

THE EFFECT OF LONG COVID SYNDROME **DEGREE SEVERITY** ON THE QUALITY OF LIFE OF COVID-19 SURVIVORS AGED 15-64 YEARS OLD AT GOTONG ROYONG HOSPITAL, SURABAYA

Aims: To analyze the effect of the severity of long COVID syndrome on the quality of life of COVID-19 survivors at the age of 15-64 years old.

Study design: Cross-sectional observational study

Place and Duration of Study: Gotong Royong Hospital, Surabaya, Indonesia between July to September 2022

Methodology: This study uses a cross-sectional design. The number of the samples used was 67 respondents who had been hospitalized at the Gotong Royong Hospital, Surabaya during the acute infection. **The sampling technique in this study was simple purposive sampling. Samples were taken from medical record files in Gotong Royong Hospital, Surabaya.** The statistical analysis used was Spearman's correlation test with the sampling technique used was purposive sampling. The instruments used were the long COVID syndrome severity questionnaire (validity score between 0,000 and 0,02 and reliability score using coefficient Alpha Cronbach generate value $\alpha = 0,966$) and the WHOQOL Bref questionnaire validity score between 0,390 and 0,798 and reliability score using coefficient Alpha Cronbach generate value $\alpha = 0,941$).

Results: **A significant effect was obtained between the severity of long COVID syndrome and the quality of life on the physical aspect, $p = 0,000$ ($p < 0,005$) with correlation strength -0,918. A significant effect was obtained between the severity of long COVID syndrome and the quality of life on the mental aspect, $p = 0,000$ ($p < 0,005$) with correlation strength -0,947. A significant effect was obtained between the severity of long COVID syndrome and the quality of life on the social aspect, $p = 0,000$ ($p < 0,005$) with correlation strength -0,949.**

Conclusion: There is a significant relationship between the degree of severity of long COVID syndrome and the quality of life of COVID-19 survivors at the age of 15-64 years old in three domains, **that are physical, mental, and social aspects.**

ABSTRACT

Keywords: COVID-19, long COVID syndrome, quality of life, productive age

1. INTRODUCTION

Corona Virus Disease 2019 (COVID-19) is a disease caused by Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2). This disease is thought to begin in Wuhan, China and began to spread throughout the world in December, 2019. In Indonesia, COVID-19 cases have reached more than 5 million cases with a death rate of more than 140 thousand cases[1].

COVID-19 is a disease with a wide range of clinical manifestations ranging from asymptomatic to severe which is characterized by Acute Respiratory Distress Syndrome (ARDS), septic shock, and organ system failure. Most COVID-19 survivors will make a full recovery, but there have been reports of prolonged symptoms and complications. Research on 273.618 survivors of COVID-19 found that within 6 months of being diagnosed with COVID-19, 57% of survivors had at least one persistent clinical symptom[2].

The clinical manifestations of long COVID syndrome are very broad with the most common symptoms are being fatigue, shortness of breath, myalgia, arthralgia, cough, headache, chest pain, anosmia, ageusia, and gastrointestinal symptom such as diarrhea[3]. Although there is no data regarding the comparison of the prevalence of long COVID syndrome in the delta and omicron variants, based on a study of 63.002 COVID-19 survivors in the UK, it was found that the prevalence of hospitalization and duration of symptoms is higher and longer in the delta variant than in the omicron variant[4].

The wide range of clinical manifestations of the long COVID syndrome can have an impact, especially in the productive age group. The study conducted by Poudel et al., found that the survivors of COVID-19 with long COVID syndrome experienced a decrease in quality of life[5]. The problem of quality of life is one of the health problems that we cannot ignore in survivors of productive age who experienced long COVID syndrome. The purpose of this study was to analyze the effect of the severity of long COVID syndrome on the quality of life of COVID-19 survivors aged 15-64 years old as a productive age group at the Gotong Royong Hospital, Surabaya.

2. METHODOLOGY

This study used an analytic observational method with a cross-sectional design with a non-probability sampling technique, namely the purposive sampling method. The study began with collecting medical record data and contacts of COVID-19 survivors with a history of hospitalization during the acute phase from January to September 2021 who fulfilled the inclusion and exclusion criteria. The number of the samples used was 67 respondents who had been hospitalized at the Gotong Royong Hospital, Surabaya during the acute infection. The study was completed with procedures for filling out the long COVID syndrome questionnaire and the WHOQOL Bref questionnaire. The long COVID syndrome severity questionnaire is divided into two parts, personal data with a medical history and the degree of each

symptom. Each long COVID syndrome degree severity is measured by the duration and intensity of the symptoms. The data obtained will be analyzed using the Spearman correlation test on the Statistical Product and Service Solution (SPSS) version 26 application.

3. RESULTS AND DISCUSSION

3.1 RESULTS

Table 1. Percentage of Each Long COVID Syndrome Symptom

Symptom	N (%)
Dyspnea	51 (76,12%)
Fatigue	58 (86,57%)
Palpitation	30 (44,78%)
Difficulty in concentration (brain fog)	55 (82,09%)
Insomnia	57 (85,07%)
Headache	27 (40,30%)
Chest pain	25 (37,31%)
Myalgia	48 (71,64%)
Arthralgia	30 (44,78%)
Sore throat	51 (76,12%)
Abdominal pain	30 (44,78%)
Cough	57 (85,07%)
Fever	28 (47,79%)
Anosmia	59 (88,06%)
Ageusia	36 (53,73%)

In this study, the most common symptoms of long COVID syndrome found in COVID-19 survivors of productive age were anosmia (88,06%), fatigue (86,57%), and cough (85,07%), Other symptoms that are less common are headache (40,30%) and chest pain (37,31%).

Table 2. Distribution of the Research Sample Characteristic

Age (Years)	Frequency (n)	Percentage (%)
15 – 24	9	13,43%
25 – 34	6	8,96%
35 – 44	7	10,45%
45 – 54	18	26,86%

55 – 64	27	40,30%
---------	----	--------

Gender

Male	36	53,73%
Female	31	46,27%

Occupation

Student/college student	6	8,96%
Private employee	45	67,16%
Entrepreneur	7	10,45%
Housewife	9	13,43%

Comorbidity

No comorbidity	37	55,22%
Hypertension	17	25,37%
Diabetes mellitus	7	10,45%
Hypertension and diabetes mellitus	6	8,96%

Based on table 2, it was found that the respondents who experienced long COVID syndrome were dominated by the age group of 55-64 years (40,30%) and the age group of 45-54 years (26,86%). In this study, it was also found that the incidence of long COVID syndrome is higher in men (53,73%) than in women (46,27%).

Table 3. Distribution of the Research Sample Characteristic Based on the Severity of Long COVID Syndrome

The Severity of Long COVID Syndrome	Frequency (n)	Percentage (%)
Mild long COVID syndrome	26	38,81%
Moderate long COVID syndrome	22	32,83%
Severe long COVID syndrome	19	28,36%
Total	67	100%

Based on table 3, it was found that 26 survivors (38,81%) survivors of COVID-19 experienced mild long COVID syndrome, 22 survivors (32,83%) of survivors experienced moderate long COVID syndrome, and 19 (28,36%) experienced severe long COVID syndrome.

Table 4. Characteristic Distribution of COVID-19 Survivors with Long COVID Syndrome Based on Comorbidity

Comorbidity	Degree Severity of Long COVID Syndrome n (%)		
	Mild	Moderate	Severe
No comorbid	22 (32,83%)	9 (13,43%)	6 (8,95%)
Hypertension	3 (4,48%)	7 (10,45%)	7 (10,45%)
Diabetes mellitus	1 (1,49%)	3 (4,48%)	3 (4,48%)
Hypertension and diabetes mellitus	0 (0,00%)	3 (4,48%)	3 (4,48%)
Total	26	22	19

Based on table 4, it was found that survivors who did not have comorbidities mostly experienced mild long COVID syndrome (32,83%), survivors with comorbid hypertension mostly experienced moderate (10,45%) and severe (10,45%) long COVID syndrome, survivors with comorbid diabetes mellitus mostly experienced moderate (4,48%) and severe (4,48%) long COVID syndrome, and survivors with both comorbidities, hypertension, and diabetes mostly experienced moderate (4,48%) and severe (4,48%) long COVID syndrome.

Table 5. Analysis of the Effect of Comorbidity on the Degree Severity of Long COVID Syndrome

Variable	Analysis test	Sig.	Explanation
Comorbidity 1. No comorbid 2. One comorbid (hypertension or diabetes mellitus) 3. Two comorbidities (hypertension and diabetes mellitus)	Spearman test	0,000	Significant

Statistically significant at p-value < 0,05

Based on data analysis using the Spearman test, the results showed that there was a significant effect between survivors without comorbid and with comorbid on the severity of the long COVID syndrome. The significance value obtained through the Spearman test is $p = 0,000$ with a correlation strength of 0,493 which means moderate.

Table 6. Analysis of the Effect of Degree Severity of Long COVID Syndrome on the Quality of Life

Variable	Analysis test	Sig.	Explanation
Degree Severity of Long COVID Syndrome and Physical Aspect	Spearman test	0,000	Significant
Degree Severity of Long COVID Syndrome and Psychology/ Mental Aspect	Spearman test	0,000	Significant
Degree Severity of Long COVID Syndrome and Social Aspect	Spearman test	0,000	Significant

Statistically significant at $p\text{-value} < 0,05$

Based on the Spearman test, it was found that there was a significant effect between the severity of long COVID syndrome and the quality of life for the physical health aspect with a value of $p = 0,000$ and the strength correlation was very strong with a value of -0,918, there was a significant effect between the severity of long COVID syndrome and the quality of life for the psychology/mental aspect with a value of $p = 0,000$ and the strength correlation was very strong with a value of -0,947, and there was a significant effect between the severity of long COVID syndrome and the quality of life for the social aspect with a value of $p = 0,000$ and the strength correlation was very strong with a value of -0,949.

3.2 DISCUSSION

In this study, data was obtained that survivors of COVID-19 with long COVID syndrome were dominated by the group of age 55-64 years old (40,30%) and 45-54 years old (26,86%). Research conducted by Daitch et al., showed that older people have a greater risk of experiencing persistent symptoms of COVID-19[6]. Changes in immune function play a role in the emergence of long COVID syndrome. With

increasing age there is a decrease in energy, **decreased muscle mass**, increased inflammatory compounds, especially IL-6, and decreased differentiation and phagocytic function of macrophage cells and neutrophils. The existence of conditions that are prone to hyperinflammation causes the risk of **prolonged symptoms of COVID-19 infection** to increase[7].

In this study, the comorbidities studied were hypertension and diabetes mellitus. Based on the result of the analysis of the effect of comorbidities on the severity of long COVID syndrome in productive age, the result obtained was $p = 0,000$ ($p < 0,05$) with a moderate correlation strength. These **results** indicate that although there is a significant influence between comorbidities and the severity of long COVID syndrome, comorbidities are not the main risk factor that influences the severity of long COVID syndrome. The result of this study is **in accordance** with the previous studies which show that comorbidities affect the severity of long COVID syndrome[8]. This theory is supported by research conducted by Yong SJ et al., which explains that the degree severity of long COVID syndrome is multifactorial[9].

Based on the analysis of the effect of the severity of long COVID syndrome on the quality of life of COVID-19 survivors in the productive age, the result obtained were $p = 0,000$ ($p < 0,05$) with strong correlation strength in **all three aspects** of quality of life, namely physical, psychological, and social aspects. These **results** indicate that there is a significant effect between the degree of severity of long COVID syndrome and the level of quality of life in physical, psychological, and social aspects of COVID-19 survivors **in the productive** age group. **The result of this study is similar** to Jacobs et al.,'s study which used the Patient Reported Outcome Measurement Information System **instrument** on 183 COVID-19 survivors[10]. **The results in this study are not accordance with the research from Chen et al., Qu et al., and Schandl et al., which shows that there is at least one aspect that is not affected by long COVID syndrome**[11,12,13].

Several factors that may influence the level of quality of life in this study are age, education level, gender, duration of hospitalization during the acute phase, occupation, and comorbidities. This theory is supported by research conducted by Todt et al., which explained that factors related to the level of quality of life in survivors of COVID-19 were female gender, presence of comorbidities, and the duration of hospitalization during **the acute phase**[14].

4. CONCLUSION

Based on the research conducted at the Gotong Royong Hospital in Surabaya, it can be concluded that there is a significant effect between comorbidities and the severity of long COVID syndrome and there is a significant **relationship** between the severity of long COVID syndrome and the level of quality of life of COVID-19 survivors of productive age in the three domains, which are physical, psychological/mental, and social aspects.

Disclaimer

This paper is an extended version of a repository document of the same author.

The repository document is available in this link:

<http://repository.ukwms.ac.id/id/eprint/33824/19/ABSTRAK.pdf>

[As per journal policy, repository article can be published as a journal article, provided it is not published in any other journal]

CONSENT

Informed consent to fill out the long COVID syndrome questionnaire and WHOQOL Bref questionnaire has been given to all respondents.

ETHICAL APPROVAL

This research has been approved by the Ethics Committee of Widya Mandala Catholic University Surabaya. All authors hereby declare that all experiments have been examined and approved by the appropriate ethics committee and have therefore been performed in accordance with the ethical standards laid down in the 1964 Declaration of Helsinki.

REFERENCES

1. WHO. WHO Coronavirus (COVID-19) Dashboard[Cited in 01th Mar 2022]. Available on: <https://covid19.who.int/region/searo/country/id>.
2. Taquet M, Dercon Q, Luciano S, Geddes JR, Husain M, Harrison PJ. Incidence, co-occurrence, and evolution of long-COVID features: A 6-month retrospective cohort study of 273,618 survivors of COVID-19. PLoS Med [Online]. 2021;18(9):1–22[Cited in 03rd Mar 2022]. Available on: <http://dx.doi.org/10.1371/journal.pmed.1003773>.
3. Aiyegbusi OL, Hughes SE, Turner G, Rivera SC, McMullan C, Chandan JS, et al. Symptoms, complications and management of long COVID: a review. J R Soc Med [Online]. 2021;114(9):428–42[Cited in 17th Mar 2022]. Available on: <https://doi.org/10.1177/01410768211032850>.
4. Wrenn JO, Pakala SB, Vestal G, Shilts MH, Brown HM, Bowen SM, et al. COVID-19 severity from Omicron and Delta SARS-CoV-2 variants. Influenza Other Respi Viruses. 2022;(November 2021):1–5[Cited in 04th June 2022].
5. Poudel AN, Zhu S, Cooper N, Roderick P, Alwan N, Tarrant C, et al. (2021) Impact of Covid-19 on health-related quality of life of patients: A structured review. PLoS ONE 16(10): e0259164[Cited in 04th Mar 2022]. Available on: <https://doi.org/10.1371/journal.pone.0259164>.
6. Daitch V, Yelin D, Awwad M, Guaraldi G, Milić J, Mussini C, et al. Characteristics of long COVID among older adults: a cross-sectional study. Int J Infect Dis [Online]. 2022; [Cited in 28th Oct 2022]. Available on: <https://doi.org/10.1016/j.ijid.2022.09.035>.

7. Laura A Bienvenu, Jonathan Noonan XWKP. Sex difference in COVID-19 mortality. *Cardiovasc Adv* [Online]. 2020;1–39[Cited in 28th Oct 2022]. Available on: <https://doi.org/10.1093/cvr/cvaa284>.
8. Sudre CH, Murray B, Varsavsky T, Graham MS, Penfold RS, Bowyer RC, et al. Attributes and predictors of long COVID. *Nat Med* [Online]. 2021;27(April). [Cited on 28th Oct 2022]. Available on: <http://dx.doi.org/10.1038/s41591-021-01292-y>.
9. Yong SJ. Long COVID or post-COVID-19 syndrome: putative pathophysiology, risk factors, and treatments. *Infect Dis (Auckl)* [Online]. 2021;53(10):737–54[Cited in 16th Mar 2022]. Available on: <https://doi.org/10.1080/23744235.2021.1924397>.
10. Jacobs LG, Paleoudis EG, Bari DL Di, Nyirenda T, Friedman T, Gupta A, et al. Persistence of symptoms and quality of life at 35 days after hospitalization for COVID-19 infection. *PLoS One* [Online]. 2020;15(12 December):1–14. Available on: <http://dx.doi.org/10.1371/journal.pone.0243882>.
11. Chen KY, Li T, Gong FH, Zhang JS, Li XK. Predictors of Health-Related Quality of Life and Influencing Factors for COVID-19 Patients, a Follow-Up at One Month. *Front Psychiatry* [Online]. 2020;11(July):1–6[Cited on 31st Oct 2022]. Available on: <https://doi.org/10.3389/fpsy.2020.00668>.
12. Qu G, Zhen Q, Wang W, Fan S, Wu Q, Zhang C, et al. Health-related quality of life of COVID-19 patients after discharge: A multicenter follow-up study. *J Clin Nurs* [Online]. 2021;30(11–12):1742–50[Cited on 31st Oct 2022]. Available on: <https://doi.org/10.1111/jocn.15733>.
13. Schandl A, Hedman A, Lyngå P, Fathi Tachinabad S, Svefors J, Roël M, et al. Long-term consequences in critically ill COVID-19 patients: A prospective cohort study. *Acta Anaesthesiol Scand* [Online]. 2021;65(9):1285–92[Cited on 31st Oct 2022]. Available on: <https://doi.org/10.1111/aas.13939>.
14. Todt BC, Szejf C, Duim E, Linhares AOM, Kogiso D, Varela G, et al. Clinical outcomes and quality of life of COVID-19 survivors: A follow-up of 3 months post hospital discharge. *Respiratory medicine*. 2021; 184:106453. Epub 2021/05/20[Cited on 01st Nov 2022]. Available on: <https://doi.org/10.1016/j.rmed.2021.106453> PMID: 34010740.