Risk and Protective Factors of Stress Level in COVID-19 Survivors

Rohmaningtyas Hidayah Setyaningrum[1], Indria Hafizah[1], Aris Sudiyanto[1], Ari Probandari[2], Eny Lestari[3]

[1]Department of Psychiatry, Faculty of Medicine, Sebelas Maret University, Surakarta, Indonesia,
[2]Department of Community Health, Faculty of Medicine, Sebelas Maret University, Surakarta, Indonesia,
[3]Department of Agricultural Communication and Extension, Faculty of Agriculture, Sebelas Maret University, Surakarta, Indonesia

Abstract

Aim: The level of mental emotional disorders in community has increased since the emergence of the COVID-19 pandemic. This study aimed to determine the risk factors and protective factors of the stress level of COVID-19 survivors. **Subjects and Methods:** This study used a descriptive analytic design with a cross sectional approach. A total of 66 respondents were involved in this study. Data were collected using a questionnaire consisting of: 1) Sociodemographic factors (age, sex, education level, COVID-19 wave and long COVID); 2) Risk factors (previous mental disorders, economic problems, substance use, loneliness, conflict in relationships and loss of important people); 3) Protective factors (spirituality, healthy eating patterns, physical activity, good sleep patterns and good personal relationships. Stress levels were measured using the Hopkins Symptom Checklist - 25 (HSCL - 25), where if the total score/ number of items ≥ 1.75 then categorized as experiencing stress disorder. For data analysis, SPSS Windows 25 was used. **Results:** The results of the descriptive analysis show that COVID-19 survivors were of the average age of 18-40 years old (78.8 %), female (80.3 %), had undergraduate education level (75.8 %), affected in wave II (45.5 %), felt loneliness (51.5 %), had conflict in their relationships (56.1 %), experienced continued effect of COVID (81.8 %), experienced anxiety (53 %), depression (56.1 %) and stress (57.6 %). The most influential factor on the stress level of COVID-19 survivors was sex (p = 0.032; OR: 0.189). **Conclusion:** There is no relationship between risk factors and protective factors on the stress level of COVID survivors. The most influential factor is the socio-demographic factor of sex.

Introduction

Based on data from the Ministry of Health dated October 7th, 2022, it was found globally that as many as 6,433,263 people in the world were confirmed positive with a death toll of 6,554,356 due to COVID-19. Based on the number of confirmed cases of COVID-19, Indonesia ranked 17th in the world where there were 6,267,721 positive cases, 17,697 people receiving treatment in hospital with 6,267,721 recoveries and 158,192 deaths. Central Java itself was ranked fourth out of 33 provinces [1,2].

Correspondence to:
Rohmaningtyas Hidayah Setyaningrum
Department of Psychiatry, Faculty of Medicine,
Sebelas Maret University
Jl. Ir. Sutami No. 36A Kentingan, Jebres,
Surakarta, Indonesia 57126
Phone: +6281226361555, E-mail: astitdr@staff.uns.ac.id

The incidence of COVID-19 (Coronavirus Disease 2019) in Indonesia began on March 2nd, 2020. COVID-19 originated from the SARS-COV-2 (Severe Acute Respiratory Syndrome Coronavirus 2) virus which infects and attacks the human respiratory system [3]. The spread of COVID-19 is very fast and widespread, especially by human-to-human spread, so it is classified as a global pandemic by the WHO. COVID-19 infection may or may not cause symptoms. Physical symptoms that appear are in the form of fever, cough, fatigue, loss of smell and taste and difficulty breathing. The COVID-19 pandemic causes distress due to the threat of being infected with the virus, behavioural adjustments, self-isolation/ social restrictions, economic crisis, loss of job opportunities, death of family members, uncomfortable physical symptoms after being infected, negative public stigma, information about COVID-19 from social media, which of course has an impact on mental health, especially psychological, for both those who have confirmed COVID-19 and those who have not [4-7].

Common stress-induced mental disorders during the COVID-19 pandemic include anxiety, loneliness, depression, sleep pattern changes, eating disorders, impaired concentration, confusion, frustration/ lost hope, rejection, withdrawal from society, somatization disorders, decreased academic performance, suicide, panic attacks, trauma, fear, drug abuse, and smoking addiction [8-12]. The group with the highest emotional mental disorder were COVID-19 survivors with moderate, severe, and critical symptoms and those who had been hospitalized. Mental disorders are triggered by the patient's response to stress resulting in symptoms of anxiety, hopelessness, deep sadness, symptoms of depression, sleep disturbances, and helplessness [13-16]. The University of Oxford conducted a study of 69 million people in the United States with 62,000 confirmed cases of COVID-19, showing that there were psychological problems in the form of anxiety, depression, and insomnia [17]. A cohort study of 1,284,437 people (people of the United States, Australia, Britain, Spain, Bulgaria, India, Malaysia and Taiwan) who were diagnosed with COVID-19 on January 20th, 2020 to April 13th, 2022, after 6 months of infection, symptoms such as anxiety disorders, cognitive deficits, dementia, encephalitis, epilepsy/ seizures, Guillain-Barre syndrome, insomnia, Parkinson's disease, mood disorders and psychotic disorders were found [15]. Symptoms of neuropsychiatric sequalae caused by COVID-19 will be present in both children and adults without comorbidities, even though the patient has been declared negative based on the results of the PCR swab. Symptoms that appear in patients who are declared cured are known as long COVID-19. Some studies stated that long Covid syndrome is still found for more than 60 days and even lasts for two years. Mood and anxiety disorders can heal within a month or two after COVID-19 infection [18-20].

It turns out that not all COVID-19 survivors experience physical or mental disorders that are triggered by stress. A study on survivors found that 62 % of the sample did not have a mental disorder and were able to get through adversity well [22]. The main factors that increase physical symptoms are age, respiratory disorders, cardiovascular disorders and comorbidities (obesity, diabetes, hypertension) [5,21].

The presence of psychological symptoms or not, may be due to risk factors or protective factors in people during pandemic, but there is still few that has been researched on COVID-19 survivors [23]. There is not much evidence to determine risk factors or protective factors of stress and the emergence of psychological disorders for COVID-19 survivors in Indonesia. The information obtained regarding risk and protective factors will be very useful for determining policies and strategies for prevention and therapy from the impact of long Covid on stress. This study aims to determine the risk factors and protective factors of the stress level of COVID-19 survivors.

Subjects and Methods

This study used analytical observational with cross sectional design. This design was chosen because it can find the relationship between risk factors and protective factors with stress levels in COVID-19 survivors. The population of this study was COVID-19 survivors who were members of a community group in Telegram named "COVID-19 Survivor" those are willing to fill the form given in the group chat. Health Research Ethics Commission at RSUD Dr. Moewardi Surakarta has stated that this research has passed the ethical test with the number 784/VI/HREC/2022.

The sampling technique used was purposive sampling, which was selected based on inclusion criteria: age 18 years and over, can speak Indonesian, and can use online applications. The sample size in this study was 66 people. The method used for data collection was by using an instrument provided through a Google Form in the form of a questionnaire consisting of: 1) Sociodemographic factors (age, sex, education level, wave of COVID-19 and long Covid); 2) Risk factors (previous mental disorders, economic problems, substance use, loneliness, conflict in relationships and loss of important people); 3) Protective factors (spirituality, healthy eating patterns, physical activity, good sleep patterns and good personal relationships); 4) The level of stress is measured using the Indonesian version of the Hopkins Symptom Checklist-25 (HSCL-25) which has been tested for validity and reliability and is used in various countries where if the total score/ number of items is ≥ 1.75 then the person is categorized as having a stress disorder [24,25]. The program used to analyze the data was the Statisti-

Table 1. Demographic Characteristics of Participants (n = 66)

Wave I: March 2020 – May 2021, Wave II: June 2021 – December 2021, Wave III: January 2022 – June 2022

Demographic Data (66 people)	Category	Frequency	Percentage (%)
Age	18 - 40 years old	52	78.8
	41 - 60 years old	13	19.7
	> 60 years old	1	1.5
Sex	Male	13	19.7
	Female	53	80.3
Level of education	High School	6	9.1
	Undergraduate	50	75.8
	Postgraduate >	10	15.2
COVID-19 wave	Wave I	12	18.2
	Wave II	30	45.5
	Wave III	8	12.1
	Wave I and Wave II	2	3.0
	Wave I and Wave III	6	9.1
	Wave II and Wave III	6	9.1
	Wave I, Wave II and Wave III	2	3.0
Previous Mental Disorders	No	61	92.4
	Yes	5	7.6
Economic problems	No	40	60.6
	Yes	26	39.4
Substance use	No	61	92.4
	Yes	5	7.6
Loneliness	No	32	48.5
	Yes	34	51.5
Conflict in relationships	No	29	43.9
	Yes	37	56.1
Loss of important people	No	52	78.8
	Yes	14	21.2
Spirituality	No	16	24.2
	Yes	50	75.8
Healthy diet	No	11	16.7
	Yes	55	83.3
Physical activity	No	23	34.8
	Yes	43	65.2
Good Sleeping Pattern	No	32	48.5
	Yes	34	51.5
Good Personal Relationships	No	23	34.8
	Yes	43	65.2
Further Impact of COVID-19 on mental health	No	12	18.2
	Yes	54	81.8
Anxiety	No	31	47
	Yes	35	53
Depression	No	29	43,9
	Yes	37	56,1
Stress	No	28	42,4
	Yes	38	57,6

In this table above, the word "and" means that the survivors are diagnosed with COVID-19 on that particular wave, for example: Wave I and Wave II means that the Survivors got infected with COVID-19 during Wave I and also Wave II.

Table 2. The Relationship between Sex and Long Covid with the Stress Level of COVID-19 Survivors

Sociodemographic factors		No Stress		Stress		P value	OR	CI 95 %	
		n	%	n	%			Min	Max
Sex	Male	2	15.4	11	84.6	0.032	0.189	0.038	0.935
	Female	26	49.1	27	50,9				
Long Covid	Yes	2	16.7	10	83,3	0.058	0.215	0.043	1.077
	No	26	48.1	28	51.9				

cal Program for Social Science (SPSS) 24, for Windows, using a chi-square test design and an odd ratio.

Results

The demographic characteristics of the respondents can be seen in Table 1. Most of the respondents were aged from 18 to 40 years (78 %), people in this age range were classified as young adults. There were more female respondents (80.3 %) than male respondents. Based on the education level, the group infected by COVID-19 were mostly undergraduates (75.8 %) which mostly suffered in wave II (45.5 %).

Risk factors that are known to have an influence on the stress level of COVID-19 survivors are mental disorders (7.6 %), economic problems (39.4 %), substance use (7.6 %), loneliness (51.5 %), conflict in relationships (56.1 %), and loss of important people (21.2 %). Whereas protective factors of COVID-19 survivors are good spirituality (75.8 %), healthy diet (83.3 %), good physical activity (65.2 %), good sleep pattern (51.5 %), and good personal relationships (65.2 %). Survivors of COVID-19 also experienced mental disorders in the form of anxiety (53 %), depression (56.1 %) and stress (57.6 %).

Based on Table 2, it is known that sex is related to the level of stress, where p is < 0.05 or p = 0.032. The

Table 3. The Relationship between Education Level, Covid Wave and Age with the Stress Level of COVID-19 Survivors

Sociodemographic Factors		No Stress		Stress		P value
		n	%	n	%	
Level of Education	SMA	4	14.3	2	5.3	0.356
	Undergraduate	19	67.9	31	81.6	
	Postgradute	5	17,9	5	13.2	
Covid Wave	Wave I	5	17.9	12	18.2	0.740
	Wave II	11	39.3	30	45.5	
	Wave III	3	10.7	8	12.1	
	Wave I and Wave II	2	7.1	2	3.0	
	Wave I and Wave III	3	10.7	6	9.1	
	Wave II and Wave III	3	10.7	6	9.1	
	Wave I, Wave II and Wave III	1	3.6	2	3.0	
Age (Year)	18 - 40	23	82.1	29	76.3	0.533
	41 - 60	5	17.9	8	21.1	
	> 60	0	0	1	26.1	

In this table above, the word "and" means that the survivors are diagnosed with COVID-19 on that particular wave, for example: Wave I and Wave II means that the Survivors got infected with COVID-19 during Wave I and also Wave II.

Table 4. The Relationship of Risk Factors with the Stress Level of COVID-19 Survivors

Risk Factor		No Stress n	No Stress %	Stress n	Stress %	P value	OR	CI 95 % Min	CI 95 % Max
Previous Mental Disorders	No	24	39.3	37	60.7	0.154	0.162	0.017	1.540
	Yes	4	80	1	20				
Economic problems	No	14	35	26	65	0.202	0.462	0.168	1.265
	Yes	14	53.8	12	46.2				
Substance use	No	24	39.3	37	60.7	0.154	0.162	0.017	1.540
	Yes	4	80	1	20				
Loneliness	No	11	34.4	21	65.6	0.223	0.524	0.194	1.413
	Yes	17	50	17	50				
Conflict in Relationships	No	11	37.9	18	62.1	0.618	0.719	0.267	1.933
	Yes	17	45.9	20	54.1				
Loss of important people	No	19	36.5	33	63.5	0.075	0.320	0.093	1.095
	Yes	9	64.3	5	35.7				

results of the analysis above show the OR value = 0.189, where the OR value < 1 or it means that the male sex is a protective factor for the stress level. Long Covid does not have a significant relationship with stress level, where the value of p is > 0.05 or p= 0.058; OR = 0.215; 95 % CI = 0.043 – 1.077.

Based on Table 3, it is known that the p value is > 0.05 for education level p = 0.356, p = 0.740 for Covid wave and p = 0.533 for age. Therefore, it can be concluded that the level of education, Covid wave, and age are not related to the stress level of the COVID-19 sur-

vivors. The results of the above analysis do not show the OR value because the chi-square table is not a 2 x 2 table.

Table 4 presents an analysis of risk factors for the stress level of COVID-19 survivors. The analysis value showed p > 0.05 for mental disorders (p = 0.154; OR = 0.162; 95 % CI = 0.017 - 1.54), economic problems (p = 0.202; OR 0.462; 95 % CI = 0.168 - 1.265), substance use (p = 0.154, OR = 0.162; 95 % CI = 0.017 - 1.54), loneliness (p = 0.223; OR = 0.524; 95 % CI = 0.194 - 1.413), conflict in relationships (p = 0.618; OR = 0.719; 95% CI = 0.267 - 1.933) and the loss of important people (p = 0.075; OR = 0.320,

Table 5. Relationship of Protective Factors with Stress Level in COVID-19 Survivors

Protective Factors		No Stress n	No Stress %	Stress n	Stress %	P value	OR	CI 95 % Min	CI 95 % Max
Spirituality	No	8	50	8	50	0.566	1.500	0.484	4.651
	Yes	20	40	30	60				
Healthy Diet	No	6	54.5	5	45.5	0.507	1.800	0.489	6.629
	Yes	22	40	33	60				
Physical Activity	No	11	47.8	12	52.2	0.604	1.402	0.505	3.893
	Yes	17	39.5	26	60.5				
Good Sleep Pattern	No	11	34.4	21	65.6	0.223	0.524	0.194	1.413
	Yes	17	50	17	50				
Good Personal Relationships	No	13	56.5	10	43.5	0.119	2.427	0.861	6.837
	Yes	15	34.9	28	65.1				

95 % CI = 0.093 - 1.095). Therefore, it can be concluded that mental disorders, economic problems, substance use, loneliness, conflict in relationships and the loss of important people are not related to the stress level of COVID-19 survivors.

Table 5 presents an analysis of protective factors on the stress level of COVID-19 survivors. The analysis value shows p > 0.05 where spirituality (p = 0.566; OR = 1.50; 95 % CI = 0.484 - 4.651), healthy eating patterns (p = 0.507; OR 1.80; 95 % CI = 0.489 - 6.629), physical activity (p = 0.604, OR = 1.402; 95 % CI = 0.505 - 3893), good sleep patterns (p = 0.223; OR = 0.524; 95 % CI = 0.194 - 1.413), good personal relationships (p = 0.119; OR = 2.427; 95 % CI = 0.861 - 6.837). Therefore, it can be concluded that spirituality, healthy eating patterns, physical activity, good sleep patterns, and good personal relationships are not related to the stress level of COVID-19 survivors.

Discussion

The results showed that the risk factors for mental disorders, economic problems, substance use, loneliness, conflict in relationships and the loss of important people are not related to the stress levels of COVID-19 survivors. Likewise, the results of research on protective factors for spirituality, healthy diet, physical activity, good sleep patterns, good personal relationships have nothing to do with the stress level of COVID-19 survivors. A meta-analysis that assessed patients' psychological symptoms based on pathophysiology and long Covid risk factors showed that the consistent risk factors for the manifestation of mental disorders were female sex and psychiatric history [26-29]. There are similarities in this study in that regard. The results of this study differ from several studies which state that risk factors such as mental disorders (anxiety, depression, post-traumatic stress), financial problems, hopelessness, alcohol use, substance use, chronic pain, and stigma affect mental disorders due to the impact of COVID-19. The existence of loneliness from several studies will affect mental health that has an impact on substance use and alcohol addiction. Likewise, factors such as life skills, lifestyle practices, positive coping, adaptability, religion, spiritual beliefs, food, healthy diet and sleep patterns as well as physical activity and social support are protective factors against mental disorders due to the impact of CO-VID-19 [23,27,30].

Demographic characteristics and the number of CO-VID-19 cases vary from country to country. This also affects the difference in symptoms in mental disorders globally. The progress of resources, culture, spirituality, perspective, adaptation process, coping, economic status

and access to health care also play a role as a risk factor and a protective factor of the occurrence of stress for COVID-19 survivors. Several studies have stated that COVID-19 survivors on the European continent are in the highest rank of experiencing stress and trauma compared to the Asian and American continents, but in a meta-analysis study it was stated that there were 3 countries that are categorized as poor countries that also had high levels of stress and trauma [31]. This may be one of the reasons why this study is different from other studies and so there are many possibilities that cause bias in a study.

A literature study that reviews the mechanisms, risk factors and management of long Covid explained that isolation or social distancing has an effect on mental and cognitive disorders. The longer a person is isolated or practicing social distancing, the worse his mental health will be, because during this period people cannot work and physical activity is limited. As a result of not working, there will be stress, anxiety, economic problems that have an impact on the emergence of behavioural changes such as avoiding or withdrawing which leads to loneliness [32,33]. Sleep disturbances often occur in long Covid cases. Poor sleep quality is common, and there are reports that many prescriptions include medications for sleep disorders. News of the large number of deaths due to COVID-19 also has an impact on sleep quality, stress, anxiety and negative emotions. Sleep problems have also been linked to feelings of loneliness related to COVID-19. Therefore, it is possible that post-covid sleep disturbances are the result of infection and inflammatory processes in the body, the negative effects of a pandemic, or a combination of both [33,34].

Many studies stated that the COVID-19 pandemic is the biggest factor that causes acute stress. This might be the result of a direct effect of viral infection on the brain and central nervous system (CNS) or an indirect effect of the systemic inflammatory process. Coronaviruses infect the CNS via haematogenous or neuronal retrograde neuroinvasive routes that cause neurodegenerative disorders [35,36]. Chronic fatigue, cognitive impairment and stress are manifestations of long Covid. Some studies said that Cognitive Behavioural Therapy can improve these complaints. Psychoeducation, group therapy, physical activity, and exercise can also improve mental disorders in long Covid patients, but there is still controversy that these therapies are not very effective in improving them [33].

It turns out that there are many things that affect the stress of COVID-19 survivors, both external and internal factors. Factors that greatly affect the occurrence of a person's stress are adaptation mechanisms and adaptive coping systems. A collection of several studies proves that active coping strategies and resilience can reduce stress levels. Individuals who have an active coping strategy will be able to solve problems, make plans, seek

help, and have structured thinking so that they are able to bounce back. Negative coping occurs when individual resilience and social support are inadequate, resulting in avoidance behaviour, inhibiting adaptation, feelings of helplessness and being associated with substance use [16].

Social determinants according to Dahlgren and Whitehead which consist of micro, meso and exo levels can affect a person's physical and mental health [37]. The micro level is oneself, the behaviour and lifestyle of the individual. The meso level is of social influences consisting of values, norms and social capital. Structural factors, which are part of the exo level, consist of the environment, access to health care, access to basic needs and employment opportunities, whereas the macro level consists of government policies. Social determinants will prevent stress on COVID-19 survivors. People with mental disorders who receive therapy and have access to good health, will avoid stress. Government policies play a role in overcoming economic problems. Social capital of the community forms social support that can prevent the use substances. A study stated that there was an indirect effect of social capital on stress through self-efficacy, stress tolerance and coping strategies. Good self-efficacy is being able to facilitate self-needs. Social capital is also a form of coping because it gains trust and good restoration from the environment to reduce exposure to stress, feelings of loneliness and avoid conflict [27,38].

The sample recruitment method was open to the COVID-19 survivor community. Potentially, individuals who are female, have higher education and have mobile phones were more willing to participate in this study, the people who could be included in this study were limited to those who have internet access. The higher proportion of women might have distorted the estimates of stress disorder given the prevalence of mental emotional disorders in women. Cross-sectional research could not confirm the causal relationship between the dependent and independent variables. All risk factor variables as well as protective factors might have bias. The strength of this research is that this research was a descriptive study which was an initial effort to identify risk and protective factors that are very important for handling stress in COVID-19 survivors. This research provides direction for future research and makes promotive and preventive models. There has been no specific effort to deal with the problem of mental emotional disorders related to COVID-19 survivors. The need to promote mental health is still high, and it is necessary to create a model that is in accordance with the conditions of the community based on social, cultural and spiritual life.

Based on the results of the study, it can be concluded that various factors can cause stress in COVID-19 survivors. This study shows that risk factors such as previous mental disorders, economic problems, substance use, loneliness, conflict in relationships and the loss of important person are not associated with the stress levels of COVID-19 survivors. Likewise, the results of research on protective factors such as spirituality, healthy diet, physical activity, good sleep patterns, good personal relationships are not related the stress level of COVID-19 survivors.

References

1. BPS. Badan Pusat Statistik Website Covid-19: Update Kasus Corona 01 September 2022 [Internet]. Jakarta (ID): BPS; 2022 [updated 2022; cited 2022 Sept 01]. Available from: https://covid-19.bps.go.id

2. Kemkes. Kementerian Kesehatan Indonesia: Pemantauan Kasus Covid- 19 Indonesia [Internet]. Jakarta (ID): 2022 [updated 2022; cited 2022 Oct 07]. Available from: https://pusatkrisis.kemkes.go.id/covid-19-id/

3. Zhou F, Yu T, Du R, Fan G, Liu Y, Liu Z, et al. Clinical course and risk factors for mortality of adult inpatients with COVID-19 in Wuhan, China: a retrospective cohort study. Lancet. 2020;395:1054-62.

4. Kaligis F, Indraswari MT, Ismail RI. Stress during COVID-19 pandemic: mental health condition in Indonesia. Med J Indones. 2020;29:436-41.

5. Devita M, Di Rosa E, Iannizzi P, Bianconi S, Contin SA, Tiriolo S, et al. Risk and protective factors of psychological distress in patients who recovered from COVID-19: the role of cognitive reserve. Front Psychol. 2022;13:852218.

6. Moradi Y, Mollazadeh F, Karimi P, Hosseingholipour K, Baghaei R. Psychological disturbances of survivors throughout COVID-19 crisis: a qualitative study. BMC Psychiatry. 2020;20:594.

7. Vigo D, Patten S, Pajer K, Krausz M, Taylor S, Rush B, et al. Mental Health of Communities during the COVID-19 Pandemic. Can J Psychiatry. 2020;65:681-7.

8. Bao Y, Sun Y, Meng S, Shi J, Lu L. 2019-nCoV epidemic: address mental health care to empower society. Lancet. 2020;395:e37-8.

9. Chew QH, Wei KC, Vasoo S, Chua HC, Sim K. Narrative synthesis of psychological and coping responses towards emerging infectious disease outbreaks in the general population: practical considerations for the COVID-19 pandemic. Singapore Med J. 2020;61:350-6.

10. Dubey S, Biswas P, Ghosh R, Chatterjee S, Dubey MJ, Chatterjee S, et al. Psychosocial impact of COVID-19. Diabetes Metab Syndr. 2020;14:779-88.

11. Sher L. Are COVID-19 survivors at increased risk for suicide? Acta Neuropsychiatr. 2020;32:270.

12. Son C, Hegde S, Smith A, Wang X, Sasangohar F. Effects of Covid-19 on college students' mental health in the united states: interview survey study. J Med Internet Res. 2020;22:e21279.

13. Liang T. Buku pegangan pencegahan dan penatalaksanaan COVID-19. Hangzhou (CN): Zhejiang University School of Medicine; 2020.

14. Liyanage-Don NA, Cornelius T, Sanchez JE, Trainor A, Moise N, Wainberg M, et al. Psychological distress, persistent physical symptoms, and perceived recovery after covid-19 illness. J Gen Intern Med. 2021;36:2525-7.

15. Taquet M, Sillett R, Zhu L, Mendel J, Camplisson I, Dercon Q, et al. Neurological and psychiatric risk trajectories after SARS-CoV-2 infection: an analysis of 2-year retrospective cohort studies including 1 284 437 patients. Lancet Psychiatry. 2022;9:815-27.

16. Zhang J, Yang Z, Wang X, Li J, Dong L, Wang F, et al. The relationship between resilience, anxiety and depression among patients with mild symptoms of COVID-19 in China: A cross-sectional study. J Clin Nurs. 2020;29:4020-9.

17. Polizzi C, Lynn SJ, Perry A. Stress and coping in the time of Covid-19: pathways to resilience and recovery. Clin Neuropsychiatry. 2020;17:59-62.

18. Mahase E. Covid-19: What do we know about "long covid"? BMJ. 2020;370:m2815.

19. Tomasoni D, Bai F, Castoldi R, Barbanotti D, Falcinella C, Mulè G, et al. Anxiety and depression symptoms after virological clearance of COVID-19: A cross-sectional study in Milan, Italy. J Med Virol. 2021;93:1175-9.

20. WHO. What we know about Long-term effects of COVID-19 [Internet]. Geneva (CH): WHO; 2021 [updated 2022; cited 2022 Sept 01]. Available from: https://www.who.int/publications/m/item/update-36-long-term-effects-of-covid-19

21. Zheng Z, Peng F, Xu B, Zhao J, Liu H, Peng J, et al. Risk factors of critical & mortal COVID-19 cases: a systematic literature review and meta-analysis. J Infect. 2020;81:e16-25.

22. Sahoo S, Mehra A, Dua D, Suri V, Malhotra P, Yaddanapudi LN, et al. Psychological experience of patients admitted with SARS-CoV-2 infection. Asian J Psychiatr. 2020;54:102355.

23. Wasserman D, Iosue M, Wuestefeld A, Carli V. Adaptation of evidence-based suicide prevention strategies during and after the COVID-19 pandemic. World Psychiatry. 2020;19:294-306.

24. Turnip SS, Hauff E. Household roles, poverty and psychological distress in internally displaced persons affected by violent conflicts in Indonesia. Soc Psychiatry Psychiatr Epidemiol. 2007;42:997-1004.

25. Turnip SS, Klungsøyr O, Hauff E. The mental health of populations directly and indirectly exposed to violent conflict in Indonesia. Confl Health. 2010;4:14.

26. Mazza MG, Palladini M, De Lorenzo R, Bravi B, Poletti S, Furlan R, et al. One-year mental health outcomes in a cohort of COVID-19 survivors. J Psychiatr Res. 2021;145:118-24.

27. Sun S, Goldberg SB, Lin D, Qiao S, Operario D. Psychiatric symptoms, risk, and protective factors among university students in quarantine during the COVID-19 pandemic in China. Global Health. 2021;17:15.

28. Tarsitani L, Vassalini P, Koukopoulos A, Borrazzo C, Alessi F, Di Nicolantonio C, et al. Post-traumatic stress disorder among covid-19 survivors at 3-month follow-up after hospital discharge. J Gen Intern Med. 2021;36:1702-7.

29. Thye AYK, Law JWF, Tan LTH, Pusparajah P, Ser HL, Thurairajasingam S, et al. Psychological symptoms in covid-19 patients: insights into pathophysiology and risk factors of Long COVID-19. Biology (Basel). 2022;11:61.

30. Horigian VE, Schmidt RD, Feaster DJ. Loneliness, Mental Health, and Substance Use among US Young Adults during COVID-19. J Psychoactive Drugs. 2021;53:1-9.

31. Yunitri N, Chu H, Kang XL, Jen HJ, Pien LC, Tsai HT, et al. Global prevalence and associated risk factors of posttraumatic stress disorder during COVID-19 pandemic: a meta-analysis. Int J Nurs Stud. 2022;126:104136.

32. Usher K, Bhullar N, Jackson D. Life in the pandemic: Social isolation and mental health. J Clin Nurs. 2020;29:2756-7.

33. Crook H, Raza S, Nowell J, Young M, Edison P. Long covid-mechanisms, risk factors, and management. BMJ. 2021;374:n1648.

34. Grossman ES, Hoffman YSG, Palgi Y, Shrira A. COVID-19 related loneliness and sleep problems in older adults: Worries and resilience as potential moderators. Pers Individ Dif. 2021;168:110371.

35. Troyer EA, Kohn JN, Hong S. Are we facing a crashing wave of neuropsychiatric sequelae of COVID-19? Neuropsychiatric symptoms and potential immunologic mechanisms. Brain Behav Immun. 2020;87:34-9.

36. Yachou Y, El Idrissi A, Belapasov V, Ait Benali S. Neuroinvasion, neurotropic, and neuroinflammatory events of SARS-CoV-2: understanding the neurological manifestations in COVID-19 patients. Neurol Sci. 2020;41:2657-69.

37. Dahlgren G, Whitehead M. The Dahlgren-Whitehead model of health determinants: 30 years on and still chasing rainbows. Public Health. 2021;199:20-4.

38. Hafizah I, Herdaetha A, Kusuma W. Social capital contribution to the emotional distress of the society of Surakarta. IJSTRE. 2022;7:1-8.