup>16</sup> In the systematic review and meta-analysis, the prevalence of depression, anxiety, and PTSD was 15.9% (95% CI, 13.24-19.13), 15.5% (95% CI, 12.29-18.54), and 21.94% (95% CI, 9.37-43.31), respectively.<sup>14</sup>

Previous experiences of outbreaks like those caused by SARS, Ebola, and MERS-CoV contribute to heightening the impact of the present pandemic. Perrin et al<sup>17</sup> found that females are more affected than males. The less educated, single people, children, and adolescents, those who have no children reported high levels of stress, anxiety, depression, and psychological impact. These subgroups, considered at greater risk for adverse psychological outcomes during a public health crisis, may be experiencing low social and emotional support, increased perceived threat to well-being and feelings of fear, isolation, and uncertainty. In our study, the ratio of males to females was almost equal, but females were more affected than males, those who were widowed, employed, and had a higher education were more affected.

In our study, we used DASS-21 scale and IES-R to understand the level of psychological distress among participants who were hospitalized for COVID-19 infection. Being diagnosed to have COVID-19 causes a number of emotional and psychological dysregulation to patients as they are not only suffering from the respiratory symptoms, but also psychosocial factors like separation from family members and relatives, fear of complications, worry about people who may be infected, loss of income, loss of loved ones, and

discrimination associated with the infection may worsen their mental health. We found our participants who reported moderate to extremely severe, anxiety symptoms (moderate 16.3%, extremely severe 14.7%) are more prominent than depression (moderate 10.1%) and stress (moderate 8.2%). In one of the recent studies, Huang et al<sup>18</sup> found that COVID-19 survivors had anxiety or depression at 23% at 6-month visit and 26% at 12-month visit. In a cohort study by Huang et al<sup>19</sup>, 23% (367/1617) reported anxiety or depression after 6 months of COVID-19 infection.

PTSD can occur in people who have experienced a traumatic event and can be disabling. According to DSM-V,<sup>20</sup> clinical manifestations include recurrent and intrusive memories, flashbacks of the trauma, avoidance of trauma-related cues, and a variety of mood and dissociative as well as cognitive symptoms. In China, the majority reported worse psychological impact with overall mean IES-R scores more than 24 points, indicating the presence of PTSD symptoms.<sup>15,20,21</sup> In our study, the largest proportion of those who scored under the category of moderate to extremely severe depression (73.0%) is mostly experiencing prominent symptoms of PTSD ( $p<0.001$ ). Janiri et al.<sup>22</sup> found 115 (30.2%) with PTSD after acute COVID-19 infection. The data from the final multivariate analysis showed that participants who had depression ( $p=0.02$ ) had a 2.78 times likeliness of having PTSD. Similarly, participants who reported having anxiety ( $p<0.001$ ) had a 3.35 times likeliness of having PTSD. Participants who reported stress ( $p=0.02$ ) had a 2.86 times likeliness of having PTSD when compared to those without PTSD.

The strength of this study was the use of validated tools to analyse the impact of psychological distress. The online survey was not only feasible but also able to recruit patients during this critical moment in a safe manner. There are some limitations in the study. First, this study used online platform to collect responses from participants. Those who did not have telephone devices, understood the language, and were concerned about confidentiality could not respond to the study. Second, our study could only focus on the hospitalised participants in one centre. Third, responses from a different time frame after 1 month of diagnosis and discharge from the hospital may alter the level of intensity. Fourth, reporting bias cannot be excluded. Fifth, there is no control group for comparison in our study. Other factors like elderly people, poor internet access, migrant, or other minority groups might have missed out from the study. Therefore, the results do not represent psychological distress following COVID-19 in general.

### CONCLUSIONS

With the pandemic which is still ongoing, people continue to experience psychological distress in various intensity. Our study has found patients who were hospitalized for COVID-19 infection experienced depressive symptoms, anxiety symptoms, and stressed using DASS-21. And the scoring which falls under moderate to extremely severe is highly suggestive of post-traumatic stress symptoms. Therefore, mental health service providers need to provide resources and intervention to mitigate the impact.

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**DECLARATIONS OF INTEREST**

The authors had no competing interests to declare. The authors did not receive any funding for this study.

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