Original Article

Correlation Between Health-Related Life Quality and Dyspnea Severity in Aged COVID-19 Survivors in Indonesia

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Abstract

Introduction: *COVID-19 is a disease that can severely reduce life quality, particularly in the aged population. The research aim was to establish the correlation between health-related life quality and dyspnea severity within aged COVID-19 survivors.*
Method: *The cross-sectional study was conducted on older COVID-19 survivors at Persahabatan Hospital, Jakarta. The use of WhatsApp® video call and Zoom® video conference applications for audio and video evaluation in data collection. The European Quality of Life-5Dimensions-5L (EQ-5D-5L) and the European Quality of Life-Visual Analog Scale (EQ-VAS) were used to assess health-related quality of life. Modified Borg and modified Medical Research Council (mMRC) dyspnea scale were used to assess dyspnea severity. The data were analyzed using correlation test.*
Results: *Based on 44 data collected, it was found that seven (15.9%) of the participants experienced mild breathlessness, while three patients (6.8%) had severe level of dyspnea on the modified Borg dyspnea scale assessment. The mMRC dyspnea scale assessment indicated that over nine patients (20.4%) had mMRC value greater than one. The study found a significant correlation ($p<0.01$) between the EQ-5D-5L and the modified Borg Dyspnea Scale, particularly in the areas of anxiety or depression ($r=0.52$), self-care ($r=0.51$), mobility ($r=0.42$), and EQ-VAS ($r=-0.53$). The EQ-5D-5L and the mMRC dyspnea scale showed a significant correlation ($p<0.01$), particularly in relation to usual activities ($r=0.69$), self-care ($r=0.62$), and mobility ($r=0.65$), as well as EQ VAS ($r=-0.58$).*
Conclusion: *Moderate positive correlations existed between life quality issues including self-care, anxiety, depression and dyspnea severity.*

Keywords: *Dyspnea, Life quality, Elderly, COVID-19.*

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Hubungan Kualitas Hidup Terkait Kesehatan dengan Tingkat Keparahan Sesak pada Lansia Penyintas COVID-19 di Indonesia

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Abstrak

Pendahuluan: *COVID-19 merupakan penyakit yang dapat menyebabkan penurunan kualitas hidup terlebih pada lansia. Tujuan penelitian ini untuk mengetahui hubungan antara kualitas hidup dengan derajat sesak napas pada lansia penyintas COVID-19.*
Metode: *Studi potong lintang ini dilakukan di Rumah Sakit Umum Persahabatan, Jakarta pada pasien penyintas COVID-19. Pengumpulan data menggunakan aplikasi WhatsApp® dan Zoom® untuk evaluasi audio dan video.Sesak napas diukur menggunakan skala pengukuran sesak modified Borg dan modified Medical Research Council (mMRC). European Quality of Life – 5 Dimensions – 5 Levels (EQ-5D-5L) dan European Quality of Life-Visual Analog Scale (EQ-VAS) digunakan untuk mengukur kualitas hidup terkait kesehatan. Data dianalis menggunakan uji korelasi.*
Hasil: *Berdasarkan 44 data yang didapat, pengukuran menggunakan skala pengukuran sesak modified Borg menemukan tujuh pasien (15.9%) yang mengalami sesak napas ringan, sedangkan tiga pasien (6.8%) mengalami sesak napas berat. Pengukuran menggunakan skala pengukuran sesak mMRC menemukan terdapat sembilan pasien (20.4%) memiliki nilai mMRC lebih dari 1. Terdapat hubungan yang signifikan ($p<0.01$) antara EQ-5D-5L dengan skala pengukuran sesak modified Borg, terutama pada aspek ansietas atau depresi ($r=0.52$), perawatan diri ($r=0.51$), mobilitas ($r=0.42$), dan EQ-VAS ($r=-0.53$). EQ-5D-5L juga memiliki hubungan yang signifikan ($p<0.01$) dengan mMRC, terlebih pada aspek aktivitas sehari-hari ($r=0.69$), perawatan diri ($r=0.62$), mobilitas ($r=0.65$), and EQ VAS ($r=-0.58$).*
Kesimpulan: *Korelasi positif sedang ditemukan antara kualitas hidup terkait kesehatan dengan derajat sesak napas terlebih pada aspek ansietas, depresi dan perawatan diri.*

Kata kunci: *Sesak napas, Kualitas hidup, Lansia, COVID-19.*

Introduction

The outbreak of COVID-19 began to have significant global effects in late 2019. It brought about health concerns and economic, social, and psychological problems. As of May 2023, the WHO officially declared the COVID-19 pandemic over after three years of battling COVID-19.[1] However, long COVID presents itself as a new challenge after this pandemic's end. Long COVID is associated with persistent symptoms that can last for months after a COVID-19 infection. Fatigue, muscle aches, and dyspnea are the most frequent symptoms of long COVID.[2,3]

The elderly population has a greater likelihood of experiencing severe disease progression, particularly if they have concurrent conditions like diabetes, hypertension, heart disease, or stroke. Furthermore, elderly individuals with comorbidities carry a higher risk of ICU admission and death.[4] According to Wu Z et al., the mortality rate among elderly patients aged 70-79 years with COVID-19 was 8.0%, while those aged over 80 years had a mortality rate of 14.8%.[5] On November 6, 2023, the Indonesia Ministry of Health confirmed 6.813.429 cases of COVID-19, with 161.918 fatalities, equating to a mortality rate of 2.4%.[6]

COVID-19 infection may cause fatigue and dyspnea up to 60 days after discharge.[7] Measurement of dyspnea severity using the modified Borg Dyspnea Scale has been implemented for COVID-19 survivors.[8–10] The modified Medical Research Council (mMRC) dyspnea scale was used as an alternative to the modified Borg dyspnea scale for measuring dyspnea severity in COVID-19 survivors.[11,12] The mMRC evaluates the effect of dyspnea on the patient's mobility. Life quality was assessed using the European Quality of Life-5 Dimensions-5 Levels (EQ-5D-5L) and the European Quality of Life-Visual Analog Scale (EQ-VAS).[13,14]

The potential of long COVID effects on patient health must be considered. Nevertheless, limited research has been conducted regarding the effect of COVID-19 on life quality and dyspnea in the aged population, particularly in Indonesia. Therefore, this study examines the correlation between life quality and dyspnea severity among aged COVID-19 survivors in Indonesia. This study hypothesizes that there is a correlation between life quality and dyspnea severity within aged COVID-19 survivors.

Method

This study is a cross-sectional analysis with participants were the aged COVID-19 survivors and had undergone rehabilitation treatment at Persahabatan Hospital Jakarta between June 2020 to March 2021. Eligibility criteria for this study included being older than 60 years, having a diagnosis of COVID-19 by RT-PCR, a negative RT-PCR at discharge, having been discharged from Persahabatan Hospital at least 14 days after treatment, and having cognitive status assessed by the MoCA-Ina. Participants that unable to understansd and follow instructions were excluded from this research. Participants who are willing to participate in this study will sign an informed consent sheet or give verbal consent which is recorded after receiving an explanation. The sample size was calculated using a correlation equation, resulting in 44 samples.

Data collected by consecutive sampling. The study assessed health-related life quality using the EQ-5D-5L. Two scales were used to assess dyspnea severity, the modified Borg scale and the mMRC scale. The modified Borg scale ranges from zero to 10, with a score of zero indicating the absence of dyspnea and a score of 10 indicating the most severe dyspnea experienced by the patient. The mMRC scores range from zero to four, with zero representing dyspnea during strenuous exercise and four representing dyspnea during everyday activities. The EQ-5D-5L describes life quality using five dimensions and five response levels. The subject performs a self-evaluation of their health status through the EQ-VAS with a range of 0 to 100 as part of the EQ-5D-5L assessment. Scores of 0 represent the worst possible health, while scores of 100 represent the best imaginable health. Additionally, data were collected on study subjects' characteristics, including age, gender, body mass index, cognitive condition assessed by MoCA-Ina, and previous history of disease.

The study was conducted after receiving ethical clearance. It was approved by the Ethics and Health Research Committee of Persahabatan Hospital (Ethical Clearance Number 95/KEPK-RSUPP/9/2020). Research subjects were contacted using WhatsApp® or Zoom® software that provided audio-visual communication. The researcher provided research subjects with an overview of study objectives and potential benefits should they elect to participate. Subjects who consented were asked to complete a research consent form. The researcher subsequently administered interviews to gather data on the subjects' characteristics, as well as their scores on the EQ-5D-5L, EQ-VAS, the modified Borg scale, and the mMRC scale.

SPSS version 20.0 for Windows is used to analyze the collected data. The initial stage of the analysis will involve describing the distribution of research participants' characteristics. Subsequently, we will evaluate the correlation from the outcomes of the EQ-5D-5L, modified Borg scale, and mMRC scale examination. Hypotheses will be tested using significance level (p) and confidence interval (CI) at significance level less than 0.05 and 95% confidence interval.

Result

Data collected at Persahabatan Hospital from February to October 2020 found that 145 elderly COVID-19 survivors were treated and 41 people died while undergoing treatment. Out of 101 individuals contacted, 29 declined, 25 were unreachable, and 3 died post-discharge from Persahabatan Hospital. A total of 44 eligible participants agreed to participate in the study. A flowchat describing the method of reporting crossectional research using Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) shown in Figure 1.[15]

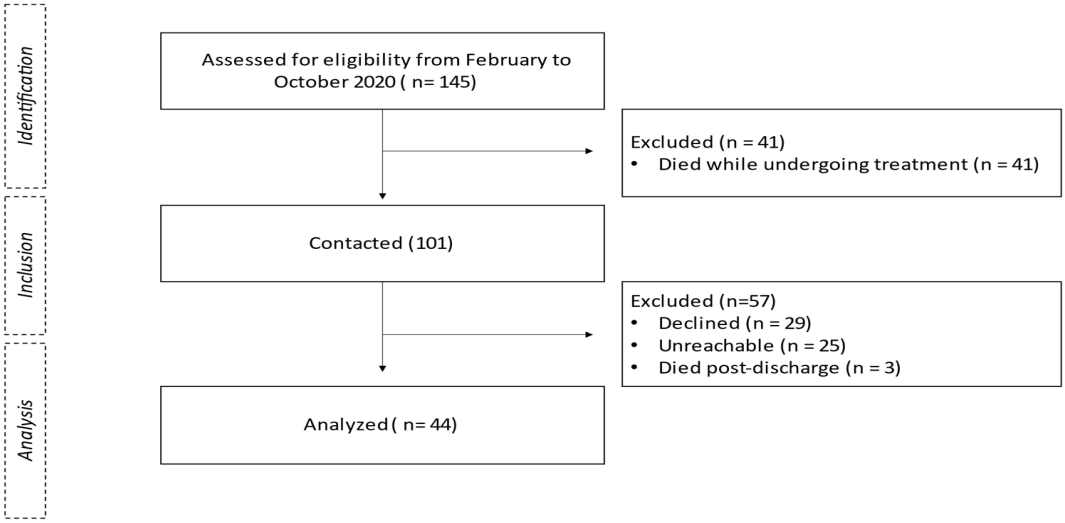

Figure 1. Flow Chart of Participant Enrollment According Principles of STROBE.

Data collected from 44 research subjects with no missing data were analyzed using univariate analysis. The results are presented in Table 1.

Table 2 describe result of health-related life quality. The median scores for the aspects of anxiety or depression, pain or discomfort, usual activities, self-care, and mobility all have a score of one. The EQ-VAS received a median score of 80.

This study found a significant weak positive correlation between life quality and modified Borg scale as measured by three aspects of the EQ-5D-5L instrument: pain or discomfort (r = 0.49), usual activities (r = 0.44), and mobility (r = 0.42). This study found a significant weak positive correlation between life quality and modified Borg scale as measured by three aspects of the EQ-5D-5L instrument: pain or discomfort (r = 0.49), usual activities (r = 0.44), and mobility (r = 0.42). This study found a significant weak positive correlation between life quality and modified Borg scale as measured by three aspects of the EQ-5D-5L instrument: pain or discomfort (r = 0.49), usual activities (r = 0.44), and mobility (r = 0.42). These results demonstrate the correlation between the two measures to be statistically significant.

There is a statistically significant with positive correlation between three EQ-5D-5L aspects, namely mobility (r = 0.42), usual activities (r = 0.44), and pain or discomfort (r = 0.49) with modified Borg scale. The modified Borg scale exhibited a moderate positive correlation with anxiety or depression (r=0.52) and the self-care (r=0.51) aspects of the EQ-5D-5L tool, which was statistically significant ($p<0.01$). Additionally, The EQ-VAS aspect demonstrated a significant moderate negative correlation (r=-0.53) with the modified Borg scale.

This study found a correlation between life quality and the mMRC scale. The pain or discomfort (r = 0.45) aspect of the EQ-5D-5L instrument had a statistically significant with positive correlation with the mMRC scale. The mMRC scale was also found to have a moderate positive correlation with the usual activities (r= 0.69), self-care (r=0.62), and mobility (r=0.65) aspects of the EQ-5D-5L instrument with statistically significant ($p<0.01$). The EQ VAS aspect of the EQ-5D-5L instrument had a significant moderate negative correlation with the mMRC scale (r=-0.58). However, there was no significant correlation (r=0.40; p=0.07) between the anxiety or depression aspect and the mMRC scale.

Discussion

Research subjects who still had dyspnea after COVID-19 hospitalization were 15 patients (34.1%) assessed with Borg dyspnea scale and 25 patients (56.2%) assessed with mMRC dyspnea scale. Daher et al. described dyspnea in severe COVID-19 patients without mechanical ventilation after hospitalization.[16] In this study, there was dyspnea that persisted up to six weeks post-treatment in 33% of patients. Other symptoms that can still be found include cough (33%), and fatigue (45%). The questionnaire used to assess patients' physical activity was from Saint George's Respiratory Hospital in London (SGRQ). The result was decrease in physical activity with a median value of 54 (19-78). The median value obtained from the modified Borg scale examination was 0 (0-

Table 1. Characteristics of the Study Participants

Variable	Median	Frequency (%)
Age (year)	65.5 (60-100)	
Gender		
Male		22 (50)
Female		22 (50)
Comorbidities		
Hypertension		21 (48)
Diabetes		14 (32)
Heart disease		3 (7)
Kidney disease		1 (2)
Stroke		2 (5)
Obesities		5 (11)
Modified Borg Dyspnea Scale	0 (0-4)	
Score 0 (nothing at all)		29 (65.9)
Score 0,5 (very very light)		0 (0)
Score 1 (very light)		5 (11.4)
Score 2 (light)		7 (15.9)
Score 3 (moderate)		0 (0)
Score 4 (somewhat hard)		3 (6.8)
Score ≥ 5		0 (0)
mMRC Dyspnea Scale	1 (0-4)	
Score 0		19 (43.2)
Score 1		16 (36.4)
Score 2		4 (9.1)
Score 3		3 (6.8)
Score 4		2 (4.5)
ICU care		4 (9.1)
Time interval until evaluation (day)	43.5 (14-73)	

Note: median value means median (upper-lower quartile).

2). In this study, it was found that a decrease in physical activity and mobility limitations could be seen from a decrease in the 6-minute walk test score below the predicted value in 79% of patients.[16]

Study by Sonnweber, et al.[17] were found that there was dyspnea that persisted at the 60-day and 100-day evaluations after COVID-19 treatment. At the 100-day post-treatment evaluation, there were still dyspnea in 36.0% of patients. Research subjects who experienced severe dyspnea with mMRC score 3-4 were 4% of research subjects. Another study by Lerum et al.[18] found dyspnea after three months after COVID-19. Dyspnea was present in 54% of subjects with mMRC score >0 and in 19% with scores >1.

The presence of dyspnea in elderly COVID-19 survivors can be caused by pulmonary fibrosis. Pulmonary fibrosis was known to occur in patients with chronic inflammation, genetic susceptibility, idiopathic pulmonary fibrosis, or was a sequela of ARDS. It's involved the development of fibroblasts, collagen deposits, and other extracellular matrices.[19] According to Wu et al,[20] 41.8% of hospitalized COVID-19 patients experienced ARDS. Dyspnea was present in 59.5% of ARDS patients upon hospital admission, and advanced age was identified as a risk factor for ARDS development. Wang, et al.[21] found ARDS in 19.6% of hospitalized COVID-19 and 61.1% ICU admission.

Life quality decreased in research subjects when assessed using the EQ-5D-5L instrument. Specifically, mobility was affected in 22.7% of patients, self-care in 25.0%, usual activities in 25.0%, pain/discomfort in 38.6%, anxiety/depression in 31.8%, and EQ-VAS scores were below 80% in 27.3% of patients.

Daher, et al,[16] found that severe COVID-19 leads to a decrease in life quality. The aspects of depression or anxiety and pain or discomfort present mild difficulty. Moderate difficulty was found in the usual activities' aspect. Median value of 60 (range from 50-70) was obtained in the EQ VAS aspect.[22]

Halpin, et al,[13] found that COVID-19 survivors experience persistent symptoms that decrease their life quality. Dyspnea was reported in 65.9% of patients who undergo treatment in the ICU and 42.6% of patients who only undergo treatment in a regular hospital room. The EQ-5D-5L instrument found a decrease in life quality. There was a decrease in health-related life quality in 68.8% ICU patients and in 45.6% of patients who only underwent treatment in a regular ward patient.[14]

This study found correlation between life quality and modified Borg scale. The Modified Borg scale showed a statistically significant positive correlation with pain or discomfort ($r=0.49$; $p=0.01$), usual or daily activities ($r=0.44$; $p=0.03$), and mobility ($r=0.42$; $p<0.01$) as measured by EQ-5D-5L instrument. The modified Borg scale had statistically significant moderate positive correlation with the anxiety or depression ($r=0.52$; $p<0.01$) and self-care ($r=0.51$; $p<0.01$) from EQ-5D-5L instrument.

Table 2. Result of Health-related Life Quality and Correlation Between Health-related Life Quality with Modified Borg Scale and mMRC Scale

Variable	Median	Score range	Modified Borg		mMRC	
			r	P	r	P
EQ-VAS Score	80	30-100	-0.53	< 0.01	-0.58	< 0.01
Anxiety or depression	1	1-4	0.52	< 0.01	0.40	0.07
Pain or discomfort	1	1-4	0.49	0.01	0.45	0.02
Usual or daily activities	1	1-5	0.44	0.03	0.69	< 0.01
Self-care	1	1-5	0.51	< 0.01	0.62	< 0.01
Mobility	1	1-4	0.42	< 0.01	0.65	< 0.01

The modified Borg dyspnea scale had moderate negative correlation (r=-0.53; p<0.01) with EQ VAS from EQ-5D-5L instrument.

Health-related life quality correlated with mMRC scale. Specifically, it displayed statistically significant, positive correlation with discomfort or pain aspect (r=0.45; p=0.02) from EQ-5D-5L instrument. Additionally, mMRC scale demonstrated statistically significant moderate positive correlation with the usual or daily activities (r=0.69; p<0.01), self-care (r=0.62; p<0.01), and mobility (r=0.65; p<0.01) aspects from EQ-5D-5L instrument. The EQ VAS demonstrated moderately negative correlation (r=-0.58; p<0.01) with the mMRC dyspnea scale. However, there was no statistically significant association between the EQ-5D-5L anxiety/depression aspect and the mMRC scale (r=0.40; p=0.07). Daher et al. found there was mild to moderate impairment in EQ-5D-5L component with the assessment median value was 63 (53-80).[16]

Strength and Limitation

There is no missing data and this study used user-friendly instruments that can be rapidly completed. The health-related life quality assessment tool, EQ-5D-5L, has been a part of the extensive evaluation of geriatric patients. The Borg and mMRC dyspnea scales are widely utilized in clinical and dyspnea research.

The study's findings may have limited generalizability as research participants were exclusively recruited from one tertiary respiratory referral hospital. Additionally, there were no physical or supporting evaluations conducted to assess pulmonary function or other potential causes of shortness of breath reported by patients, which represents a limitation of this study.

Conclusion

A moderate positive relationship exists between the dyspnea severity and aspects like anxiety, depression, and self-care. Additionally, The EQ-VAS score and dyspnea severity have a moderate negative correlation.

The correlation between health-related life quality and dyspnea severity among aged COVID-19 survivors in Indonesia is crucial in understanding the lasting impact of the virus. The degree of dyspnea scale showed a significant positive correlation with health-related life quality, with aspects including pain and discomfort, self-care, usual or daily activities, and mobility. Consequently, a greater dyspnea severity corresponds to worse life quality in said aspects. The degree of dyspnea scale exhibited a significant negative correlation with the EQ VAS score. This means that the higher the severity of dyspnea, the worse the quality of life envisioned by the patient.

Conflicts of Interest

We declare no conflicts of interest in this study.

Sources of funding

None

Acknowledgment

Appreciation to study participants, research team organizers, and examiners in this research.

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