



## Inpatient Geriatric Rehabilitation Modification in the Pandemic Era and the Effect to ADL Improvement

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### ABSTRACT

**Introduction:** The infection prevention and control activities during the COVID-19 outbreak may affect every aspect in medical services, including medical rehabilitation. In geriatric patients, rehabilitation programs are essential to help in overcoming consequences of physical and cognitive impairments, and to prevent functional decline after hospitalization. To protect both patients and healthcare professionals, direct contact through visits/ward round by healthcare professionals will be reduced, and the rehabilitation programs will be emphasized on patient's independence and/or caregiver competence. This study aims to evaluate the impact of service adjustment to functional capacity of the inpatient geriatric population in RSCM, Jakarta. **Method:** This is a cross-sectional study. Data were taken through 45 medical records of geriatric patients who received inpatient care before the pandemic (2016 to February 2020) and during the pandemic (from March 2020). Functional ability was assessed by Barthel Index at hospital admission and discharge. **Result:** From 23 geriatric patients who received inpatient care before the pandemic, the mean difference of Barthel Index was 4.69. After the pandemic, the mean difference of Barthel Index from 22 patients was 2.75. However, this is not statistically significant ( $p = 0.074$ ). The mean length of stay reduced from 20.2 days pre the pandemic, to 17.47 days during the pandemic ( $p = 0.413$ ) **Conclusion** There was no statistically significant difference in Barthel Index and length of stay due to service adjustment in Medical Rehabilitation Department during the COVID-19 era. There may be other factors contributing to patient's recovery other than differences in health care services that are not analyzed in this study. Therefore, a larger study is required to prove this beneficial effect.

**Keywords:** Rehabilitation; geriatric; inpatient; recovery of function; coronavirus; pandemic

### INTRODUCTION

Coronavirus disease 2019 (COVID-19) is a group of symptoms consisting of cough, flu, high fever and sore throat. COVID-19 is caused by a new type of Coronavirus called SARS-CoV-2. In December 2019, the virus began to spread in the city of Wuhan, China. By April 2020, the virus has spread all around the world, with a total of 3,400,000 confirmed cases and a total of 238,000 deaths (Li et al., 2020). The World Health Organization (WHO) declared COVID-19 as pandemic in March 2020. The number of confirmed cases in Indonesia in early May 2020 was 11,587 with a death toll of 864; the numbers are still increasing up to this day according to Gugus Tugas Penanganan COVID Indonesia (2020).

Rehabilitation is a process of assessment, management, and

adjustment with an ongoing evaluation in which individuals and caregivers are given support to obtain physical, cognitive, social and psychological functions as well as participation in society, in order to achieve optimal quality of life according to each individual's potential (Khan & Amatya, 2020). COVID-19 resulted in multiple systemic conditions and has various post-infection symptoms. Long COVID is a term to describe the group of symptoms persisting after acute COVID-19 infection has passed. Most common long COVID symptoms include extreme fatigue, persistent breathlessness, chest pain, GI problems, persistent anosmia, palpitations, and headache (Ahmed et al., 2020).

Geriatric population is very susceptible to COVID-19 disease, with a high incidence of morbidity and mortality. COVID-19 infection in geriatric patients has been known to cause decreased activities of daily living (ADL) and quality of life accompanied by decreased physical and mental functions. Therefore, rehabilitative measure is very important to maintain and/or increase the functional capacity of the geriatric population; hence maximizing their ADL and quality of life (Liu et al., 2020).

The pandemic also affected medical health care system, as health care facilities now implements standard procedural recommendations according to infection prevention and control

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guidelines applied in Indonesia by Ministry of Health (2020). The implementation of the infection prevention and control strategy causes health-care services, including medical rehabilitation sector, to make adjustments, among others, with emphasis on programs that can be carried out by patients with or without the help of caregivers independently.

In the beginning of the pandemic, we need to compensate the limited availability of personal protective equipments (PPE), delayed treatment because long period of waiting PCR result, limited resources due to increased confirmed case among the medical staff, and restriction of staff with comorbidities and late age to not directly do rehabilitation services to patients. So we have to make few adjustments from dominantly direct rehabilitation service to telerehabilitation and shared medical review.

More comprehensive understanding of geriatric patient's functional status in relation to rehabilitative process in pandemic era leads to better adjusted management, in order to obtain maximum quality of life for the patients in the middle of shifting health-care systems, affected by the pandemic. Therefore, this study in elderly patients comparing rehabilitation care before and during the pandemic, using an increase in the functional scale as an outcome is conducted.

## OBJECTIVE

This study aims to evaluate the impact of service adjustment to functional capacity of the inpatient geriatric population in RSCM (Dr. Cipto Mangunkusumo National Central Public Hospital), Jakarta.

## METHODS

This is a descriptive study using cross-sectional design. Forty-five medical record were obtained from elderly patients who were admitted to Ciptomangunkusumo General National Hospital (RSCM) and consulted to medical rehabilitation department during 2016 until February 2020 and from March 2020, after pandemic started. Ciptomangunkusumo General National Hospital is a government owned, tertiary national referral hospital with more than 800 beds available for inpatient ward. One of its center of excellence is integrated geriatric ward where all patients with geriatric syndrome and many underlying disease will be treated by geriatric expert doctors team from various department such as medical rehabilitation, internal medicine, psychiatric, and could be consulted to other department as well according to the patient's diagnosis.

All new patient admitted to the ward will be assessed with comprehensive geriatric assessment (CGA) and will receive rehabilitation program from medical rehab team from day one. All patients in integrated geriatric ward will receive rehabilitation service as most of them already had long term impairment from the day of admission such as immobilization and other functional disabilities. These conditions will affect the course of treatment during hospital stay if left untreated.

We analyzed the impact of service adjustment in our department during the COVID-19 outbreak from patient's functional improvement by comparing patient's Barthel Index score at admission and at discharge and the patient's length of stay (LoS). Patients included in this study are patients with geriatric syndrome admitted at our integrated geriatric ward during the set time frame. The diagnosis of the patients included

in this study may vary, but all patients have geriatric syndrome and comorbidities. This study does not include geriatric patients with COVID-19 disease.

Datas were processed using SPSS for Windows version 22.0. The results were displayed in narrative and tabular form. Descriptive analysis were presented in the form of the distribution of the characteristics of research subjects and research variables such as delta Barthel index pre and post admission and length of stay related to COVID-19. A difference test of two means or proportions were carried out to assess differences between groups.

## RESULTS

We analyzed a total of 45 patient's data, 23 of which were treated before pandemic and 22 of which were treated after pandemic. Patients included in this study are geriatric patients admitted to RSCM integrated geriatric ward with geriatric syndrome and various underlying diagnosis.

Geriatric patients included have approximately same baseline characteristics as shown in Table 1. As shown by the *p*-values, no significant differences of subjects were seen between both groups. The subjects mostly consist of the elderly with a mean age of 68.7 and 68.5 for the pre-pandemic group and the pandemic group, respectively. Additionally, the body mass index for the pandemic group was slightly lower, although there were no statistically significant differences. Other characteristics such as MMSE and mobility score in both groups are similar. The distribution of disease categories, gender, marital status, and caregiver in both groups were equal.

The mean delta of Barthel Index score at admission to discharge during inpatient care before the pandemic was 4.69, while during the pandemic, mean improvement was 2.27. The data distribution was normally distributed, analyzed using Shapiro-Wilk test of normality with *p* = 0.144. However, the mean difference of barthel index before and during pandemic is not statistically significant [*p* = 0.074]. The mean of length of stay during pandemic is also lower than that of before pandemic, but the mean difference is also not statistically significant [*p* = 0.413] (Table 2). Adjustment of medical rehabilitation service in geriatric inpatient ward during pandemic is described in Table 3 below.

Table 1. Baseline Characteristics

Characteristics	Before the Pandemic	During the Pandemic	<i>p</i> value
<b>BMI (mean ± SD)</b>	22.30 ± 3.51	20.47 ± 4.94	0.075 <sup>†</sup>
<b>Gender</b>			
Male	10	10	0.894 <sup>‡</sup>
Female	13	12	
<b>Marital Status</b>			
Married	18	14	0.246 <sup>§</sup>
Single	4	8	
Widowed	1	0	
<b>Morbidity (%)</b>			
Infection	11	5	0.120 <sup>‡</sup>
Organ failure	11	12	0.768 <sup>‡</sup>
Malignancy	2	6	0.135 <sup>‡</sup>
<b>MMSE</b>	26.35 ± 0.71	26.68 ± 0.72	0.125 <sup>†</sup>
<b>Baseline mobility</b>	2.21 ± 0.79	2.27 ± 0.98	0.836 <sup>†</sup>
<b>Caregiver</b>			
Professional	3	3	1.00 <sup>‡</sup>
Family member	20	19	

*p*-value is calculated for differences in means using independent t test.

<sup>†</sup> *p*-value is calculated for differences in proportions using chi-square test.

<sup>‡</sup> *p*-value is calculated for differences in proportions using Fischer exact test.

Table 2. Comparison of Barthel Score Improvement Before and During the Pandemic

	Mean before Pandemic (n=23)	Mean after Pandemic (n=22)	Mean Difference (95% CI)	pValue
<b>Barthel Index</b>	4.69	2.27	2.42 (-0.24 – 5.09)	0.074
<b>Length of stay</b>	20.27	17.47	2.79 (-4.25 – 9.84)	0.413

Table 3. Rehabilitation Service Adjustment During the COVID-19 Pandemic

	Before 2020	After Pandemic (2020)						
		March	April	May	June	July	Aug	Sept
No. of Psychiatrist in charge	3	1	1	1	1	1	1	1
No. of residents visit every week	6	3	3	3	6	6	6	6
Online logbook	No	No	Yes	Yes	Yes	Yes	Yes	Yes
Tele-medicine	No	No	No	Yes	No	No	No	No

## DISCUSSION

The high prevalence of chronic diseases and decreased physiological reserves of the body lead to a high rate of disability in elderly patients. Geriatric rehabilitation holds an important role in optimizing the functional prognosis and quality of life of elderly patients (Stott & Quinn, 2017). The goal of geriatric rehabilitation is to restore and improve the patient's independence, so that they may achieve optimal function and ability to perform daily activities (Paraschiv et al., 2015).

Elderly patients who underwent hospitalization often have decreased functional capacity resulting in disability and dependency (Sanchez-Rodriguez et al., 2015). Functional status is the ability to maintain independence and to carry out daily life activities (Indonesian Minister of Health Regulation, 2014). Several studies reported few predictors of functional status restoration in elderly patients after hospitalization. The predictors for higher functional recoveries include younger age, good nutritional status, independency before admission (patients living alone), fewer chronic disease, and high cognitive status before admission. Several previous studies reported that predictors of functional recovery may vary depending on the disease complexity and population characteristics (Denkinger et al., 2010; Koh et al., 2013). Other studies showed limited generalizability to specific pathologies such as cognitive impairment, depression (Lenze et al., 2007), cerebrovascular disease (Heruti et al., 2002), and hip fracture (Rolland et al., 2004); and specific treatment setting such as in community (Fusco et al., 2007), geriatric day hospital (Hershkovitz et al., 2007), and home rehabilitation (Crotty et al., 2008).

The success of rehabilitation programs are often measured by the increase of instruments' score that assess the patient's

performance in doing daily activities, one of which is the Barthel index (Sanchez-Rodriguez et al., 2015). A previous study in elderly patients defined functional recovery as an increase of Barthel Index score for at least 30%. The study reported 70.3% elderly patients achieved functional recovery after post-acute rehabilitation treatment. Comprehensive knowledge of the patient's functional status leads to a better understanding of the impact of rehabilitation process; hence helping steps towards developing more appropriate and effective interventions (Seematter-Bagnoud et al., 2013).

Coronavirus (COVID-19) has a huge impact on the delivery of medical care services throughout the globe. Health care providers have to adapt services quickly while under pressure to ensure a safe environment for patients and health-care workers (CQC NHS, 2020). During the pandemic, Medical Rehabilitation Department in Cipto Mangunkusumo General Hospital decreased ward visit from 6 days per week to 3 days per week. We also counted arrangement for inpatient visits from 3 medical residents per day to 2 medical residents per day. During this period, we also had only one geriatric psychiatrist in charge instead of the usual two. The reason for these changes was to decrease exposure and limited resources of personal protective equipment (PPE) in the beginning of the pandemic. Even though we had reduction in psychiatrist visit for inpatient ward, daily medical visit and review is still done from internal medicine doctors. We obtained the data from internal medicine colleagues and done indirect review and adjustment to rehabilitation plan according to the patient's condition. Inpatient rehabilitation care services are described in Table 3 above.

Medical services were adjusting enormously because of the pandemic, especially during the early outbreak at the first half of 2020. A study in United States reported that health care practices began deferring elective visits, modifying their practices to safely accommodate in-person visits, and increasing the use of telemedicine, beginning in March 2020. The number of visits to ambulatory care providers had declined by nearly 60 percent in April 2020, the numbers began to rebound by May even though they were still below the prepandemic baseline (Mehrotra et al., 2021).

The shifting medical care system during the pandemic obviously have a huge impact on patients receiving health care service. A survey directed by National Health Service (NHS) in United Kingdom reported feedbacks from 10,336 hospitalized patients during COVID-19 pandemic, from April 1st to May 31st 2020. Even though most patients (83%) felt safe from the risk of catching COVID-19 disease during their hospital stay, certain groups of patients consistently reported poor experiences of care. Similar to their annual adult inpatient survey, younger people (aged below 55) reported more negative experience during hospitalization in the COVID-19 era, while older patients (aged more than 75) reported to have more positive health care experienceS (CQC NHS, 2020). Study on hospice care in Taiwan during the COVID-19 outbreak reported that hospice home care services were maintained, meanwhile the utilization of hospice inpatient care services was dramatically reduced. This suggests that adjustment to hospice care delivery is needed, given that high quality end of life service is an important humanitarian aspect (Chou et al., 2020).

Our study shows that during the pandemic, mean increase of Barthel Index after rehabilitation treatment was reduced.

However, the difference was not statistically significant. This may show that even though direct health care services may be limited due to the pandemic, other alternatives, such as telerehabilitation, self-fill logbook, and phone calls that we implement may help patients undergo more throughout rehabilitation process.

## CONCLUSION

There is no statistically significant difference in the increase of Barthel Index and LoS due to service adjustment in Medical Rehabilitation Department before and during the COVID-19 era. Despite the fact that close contact had to be minimized, rehabilitation programs in RSUPN Cipto Mangunkusumo could still find ways to improve functional ability in geriatric patients. Even so, there may be other factors contributing to patient's recovery other than differences in health care services after the pandemic, that are not analyzed in this study. Therefore, a larger study is required to prove this beneficial effect.

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